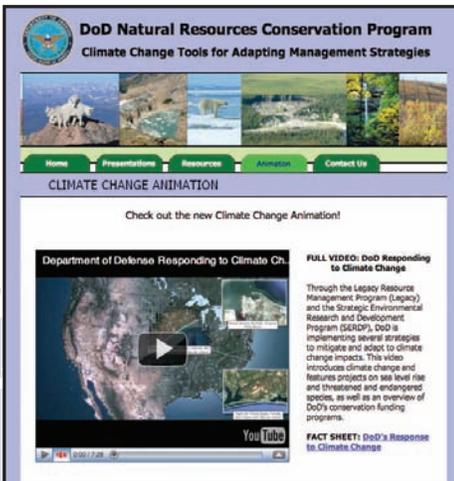


ANIMATION:

Department of Defense Responding to Climate Change

Developed with support from SERDP, ESTCP, and Legacy, this animation summarizes ongoing work throughout the country to provide information, analyses, and tools that DoD resource managers and policy makers need to meet current and future mission and stewardship responsibilities, considering the impacts of climate change. DoD initiatives aim to better understand and respond to the impacts of climate change on the military mission and the landscapes and biological diversity of military lands.

To view the animation, visit www.dodworkshops.org/files/ClimateChange/CC-Animation.html.



SPOTLIGHT

Conference Highlights Climate Change and Partnerships

By L. Peter Boice, Deputy Director, DoD Natural Resources and Director, Legacy Program

Two themes permeated the biannual Sustaining Military Readiness (SMR) Conference held in Nashville, Tennessee, July 25-29—the need to plan and adapt for climate change and the value of partnerships. Almost 1,000 conference attendees heard senior military and civilian leaders discuss these and other topics currently affecting military training and testing, natural and cultural resources management, and sustainable and compatible land, air, sea, and frequency use.

To SMR attendees, climate change is real and already affecting the Department of Defense's (DoD) strategic planning, infrastructure, and resource base. Perhaps RADM David Titley, Oceanographer and Navigator of the Navy, and one of the conference's opening plenary speakers, provided the best response to those who still doubt the reality and immediacy of climate change—"the Navy makes decisions based on facts." And, for the Navy, key facts already upon us include rapid sea level rise and increasing Arctic maritime activity.

What can we who manage DoD's natural resources do? Among the actions suggested by SMR speakers to address climate change impacts are:

- Identify our most sensitive installations and resources.
- Monitor for change.
- Identify and protect core sites and climate refugia.
- Emphasize resilience.
- Maintain maximum flexibility for future uses.
- Reduce exposure to future threats.
- Improve connectivity.
- Work with military trainers and testers to identify their future missionscape needs.
- Landscape Conservation Cooperatives and Climate Science Centers will be increasingly important tools.
- Learn by doing.

Finally, as Dawn Lawson said in her presentation, *Challenges of Climate Change Adaptation for Military Installations*, "Just get started." Doing nothing is as much a choice fraught with uncertainty.

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NATURALLY SPEAKING

From the Desk of L. Peter Boice, DoD Deputy Director, Natural Resources and Director, Legacy Program



Planning in Uncertain Times

Global recession. Continuing wars. Terrorism threats. Climate change. Environmental setbacks. Reduced budgets. Decreased services.

We live in challenging and uncertain times – times that demand we match the resolve and initiative of our parents and grandparents to ensure that we too can one day speak of adversities met and futures assured.

It would be presumptive to suggest that the issues facing DoD's Natural Resources (NR) Program are on the same scale as those that dominate today's international headlines. Nonetheless, we can use the same planning processes to define and prioritize future actions for the NR Program to combat the challenges we face.

This is why we are working to complete a DoD NR Strategy. Through the vision, mission, and priorities outlined in this Strategy, now under review by senior leadership, the DoD NR Program will direct its efforts in ways that anticipate and adapt to changes, thereby helping ameliorate or minimize impacts to mission and environmental stressors.

I expect to describe the Strategy in more detail in the next issue. In the remainder of this column, I'll describe why we've devoted the time and resources to develop this Strategy – to be accountable to our stakeholders; to identify changing program needs; to enhance communications; and to provide a cohesive, comprehensive vision for the near future.

Accountability

The Military Services spend more than \$300 million per year conducting conservation and natural resources activities at military installations across the country. We must always be able to justify how we use these public funds. Are we meeting legal and mission-relevant priorities? Are we meeting training and testing needs? Have we improved the health of the military's essential natural resources? Are we evaluating the effectiveness of these expenditures with easy-to-understand metrics? Are we contributing to broader stewardship goals?

We must expect to address these and similar questions more frequently and, perhaps, in less friendly settings. To effectively respond, we must be able to understand key stakeholder needs. And we must be able to demonstrate the significant cost savings and other efficiencies that accompany leveraged funding and avoidance of future costs.

Changing Program Needs

The draft DoD NR Strategy highlights the scope of changing program needs –

- Significant increases in troop densities at installations across the country are straining existing resource and range capacities.
- Increased urbanization at or near installation boundaries means that DoD lands must continue to be havens for many rare habitats and species.
- Ecosystems also are changing; impacts from climate change and invasive species, expanding commercial land use, and urbanization are resulting in increased species endangerment and irreversible landscape degradation.

DoD NR managers need to maintain maximum flexibility in the face of these and other increasingly rapid changes. Our goal is to assist these managers and others by providing a comprehensive set of new tools, training, and information to help them respond to these and other changing needs.

