



Steppingstones

NEWSLETTER OF THE DEPARTMENT OF DEFENSE
PARTNERS IN FLIGHT PROGRAM



DoD's Strategic Plan for Bird Conservation

Migratory bird populations are declining throughout the Western Hemisphere. Many of these species use military lands for nesting and breeding during the summer months, for feeding and resting during their migrations, and as refugia during their non-breeding months. Because birds do not recognize geopolitical boundaries, the Department of Defense (DoD) seeks to partner with public and private land managers to cooperatively help stem declines in bird populations. Through these partnerships, DoD actively manages its natural resources to support mission needs and flight safety goals, while pursuing a sound conservation ethic that strives to benefit bird species throughout the Americas. Sustainable use of our resources supports the military mission and enhances the natural environment.

The DoD Partners in Flight (PIF) Program provides a coordinated framework for incorporating bird habitat management efforts into installation Integrated Natural Resources Management Plans (INRMPs). Our mission is to ensure that all Military Departments have access to the land, sea, and air resources necessary to ensure realistic testing and training. The DoD PIF Strategic Plan identifies actions that support and enhance the military mission while also maintaining secure bird populations. Goals and priorities are identified for eight key areas (see box). These goals and priorities outline the vision for how the DoD PIF Program will develop and

management approach based on regional or physiographic assessments, long-term planning, and enhanced program efficiencies.

Monitoring Our Success

To measure the Program's success, DoD PIF established a rating system to objectively evaluate performance and achievement in meeting the stated goals of the Strategic Plan. Focus areas assess the overall health of the DoD PIF Program as well as the effectiveness of this Strategic Plan and bird conservation actions on DoD lands. Evaluation results will be reported on an annual basis to DoD leadership and posted on the DoD PIF web site.

DoD PIF Priorities

1. Stewardship
2. Partnerships/Cooperation
3. Communications
4. Habitat and Species Management
5. Bird/ Animal Aircraft Strike Hazard (BASH)
6. Monitoring
7. Research
8. Information and Education

The Challenges Ahead

In the world of conservation, ecosystems and landscapes are changing at an unprecedented rate due to many factors, including human activities and our changing climate. The challenges of bird conservation, too, are continually changing. Bird conservation depends increasingly on cooperation and public-private partnerships. Better ecoregional conservation depends on better management, which requires better science. Cooperation helps all partners integrate individual organizational/agency missions with broader conservation priorities.

Adapting management actions to changing conditions requires knowledge, planning, and flexibility since change is, by nature, constant and unpredictable. Within DoD, this adaptive management approach is implemented through the INRMP, which:

- ✦ uses the best available scientific information;
- ✦ fosters long-term sustainability of ecosystem services;
- ✦ maintains or restores native ecosystem types;
- ✦ supports ecological processes; and
- ✦ manages resources for the long-term.

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implement conservation strategies that balance mission support while minimizing impacts to bird species and habitats. This strategy will enable DoD to better integrate programs for migratory and resident birds into existing natural resources and land management programs. It seeks to encourage new and innovative management techniques, an ecosystem

Military installations provide valuable habitat for birds, and serve as *steppingstones* during migration.

Continued on next page

DoD's Strategic Plan for Bird Conservation (cont.)

Adaptive management also requires us to monitor the effectiveness of predictive tools, develop innovative management tools, and look for non-traditional partnerships and creative methods of communicating information.

For DoD, tools such as buffer programs that strive to stem mission encroachment and conserve species and habitats rely heavily on targeting lands with the highest mission and conservation values. As increasing conservation reliance of species, invasive species, climate change, and other yet-to-be discovered threats continue to challenge our conservation efforts, DoD PIF will increasingly rely on partnerships both within DoD and with non-DoD partners, just as those partners will depend on DoD PIF. In planning for the future, DoD PIF's representatives will look to existing partnerships, such as the Ecoregional Partnerships, Joint Ventures, and other collaborative efforts as a way to leverage resources and manage at a broad scale.

Regional Representatives Program Metrics

To gauge DoD PIF's success in meeting established goals and objectives, the representatives helped develop focus areas and questions designed to quantify the Program's effectiveness and accomplishments. Each focus area will receive a red, yellow, or green rating. Resulting color bands will be used to measure successes and identify where additional resources may be needed.

DoD strives to be a conservation leader and good steward of its resources. DoD's natural resources managers will continue to use informed, strategic approaches to implement cooperative projects and programs that benefit birds and their habitats. Only by working together with a broad network of partners can DoD PIF truly meet its long-term goals of keeping common birds common, avoiding species endangerment, and maintaining the military's testing and training mission.

DoD PIF Representatives Annual Planning Meeting

The DoD PIF Representatives gathered for their 2009 Annual Meeting in San Diego, CA, from May 26-28. Attendees engaged in a wide variety of bird conservation discussions, including conservation-reliant species, Gull-billed Terns, Coordinated Bird Monitoring, the DoD PIF Strategic Plan and metrics, and regional species of concern lists. In addition, Melissa Booker of NAVFAC gave a special presentation on the San Clemente Loggerhead Shrike Program. Field trips focused on bird conservation challenges and solutions at Marine Corps Base Camp Pendleton, Tijuana Slough National Wildlife Refuge/NOLF Imperial Beach, NAB Coronado, and NAS North Island.