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NATURALLY SPEAKING *Continued*

Enhanced Communications

Effective communications are key to how we convey the importance and effectiveness of continued investments in natural resources management activities on DoD lands, as well as the potential need for focused additional resources. The draft DoD NR Strategy makes a compelling case for focused communications with all stakeholders –

- Many DoD stakeholders as well as the general public have limited understanding or awareness of the extent and uniqueness of DoD’s natural resources holdings.
- For those partners who are familiar with DoD’s natural resources management activities, there is a general lack of understanding that the NR Program’s central purpose is to support mission activities.
- This communication gap can hinder DoD’s ability to work across geopolitical boundaries or toward broad landscape-level management objectives, as well as impede natural resources activities at the installation level.

We must understand that those with the greatest potential to impact NR budgets and legislation may be among those called upon to support decisions based solely on arbitrary budget reductions or other targets made without a full understanding of the potential effects of such cuts.

A Comprehensive Vision

Perhaps the most important gift that a DoD NR Strategy can offer to its stakeholders is a cohesive roadmap for the future. What do we hope to achieve? How can any one office’s or installation’s efforts support a broader vision? In a perfect world, what would we want to achieve? Can we anticipate the need for new policies and tools before they’re needed?

We have just started to flesh out an Implementation Plan for the DoD NR Strategy. My hope is that, as we do so, and as we invite additional contributions, we will not feel constrained to that which seems merely doable, but strive to identify those potentially game-changing ideas that might at first glance seem out of reach.

I urge you to consider how you might use the DoD NR Strategy – to be accountable to our stakeholders; to identify changing program needs; to enhance communications; and to provide a cohesive, comprehensive vision for the near future. And especially for one overarching reason, attributed to perhaps the 20th Century’s most quoted philosopher –

“If you don’t know where you are going, you might wind up someplace else.” – Yogi Berra

SPOTLIGHT *Continued*

Partnerships will continue to play a significant role in managing DoD’s natural resources. Alison Dalsimer, chair of the breakout session, *Partnering to Achieve Common Goals*, succinctly described how DoD’s natural resources managers partner to:

- Improve understanding of DoD mission and stewardship needs.
- Place DoD lands into larger regional context.
- Enhance resource sharing and cost efficiencies.
- Ease integrated natural resources management plan (INRMP) approval and implementation.
- Increase management flexibility.
- Demonstrate DoD’s community engagement.

Factors to consider in continuing existing partnerships and establishing new ones include:

- Limited resources and increasing competition are the “new normal.” Managers need to adjust their priorities and their strategies to more effectively compete.
- Planning must consider larger landscapes and a broader suite of potential partners.

- Regional partners can help improve habitat connectivity and provide the space needed to accommodate range shifts.
- Climate change impacts are increasing the urgency—and value—of partnering.
- Invasive species are a prime example of natural resources management needs that are best managed in a coordinated way. Regional invasive species management can leverage funding, reduce maintenance costs, provide more effective long-term treatment, and enhance public awareness.
- Effective partnering can better address military readiness concerns by mitigating pressures from surrounding lands and new land uses.

One of the real values of the SMR Conference was being able to engage different stakeholders with an interest in DoD resource management uses in joint dialogue on such overarching issues as climate change and partnerships. Articles throughout this issue of *Natural Selections* address additional topics of discussion, sessions, and workshops from the recent conference.

For more information, refer to the conference presentations now available under the Agenda tab at www.smrconference.com.

Advancing the Readiness and Environmental Protection Initiative

By Nancy Natoli, DoD REPI Coordinator

DoD's Readiness and Environmental Protection Initiative (REPI) protects the nation's military readiness, enhances relationships with communities, and preserves the environment. REPI funds cost-sharing partnerships for the military with state and local governments and private conservation organizations, as authorized by Congress in 2002 under Section 2684a of Title 10, U.S.C. The partnerships obtain easements or other interests in land from willing sellers that preserve critical buffer areas near military installations. Since its inception, REPI has protected more than 174,000 acres of buffer land in 59 locations in 23 states. With its cost-share requirement, REPI has proven to be a cost-effective tool in protecting mission capabilities that are at risk.

REPI's success and high regard to date are due to its multiple benefits and the win-win nature of the partnerships furthering conservation and national defense. To continue these successful partnerships in a climate of DoD budget efficiency measures and challenging budgets at other federal land protection agencies, REPI managers must continue to be flexible and creative in crafting partnerships and working with willing landowners to generate mutual and

multiple benefits. To support a REPI program of enduring and comprehensive cross-boundary partnerships that continually assess and address threats to places and resources needed for military training and testing, OSD is working to establish new partnerships with other Federal agencies and across regional boundaries, continue to double REPI dollars with partner dollars, and encourage innovation and lessons learned across Services and projects.

For example, OSD is partnering with The Trust for Public Land (www.tpl.org) to conduct a strategic conservation analysis of all REPI locations to identify key landscape-level partnerships that maximize leveraging of public and private funds and enhance the efficiency and leveraging ability of partnerships. This effort includes a site-level analysis of ecological vulnerability and existing protected lands, federal land protection program priority designation, and focus areas for private conservation investment.

OSD has also partnered with the Land Trust Alliance (LTA), the national convener of more than 1,700 member land trusts across the country (www.landtrustalliance.org). Rand Wentworth, LTA's president, gave plenary remarks at the 2011 Sustaining Military Readiness Conference, highlighting

the importance of the longstanding relationship LTA has had with DoD to facilitate REPI partnerships and enhance installation-level understanding of land conservation methods and tools. LTA's promotion of standards and practices and other resources to support the land trust community's ability to increase the pace, quality, and permanence of land conservation is important to REPI success. The partnership with LTA provides DoD installations with access to the comprehensive resource library in LTA's Learning Center, a private community of practice to interact with partners, a webinar series to highlight topics of interest to the REPI community, and support for boot camps with in-depth training on innovative conservation finance.

Continued REPI success will require thoughtful planning at the installation level with operators and range managers. In a climate of transformation and resetting, it is critical that REPI planners understand the current and future operational mission footprint and are planning protection measures to ensure continued access to those capabilities. Regular communication and planning across directorates will also help REPI planners find areas for additional leveraging or benefits to include:

- Land exchange authority
- Species or habitat conservation credits
- Wetlands mitigation and banking
- Cultural resource mitigation
- Revenue generation or working lands protection
- Compatible renewable energy planning
- Landscape-level linkages and regional partnerships

Each of these topics has been or is planned to be addressed in a REPI webinar. These webinars encourage innovation and best practices to accelerate the rate of protection so that the greatest flexibility and capabilities can be maintained across DoD for the current and future mission. For more information on REPI, including links to webinars, visit www.repi.mil.



Bats and White-Nose Syndrome: Current Status and Future DoD Impacts

By Jeremy T. H. Coleman, U.S. Fish and Wildlife Service, and Eric R. Britzke, U.S. Army Corps of Engineers



photos by Ryan von Linden



Little brown bat

Department of Defense (DoD) installations house populations of three Federally listed bat species along with many of the more common bat species. At the time of listing for these three species, human disturbance and its associated impacts was identified as one of the primary threats to these species. Initial conservation efforts involved modifying human activities to minimize anthropogenic impacts (e.g., gating caves and abandoned mines to limit disturbance at roost sites and closing caves to human access in winter to reduce impacts during hibernation). These and other measures were proving to be effective in many circumstances, and populations of listed species were showing improvement through the 1990s and early 2000s. The emergence of a novel wildlife disease, white-nose syndrome (WNS), has reversed the progress made by many populations of listed hibernating bats, devastated populations of common bat species in eastern North America, and altered the conservation landscape for hibernating bats as we have come to know it. At the time of this writing, WNS is now considered by many to be the biggest threat to hibernating bat species in North America.

White-nose syndrome was discovered in Schoharie County, New York, in 2007. Since then it has spread to more than 190 sites throughout eastern North America and has been confirmed in 16 states and four Canadian provinces. Increased vigilance in surveying for the disease and improved diagnostic procedures are likely responsible for the detection of the fungus *Geomyces destructans*, the presumptive cause of WNS, at sites in three additional states—Delaware, Missouri, and Oklahoma—where the disease has not yet been confirmed. The detection in western Oklahoma represents an apparent spread of approximately 2,200 km from the index sites in eastern New York, but the actual distribution of *G. destructans* on the landscape is unknown.

To date, six species have been confirmed with WNS and have suffered mortality; however, the impact to affected species has not been consistent and some have demonstrated lower mortality than others. An assessment of wintering populations at 42 hibernacula across five northeastern states revealed a total loss of 88% of individuals across all bat species in sites that have been affected for more than 2 years, with colony losses at some sites exceeding 99%. Two species considered to be common on the pre-WNS landscape,

the little brown bat and northern long-eared bat, have demonstrated declines in excess of 90% across all 42 sites and, together with the eastern small-footed bat, are currently under review for federal listing. Additionally, a recent modeling study of the little brown bat, which once constituted 80% of the Northeastern hibernating bat community, has suggested that the species may be facing regional extirpation within 15-20 years. As WNS continues to spread through North America, there is concern that additional species may likely suffer similar impacts.

White-nose syndrome presents a novel conservation challenge for land and resource managers due to the scale of the issue, the severity of population impacts, and the great many unanswered questions. Managing WNS is, therefore, fraught with uncertainties including the origin and ecology of the fungus, the dynamics of the disease, and the physiology and population dynamics of the species affected. Additionally there is no single model to follow to guide the management of a wildlife disease of this virulence and magnitude, of which so little is known.

To mount a coordinated and comprehensive response to this rapidly spreading pathogen, a national plan has been developed to provide guidance to the federal, state, and tribal agencies, and their partners, engaged in the issue. *A National Plan for Assisting States, Federal Agencies and Tribes in Managing White-Nose Syndrome in Bats* was developed with input from many state, federal, and tribal agencies, including DoD, and finalized in May 2011. The plan establishes an organizational structure for agencies and partner organizations, with oversight up to the Washington level, and formally establishes seven working groups to address the many elements that are integral to the research and management of WNS at the national/continental level. Participation on the working groups is based on expertise and is open to all qualified individuals, regardless of professional affiliation. The national plan will inform and integrate with state and regional WNS response plans; it is not intended to replace planning at the local level. Furthermore, the national plan is a static document that provides the framework for the collective response. A new web site is in development that will house the protocols, plans, and other guidance that constitute the

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Looking Back on the Future of Bird Conservation

By Chris Eberly, DoD Partners in Flight Program Manager



The DoD Partners in Flight (DoD PIF) Program is celebrating 20 years of conserving birds and their habitats on DoD lands. As with any program supporting natural resources within DoD, the primary mission of DoD PIF—and the cornerstone of our strategic plan—is to support the military training, testing, and safety mission. We also identify deficiencies in the knowledge and accessibility of information that can benefit the DoD natural resources community.

At the recent DoD PIF planning workshop, migratory bird monitoring as well as eagles were significant topics of discussion. DoD PIF has been working on a strategy to better coordinate monitoring activities on DoD lands. Monitoring has frequently been done without an eye toward the larger landscape. In addition, monitoring data all too often end up sitting on someone's computer or in a file cabinet, inaccessible for analysis and potentially lost to retirement or computer upgrades. The investment in monitoring is important, and we want to maximize the effectiveness of that investment and ensure all data are properly archived and available for future analyses.

A priority project to help achieve these monitoring goals is identifying those bird species that have the highest potential to impact the military mission if they were to become federally listed. We are working with OSD and the military Services to make this list the most effective tool possible for resource managers. In support of this effort, NatureServe is updating its analysis of Species at Risk on DoD lands. In the past, birds have been under-represented on this list. Many bird species with steep population declines or species being petitioned for listing do not meet the G1/G2 criteria used in NatureServe's analysis. DoD PIF is working with NatureServe to identify a method that will better represent priority bird species at risk on DoD lands.

I also gave a presentation on bird conservation measures at the recent Sustaining Military Readiness Conference. Conservation measures (also known as best management practices) are generally accepted, informally standardized techniques, methods, or



Yellow-headed blackbird

photo by Chris Eberly

processes that have proven themselves over time to accomplish given tasks. Often based on common sense, these practices are commonly used where no specific formal methodology is in place or the existing methodology does not sufficiently address the issue. The idea is that with proper processes, checks, and testing, a desired outcome can be delivered more effectively with fewer problems and unforeseen complications. A conservation measure can evolve to become better as improvements are discovered (i.e., adaptive resource management). Therefore, it is more an adaptive learning process rather than a fixed set of rules or guidelines.

DoD PIF representatives developed a list of existing conservation measures, which can be found on www.dodpif.org. One of the take-home messages in my presentation was to focus on the non-breeding season when conducting activities that may impact birds. Several people approached me after the session to inquire where to find appropriate dates for the breeding season of birds in their area. DoD PIF will work with the PIF Science Committee, the North American Ornithological Atlas Committee, and the National Bird Phenology Network to identify or compile the most appropriate data for installations on breeding season dates.

We invite your feedback about what tools would be helpful to resource managers in managing DoD lands, conserving priority bird species, and protecting the mission.

Bats and White-Nose Syndrome *Continued*

implementation plan, the adaptive and functional component of the national response. Natural resource managers on all public lands are encouraged to become familiar with the guidance provided in the national plan to inform their actions and planning at the local level. For information on the national and state WNS plans, see www.fws.gov/WhiteNoseSyndrome/.

Given the unprecedented threat posed to bats by WNS, bat conservation in North America is now in unfamiliar territory. The broader ecological and socio-economic impacts of this disease are unknown. However, it is likely that the risks to bat population sustainability will result in changes to conservation regulations, as agencies with regulatory authority find new actions warranted

and/or necessary. This has already begun to manifest through the initiation of listing procedures for bat species in several WNS-affected and unaffected states and at the federal level. Should multiple new species become listed, there is the potential for considerable impacts to mission activities because of the additive effect of the varying roosting and foraging requirements of different bat species. To minimize any such impacts, DoD managers should immediately assess their bat resource and continue to monitor all bat populations pre- and post-WNS arrival. It is only through this knowledge that mission impacts can be minimized. To assist DoD personnel in minimizing the impacts of WNS on mission requirements, DoD Natural Resources is in the process of developing a policy document for this emerging disease.

DoD Partners in Amphibian and Reptile Conservation Strategic Plan

By Robert E. Lovich and Chris Petersen, Naval Facilities Engineering Command; Priya Nanjappa, Association of Fish and Wildlife Agencies, Amphibian & Reptile Coordinator, State Liaison to PARC; and Terry Riley, Federal Agencies' Coordinator, PARC



Military installations provide habitat for a broad spectrum of native flora and fauna, including amphibians and reptiles, many of which are rare, some of which are federally listed as threatened or endangered species. In 2009, the DoD Legacy Resource Management Program funded the development of a strategic plan for the newly emerging DoD Partners in Amphibian and Reptile Conservation Program (DoD PARC), a coalition of DoD professionals that support the conservation and management of amphibians and reptiles on DoD lands in support of the military mission. The group includes people within the DoD community that share common goals and leverages partnerships and existing resources. The strategic plan seeks to provide a clear direction for action to improve and coordinate management of herpetofauna on DoD lands.

Strategic planning for conservation and management of natural resources is a key element in the operation of the military. Strategies to protect the environment and benefit DoD are implemented to avoid mission conflicts, while at the same time protecting America's natural heritage. Some of these strategies include encroachment avoidance, regulatory compliance, avoidance of species-level listings and their associated constraints, landscape continuity for wildland training exercises, aesthetic benefits, and public support for land use and operations. Strategic plans also help raise public awareness and outreach; support habitat creation, restoration, and preservation; and promote the protection and conservation of threatened and endangered species. For example, since the DoD Partners in Flight Strategic Plan was first published in 1994, public awareness of bird conservation and management has increased, habitats and bird species have been conserved, and

critically endangered species have been brought back from the brink of extinction, while at the same time maintaining military training opportunities.

Building on this history of strategic planning successes, the overall objective of the DoD PARC Strategic Plan is to better integrate amphibian and reptile conservation and management on the DoD landscape. Development of the strategic plan has involved the major conservation stakeholders: DoD, one of the largest stakeholders in the protection and conservation of threatened and endangered species in the United States, PARC, and other federal agencies, including the U.S. Fish and Wildlife Service, Bureau of Land Management, and U.S. Forest Service. With the comprehensive resources that PARC and these agencies bring to bear, it is anticipated that DoD will be better able to address amphibian and reptile conservation issues while simultaneously supporting military readiness. This strategic plan will provide for enhanced conservation and management of natural resources on military installations throughout the United States and provide a framework for similar activities on installations throughout the world.

To develop the DoD PARC Strategic Plan, two workshops were held in 2010, one on the east coast and another in the western United States. These workshops convened DoD staff and other natural resource experts. Data gathered at the workshops were used to develop an outline for the plan. Writing began in Fall 2010 by a team of more than a dozen professionals representing all the military Services. The first draft was completed in Winter 2011, and the DoD Conservation Committee was provided a copy for review and comment. In May 2011, OSD sent the revised plan to the military Services. Comments were



received in July 2011 and are currently being incorporated. Additional review of the revised plan is anticipated before the final version is completed in 2012.

A DoD PARC Strategic Plan implementation workshop was held at the recent Sustaining Military Readiness Conference. At the workshop, there were discussions of the organizational structure of the program, working groups, and a demonstration of a DoD amphibian database. The workshop leaders gathered vital information regarding the completion of the strategic plan in addition to defining short- and long-term goals of the program. A second implementation workshop will be held in late 2011 or early 2012.

The final DoD PARC Strategic Plan will be made widely available to DoD installations and personnel, with copies distributed both online as downloadable content and as printed material, to enable DoD natural resource staff and land managers to integrate the broad herpetological expertise of the PARC network with specific management actions, activities, and/or capacity-building opportunities at the installation level. A comprehensive view of reptile and amphibian conservation needs on DoD administered lands will be provided. This combination of guidance and expertise will help ensure that military readiness is not adversely impacted as a result of degrading ecosystem health (amphibian and reptile population die-offs, declines, or extirpations).

DoD Regional Partnerships Update

By Jan Larkin, Office of the Deputy Under Secretary of Defense for Installations and Environment, Basing Directorate

In an environment of diminishing resources, it is imperative that states and federal governments find ways to work together on multiple levels. Working across boundaries, both organizational and geographical, is one way to find innovative solutions to resource issues. Multi-state regional partnerships are useful to encourage compatible resource-use decisions and improve coordination among federal agencies, Tribes, states, and the military Services. These partnerships provide a collaborative process to seize opportunities and solve complex problems for mutual and multiple benefits. With a specific mission to sustain the individual and collective missions of partner organizations, they can leverage multiple sources of funding to create landscape solutions. Regional partnering recognizes that single agency actions aimed at single mission objectives are often less likely to achieve desired results given today's budget constraints as well as the complexity and overlap of missions and interests.

DoD pioneered the first regional partnership with four states in the southeastern United States in 2005. Since then, the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) has added two more states, and partners in five southwestern states have established a second regional partnership. The Western Regional Partnership (WRP) was initiated in 2007 and officially chartered in 2010.

Both of these partnerships provide a forum to address issues of mutual concern with states, Tribes, and federal agencies. Senior policy-level federal, state, and tribal leaders coordinate to identify common goals and emerging issues and to develop solutions that manage, sustain, and enhance

natural, economic, and human resources as well as national defense. Leveraging of resources and linking of efforts help to avoid duplication of efforts and encourage sharing of best practices. Supporting partnership infrastructure includes requirements mapping, state-level Commanders' Councils, and projects of mutual benefit and interest.

SERPPAS celebrated its fifth year in 2010 and embarked on a reflective survey of accomplishments and agency priorities. Based on these priorities, the Partnership set forth an ambitious strategic plan for continued action and success. Strategic actions for 2011-2012 are focused around the areas of marine and coastal, climate, forestry, and implementation models. Objectives include initiating and completing regional sustainability projects and developing a GIS Sustainability Decision Support Tool that integrates state, DoD, and other federal data for use in regional planning. The SERPPAS Principals will meet in November to review progress made in implementing the strategic action plan.

The **WRP**, similar to SERPPAS, operates with principals and co-chairs, guided by a staff-level steering committee. The WRP agenda operates within a committee structure and includes committees on disaster preparedness, energy, GIS, land use, wildlife corridors, critical habitat, and threatened and endangered species. The WRP Principals will meet in September to consider the Steering Committee recommendations to focus efforts on issues such as military readiness, natural resources, and energy planning and infrastructure in the West.

More information on these partnerships is available at www.serppas.org and www.wrpinfo.org.



AFPMB Works to Protect Butterflies and Pollinators

By CDR Steven Rankin, Chief, Operations Division, Armed Forces Pest Management Board (AFPMB) and Dr. Pete Egan, Environmental Biologist, Operations Division, AFPMB

The Armed Forces Pest Management Board (AFPMB) was initially established to control insect vectors of military-significant diseases. In time the mission expanded to include insect, vegetation, and vertebrate pest management. DoD is concerned with protecting its facilities and personnel from pests while having as minimal an impact on the environment as is feasible.

The AFPMB Natural Resources Committee addresses pest management in the natural environment, seeking to protect rare and endangered species from the harmful side effects of pesticides and other control measures. Butterflies and native pollinators

have become an increasingly important management area to preserve biodiversity on military installations.

As the AFPMB is the DoD organization with entomologists and insect pest expertise, butterflies and pollinators are a natural area for ongoing collaboration with the DoD Natural Resources Program and the National Military Fish and Wildlife Association (NMFWA). The AFPMB Natural Resources Section is a member of the NMFWA Pollinator Working Group and participates in annual meeting sessions, sharing current information about pollinators.



Monarch butterfly

photo by Robert Keith Snead

AFPMB maintains an image data base on its home page - www.afpmb.org. Readers are encouraged to provide photos of pollinators, butterflies, beetles, and other species. Each image should have a brief description. Send photos to afpmb-webmaster@osd.mil for consideration.

DID YOU KNOW?

Alternative Energy Development Can Have Environmental Impacts

To reduce greenhouse gas emissions and improve efficiencies, various types of alternative energy are being developed and implemented around the world. Such alternatives include renewable energy sources like sunlight, wind, and biomass, as well as hydropower, geothermal power, and biofuels. As the number of alternative energy projects increases, consideration of the following potential environmental impacts becomes increasingly important.

- **Visual Impacts:** Many alternative energy technologies require large infrastructure—wind turbines, solar panels, concrete dams, power stations, and large cooling towers—and are located in coastal areas, scenic river valleys, and open countryside.
- **Habitat Disturbance:** Alternative energy siting can lead to habitat disturbance, whether it's the rerouting of waterways, reallocation of land usage for fuel crops, or displacement of certain plant and animal species.
- **Bird Strikes:** Wind power technologies use numerous large wind turbines that are often built in wind corridors that are also known migratory bird routes.
- **Cultural Resource Impacts:** Beyond ground disturbance from construction, the rerouting of waterways, as well as submersion of land for the construction of hydroelectric dams, can have significant impacts on cultural resources.
- **Air Emissions:** Initial alternative energy development can generate toxic or harmful air emissions, including construction equipment emissions, fugitive dust, as well as hydrogen sulfide and carbon dioxide from geothermal development.
- **Water Use:** Certain alternative energy technologies require large amounts of water to function and maintain them (e.g., mirror washing and cooling towers for solar power).
- **Wastewater Discharges:** Using geothermal energy requires drilling deep holes and inserting pipes for pumping high-temperature fluids from the ground. The rocks that contain these fluids may also contain minerals, which tend to form a scale inside the pipes and production equipment. These rocks may also contain radionuclides that can make their way into the mineral scale, production sludges, and wastewater.
- **Hazardous Materials and Waste:** While nuclear power produces a great deal of energy, it also produces hazardous materials that must be carefully handled.
- **Noise:** Wind turbines and drilling for new geothermal fields produce noise that can be a short- and long-term concern for communities in the surrounding area.
- **Land Use Compatibility:** Alternative energy siting involves decisions about land use. The compatibility of alternative energy development with other land uses such as outdoor recreation or agriculture is an important consideration.

Working with stakeholders to avoid or reduce these types of impacts can facilitate alternative energy development and significant economic, environmental, and energy security benefits.

NEW! NATURAL RESOURCES DOCUMENTS

Reports, Fact Sheets, Spreadsheets, Presentations

Highlighted here are recently uploaded reports and fact sheets on the Legacy Tracker or on the DENIX web site. For Legacy-related products, please visit https://www.dodlegacy.org/Legacy/intro/ProductsList_NU.aspx. All Legacy products and many more are available at www.denix.osd.mil/nr. In addition, bird-related products are also posted on the DoD Partners in Flight web site at www.DoDPIF.org.

Policy and Guidance

[DoD Legacy Resource Management Program Guidelines – Guidance Document](#)

[State Wildlife Action Plans: Shaping National Fish & Wildlife Conservation \(Legacy 07-338\) – Final Report](#)

Individual State Wildlife Action Plans identified conservation challenges, needed actions, and opportunities at the state level. To identify common priorities that can be used to guide national conservation work, information was gathered from a survey of state fish and wildlife agencies, a review of the State Wildlife Action Plans, and discussions with state Wildlife Diversity Program Managers and State Wildlife Action Plan Coordinators. This report outlines the top 10 threats to wildlife that are common across the states and provides recommendations for specific actions to address each of those threats in an effort to realize comprehensive fish and wildlife conservation.

Climate Change

[Tools to Assess and Assist Vulnerability of Rare, Sensitive, Threatened and Endangered Species at Risk from Climate Change \(Legacy 09-433\)](#)

This project developed a scientifically-based decision support tool for assessing vulnerability of individual species to declines (or increases) associated with climate change. Species at Fort Huachuca and the eastern portion of the Barry M. Goldwater Range in Arizona were targeted for assessment as large magnitude climate effects are projected for the southwestern United States. Assessments used basic ecological principles to rank individual species of interest according to predicted climate change responses and associated population declines balanced with responses expected to incur resilience or population increases. Specific areas of vulnerability, research needs, and management implications as related to climate change are identified for each species.

Fort Huachuca - [Fact Sheet](#); [Final Report](#)
Barry M. Goldwater Range - [Fact Sheet](#); [Final Report](#)

[Tool for Terrestrial Vertebrate Species](#) - Species assessments of vulnerability can assist in prioritizing conservation needs and management actions. This flexible tool can be used to assess the relative risk of individual species to population declines or increases associated with projected changes in climate and related phenomena.

[Tool for Plant Species](#) - Despite lack of information on plant species response to climate change, some simple predictions can be made regarding plant traits likely to be associated with lesser or greater vulnerability to declines. This scoring system is based on a few readily identifiable and predictive plant traits to assess vulnerability of individual plant species to climate change.

On August 30, 2010, the Rocky Mountain Research Station (RMRS) conducted a workshop, “Assessing Species Vulnerability to Climate Change: Using the Rocky Mountain Research Station (USFS) Assessment Tool to Assist Management Goals in the Face of Climate Change” at the Tucson Regional Office of the Arizona Game & Fish Department to present the findings of Legacy Project #09-433. Refer to the [Workshop Report](#) for demonstration materials and presentations.

[Climate Change: Adaptive Management Tools and Strategies \(Legacy 10-466\) – Workshop Report](#)

To provide information on the breadth of climate change tools available, as well as guidance on how to use them, the Legacy Program sponsored the Climate Change Tools for Adapting Management Strategies Workshop at the 2010 National Military Fish and Wildlife Association (NMFWA) Annual Meeting. This workshop invited speakers to provide assessments of tools available to DoD natural resources managers so they can better respond to climate change impacts.

Invasive Species

[Commander’s Guide on Invasive Species - Guidance Document](#)

Invasive species can take over training lands, injure soldiers, damage equipment, overwhelm listed and at-risk species, and significantly erode natural resources and training budgets. The Commander’s Guide on Invasive Species highlights key issues, relevant policies, mission impacts, and key actions that commanders and other installation personnel can take.

[Effects of Invasives on the Distribution of Keystone Desert Plants on Military Lands - Agave and Pollinator Inventory, May 2009 \(Legacy 08-411\) – Excel Spreadsheet](#)

This spreadsheet features various data and analysis on pollinator species and agave surveys.

[Legacy Resource Management Program Invasive Species Projects 1991 to 2010 – Fact Sheet](#)

This fact sheet lists the Invasive Species projects that Legacy funded from 1991 to 2010. The list is organized by year and includes the total funding for invasive species projects in a given year.

Pollinators

[Sustainable Landscape Designs Utilizing Native Species to Increase Pollinator Habitats on Military Lands \(Legacy 09-461\) – Fact Sheet; Guidance Document; Poster; Presentation Template](#)

Plant-pollinator relationships are one of the keystone indicators of healthy ecosystems and a sign of long-term plant health. With the loss of or damage to native habitats, there is growing concern that pollination relationships are imperiled with possible significant impacts to crop production and survival of endangered species. This project developed guidance for DoD land managers to develop landscape plantings that provide food, water, and shelter to numerous pollinators. Included are lists of suggested native plants for those plantings. The guidance document also provides introductory information on supporting pollinators through sustainable management techniques. To augment the guidance document, the project developed a poster and presentation template for installation use.

continued on next page

NEW! NATURAL RESOURCES DOCUMENTS *Continued*

San Pedro River

[Linking Science and Policy through an Adaptive Management Approach: The San Pedro River - Long Range Five Year Planning Document 2007-2011 \(Legacy 05-250\) – Strategic Plan](#)

This strategic plan identifies and prioritizes projects, policies, and programs to meet the Upper San Pedro Partnership's mission to address the long-term water needs of the Sierra Vista Sub-watershed by achieving sustainable yield of the regional aquifer by 2011 and beyond to preserve the San Pedro Riparian National Conservation Area and ensure the long-term viability of Fort Huachuca.

[Linking Science and Policy through an Adaptive Management Approach: The San Pedro River \(Legacy 06-250\) – Technical Report](#)

The first ever observation of zero flow in the San Pedro River at the USGS Charleston streamflow-gaging station on July 6, 2005, inspired much public and scientific interest in understanding the causes of this event. This paper provides a summary of the issues and contributing factors associated with this hydrologic event. It was developed by the broad membership of the Upper San Pedro Partnership Technical Committee, including hydrologists, engineers, ecologists, and other scientists who worked together to reach a common understanding of this complex issue.

BASH

[Assessing and Reducing BASH Risk Potential of Migrating and Breeding Osprey in the Mid-Atlantic Chesapeake Bay Region – Poster; Articles \(Legacy 06/07/08-292\)](#)

This poster summarizes the purpose, methods, and initial results of this project, which tracks osprey near Langley AFB, Virginia, with the ultimate goal to reduce Bird Air Strike Hazards (BASH). The poster was presented at the 2007 Sustaining Military Readiness Conference in Orlando, Florida. This compilation of articles is focused on the overall progress and successes of the project.

Outreach Materials

[Department of Defense Natural Resources Success Stories – Fact Sheet](#)

This fact sheet highlights numerous DoD natural resource success stories, including the desert tortoise, osprey, seepage bogs of the Gulf Coastal Plain, golden-cheeked warbler, longleaf pine forests, burrowing owl, West Indian manatee, preventing Bird Air Strike Hazard (BASH) conflicts, San Nicolas Island fox, riparian woodlands in the Desert Southwest, loggerhead sea turtle, red-footed booby, Hawaiian stilt, Timber rattlesnake, and Mexican spotted owl.

[Trash Just Goes Away, Doesn't It \(Legacy 07-292\) – Poster](#)

This poster discusses how plastic trash and other human debris impact wildlife. As an example, it details the fate of an individual osprey whose migration was being tracked as part of a Legacy project.

[Don't Let Your Cat Go AWOL! Indoor Cats Are Safe Cats – Brochure](#)

This brochure describes issues related to free-roaming cats and provides several tips for how military bases and personnel can responsibly maintain their domestic cat populations.

UPCOMING EVENTS

Conferences, Workshops, and Training

Association of Fish and Wildlife Agencies (AFWA) 101st Annual Meeting

September 11-14, Omaha, Nebraska

At AFWA's Annual Meeting, attendees will learn, share, and connect with North America's fish and wildlife leaders. Participants can expect a thought-provoking plenary session and special workshops, committee collaboration and working group meetings, recognition of outstanding peer achievements at an awards banquet, and numerous social and networking opportunities. For more information, visit www.fishwildlife.org/index.php?section=annual-meeting&activator=20.

The Wildlife Society 18th Annual Conference

November 5-10, Waikoloa, Hawaii

At this annual conference, wildlife professionals from across North America will participate in a plenary session and wide variety of technical sessions, symposia, and workshops designed to enhance knowledge and provide a forum professionals can share expertise, explore the latest research, and discuss techniques and solutions for conserving wildlife. Visit www.wildlifesociety.org/ for details.

Partners in Environmental Technology Technical Symposium & Workshop

November 29 – December 1, Washington, D.C.

This conference assembles more than 1,200 environmental researchers and technology developers with the defense user and regulatory communities to showcase cutting edge environmental technologies and ideas, as well as communicate the most difficult challenges of our defense establishment. This year's Symposium & Workshop will offer an opening Plenary Session, 15 technical sessions, four short courses, more than 450 technical poster presentations, and exhibitors from funding and partnering organizations. For more information, visit www.serdp-estcp.org/symposium.

LINKS OF INTEREST

Of particular relevance to this issue.

[DoD Partners in Flight - www.dodpif.org](http://www.dodpif.org). The DoD PIF Program supports and enhances the military mission while it works to develop cooperative projects to ensure a focused and coordinated approach for the conservation of resident and migratory birds and their habitats.

[Partners in Amphibian and Reptile Conservation - www.parcplace.org](http://www.parcplace.org). PARC is a partnership of individuals and entities dedicated to the conservation of amphibians and reptiles and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public/private partnerships.

[USFWS White-Nose Syndrome - www.fws.gov/WhiteNoseSyndrome](http://www.fws.gov/WhiteNoseSyndrome). This site provides numerous resources to assist efforts to respond to white-nose syndrome and its impacts on bat populations. Included are background information; a reporting module; photos, audio, and video; maps; research and monitoring activities; and planning efforts.

[Bat Conservation International - www.batcon.org](http://www.batcon.org). BCI is devoted to conservation, education, and research to protect bats and their ecosystems around the world.

[Armed Forces Pest Management Board - www.afpmb.org](http://www.afpmb.org). The AFPMB recommends policy, provides guidance, and coordinates the exchange of information on pest management throughout DoD. The AFPMB's mission is to ensure that environmentally sound and effective programs are present to prevent pests and disease vectors from adversely affecting DoD operations.

[DoD Pollinator Workshop - www.DoDpollinators.org](http://www.DoDpollinators.org). This web site provides an overview of pollinators and the reasons they are important to DoD. It highlights the 2009 NMFVA workshop on pollinators and has many useful resources, including fact sheets and technical reports, pocket guides to identifying pollinators, and links to other web sites on pollinators.

[DoD Natural Resources Conservation Program - www.DoDNaturalResources.net](http://www.DoDNaturalResources.net). DoD's NR Program provides policy, guidance, and oversight for management of natural resources on all land, air, and water resources owned or operated by DoD.

[DoD Legacy Resource Management Program - https://www.dodlegacy.org](https://www.dodlegacy.org). This DoD program provides funding to natural and cultural resources projects that have regional, national, and/or multi-Service benefits. The Legacy Tracker lets you download fact sheets and reports for completed Legacy-funded projects.

[DoD TER-S Document Repository - http://dodtes.nbii.gov](http://dodtes.nbii.gov). A compilation of DoD Threatened and Endangered Species documents and data made available online through the National Biological Information Infrastructure. Information contained in these documents is considered "gray" literature (i.e., not peer reviewed).

[Biodiversity Handbook - www.dodbiodiversity.org](http://www.dodbiodiversity.org). On this web site you will find a thorough introduction to biodiversity and how it applies to the military mission; the scientific, legal, policy, and natural resources management contexts for biodiversity conservation on DoD lands; and practical advice from DoD natural resources managers through 17 case studies. A Commander's Guide to conserving biodiversity on military lands is also available.

[DoD Invasive Species Outreach Toolkit - www.DoDinvasives.org](http://www.DoDinvasives.org). The Toolkit is an education and outreach tool to help DoD land managers communicate about invasive species. It contains modifiable outreach materials such as posters, brochures, reference cards, and a PowerPoint presentation. A list of resources to help identify information and funding sources is also included.

[Readiness and Environmental Protection Initiative - www.repi.mil](http://www.repi.mil). Under this initiative, DoD partners with conservation organizations and state and local governments to preserve buffer land and habitat around military installations and ranges as a key tool for combating encroachment. By promoting innovative land conservation solutions, REPI supports effective and realistic military training and testing now and into the future.

[Southeast Regional Partnership for Planning and Sustainability - www.serppas.org](http://www.serppas.org). A partnership among state environmental and natural resource officials across the Southeast, DoD, and other federal agencies, SERPPAS works to prevent encroachment around military lands, encourage compatible resource-use decisions, and improve coordination among regions, states, communities, and the military Services.

[Western Regional Partnership - www.wrpinfo.org](http://www.wrpinfo.org). The WRP provides a proactive and collaborative framework for senior policy level Federal, State, and Tribal leadership to identify common goals and emerging issues in the states of Arizona, California, Nevada, New Mexico, and Utah and to develop solutions that protect natural resources, while promoting sustainability, homeland security, and military readiness.

[DOI Climate Science Centers - http://nccwsc.usgs.gov/csc.shtml](http://nccwsc.usgs.gov/csc.shtml). This network of eight climate science centers (CSCs) provides scientific information, tools, and techniques to study impacts of climate change, synthesize and integrate climate change impact data, and develop tools that DOI managers and partners can use when managing land, water, fish and wildlife, and cultural resources. The centers focus on understanding landscape stressors related to climate change and designing adaptation strategies at a regional level.

[DENIX - www.denix.osd.mil/nr/](http://www.denix.osd.mil/nr/). DENIX is an electronic environmental bulletin board that provides access to environmental information, such as Executive Orders, policies, guidance, INRMPs, fact sheets, and reports.

[DISDI Portal - https://rsgis.crrel.usace.army.mil/disdicac](https://rsgis.crrel.usace.army.mil/disdicac) (DoD only, CAC required). The DISDI Portal offers high-level geospatial data on DoD's installations, providing strategic maps of installations and information on how to access more detailed data. IVT data forms the foundation for the DISDI Portal, which is accessible to DoD staff with a common access card.

[Strategic Environmental Research and Development Program and Environmental Security Technology Certification Program - www.serdp-estcp.org](http://www.serdp-estcp.org). SERDP and ESTCP are DoD's environmental research programs, harnessing the latest science and technology to improve environmental performance, reduce costs, and enhance and sustain mission capabilities. They are independent programs managed from a joint office to coordinate the full spectrum of efforts, from basic and applied research to field demonstration and validation.

[Cooperative Ecosystem Studies Unit Network - www.cesu.psu.edu/](http://www.cesu.psu.edu/). This network of 17 cooperative units provides research, technical assistance, and training to federal resource and environmental managers. DoD is a member of 14 units of the CESUs National Network.



DOD NATURAL RESOURCES PROGRAM

Enabling the Mission, Defending the Resources

www.dodnaturalresources.net

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Natural Selections is written and published quarterly by HydroGeoLogic, Inc.
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