The DoD PIF Strategic Plan is expected to be published before the end of the year. It will be available in print form and also on the DoD PIF web site (www.dodpif.org).

- Chris Eberly, DoD PIF
Program Coordinator



Baltimore Oriole
Photo: U.S. Fish & Wildlife Service



Northern Bobwhite
Photo: U.S. Fish & Wildlife Service

Site Profile Contribution

Are you proud of the conservation efforts at your site? Do you want to share your success stories? If so, consider submitting a profile for your site, so we can highlight it in the next issue. This is your opportunity to tell *Steppingstones* readers about all the great bird conservation work you're doing!

If interested, please contact:
Chris Eberly at ceberly@dodpif.org; or
Erica Evans at DoDNRConservation@bah.com

We look forward to hearing about your successes!

Partnership Focus: Sonoran Steppingstones

On January 6, 2009, the Sonoran Desert Military Ranges Conservation Partnership Team (Sonoran Conservation Partnership Team) joined formally with the Sonoran Joint Venture to work collaboratively on binational conservation of migratory birds in southern Arizona and northwestern Mexico. This marks a first for the Department of Defense (DoD) and the military services to join with an international bird conservation joint venture under the Migratory Bird Treaty Act. The Sonoran Conservation Partnership Team supports the Barry M. Goldwater Range (BMGR), Yuma Proving Ground (YPG), Marine Corps Air Station (MCAS) Yuma, Luke Air Force Base (AFB), and Davis-Monthan AFB in southern Arizona. All four Military Services (Army, Navy, Air Force, and Marine Corps) are represented on the team, along with the U.S. Fish and Wildlife Service (USFWS), Arizona Game and Fish Department (AZGFD), Bat Conservation International, and the Sonoran Joint Venture.

This key conservation steppingstone is but one of many that DoD and the Military Services have undertaken in the Sonoran desert to manage over 3.5 million acres of military lands. How did they get to this step, and how will they pursue the way forward on the Sonoran desert landscape? Creating and fulfilling a first step was a cooperative conservation effort by The Nature Conservancy, the military installations, and several other partners from 1998 to 2000. This comprehensive planning effort, funded in part by the DoD Legacy Program, resulted in the report entitled, *An Ecological Analysis of Conservation Priorities in the Sonoran Desert Ecoregion, April 2000*. This critical step became the framework to develop the first-ever Integrated Natural Resources Management Plan (INRMP) for the BMGR, which was finalized in 2007. As the INRMP was developed, another key step included implementing the *DoD Species At Risk (SAR) - AZ/NM Military Ranges* project, thanks to DoD Legacy Program funding, including a temporary team review of SAR resources at BMGR, YPG, and MCAS Yuma. The project pulled together all three military installations, for the first time, in a working leadership team with the USFWS and AZGFD. One project result was the formation and forward movement of the permanent Sonoran Desert Military Ranges Conservation Partnership Team.



Photo contributed by Aaron Alvidrez

The Team's role is to support the military mission, range sustainability, and natural resources stewardship at BMGR, YPG, MCAS Yuma, Luke AFB, and Davis-Monthan AFB; support the BMGR Executive Committee; and work collaboratively on threatened, endangered, and at-risk species (TER-S), migratory birds, bats, native plants/pollinators, invasive species and other natural resource conservation and management issues/topics at a landscape level with the military installations, adjacent partner lands, and Mexico. Many of these species are binational in distribution, including the Sonoran pronghorn, Le Conte's Thrasher, flat-tailed horned lizard, Sonoran desert tortoise, and several other bat and migratory bird species. These are well-documented as part of the Sonoran Desert Ecoregion Initiative. The Team also supports the DoD Readiness and Environmental Protection Initiative (REPI) program for all military lands in the Sonoran desert landscape.



Photo contributed by Aaron Alvidrez

Further key steps included joining with Bat Conservation International in 2008, as they opened their new Southwest office in Tucson with a direct focus on the Sonoran desert landscape, and with the Sonoran Joint Venture in early 2009. These two partners are both binational in scope and a key to the way forward as the team looks toward developing a future landscape level partnership, the Sonoran Conservation Partnership, with multiple partners including the Bureau of Land Management, Forest Service, National Park Service, Department of Homeland Security, Arizona state lands, private landowners, Tohono O'odham Nation, Sonoran Institute, the International Sonoran Desert Alliance (ISDA, 1995), and other interested stakeholders. The Sonoran partnership will be a major steppingstone in the long-term conservation and sustainment of the international Sonoran desert landscape. The value of the steppingstone in joining formally with the Sonoran Joint Venture opens possibilities for additional steppingstones in bird conservation across this landscape in Arizona and Mexico.

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Partnership Focus: Sonoran Steppingstones (cont.)

The Sonoran Joint Venture includes Arizona, southern California, and northwestern Mexico, covering a diverse landscape from desert basins to several major sky island (forested) mountain ranges and over 3,000 miles of coastline areas. This area includes four major binational watersheds shared between the United States and Mexico. The Sonoran Joint Venture is considered a successful role model for international bird conservation and is closely involved with Partners in Flight and the Arizona Bird Monitoring initiative. Bird diversity in the region is among the highest in North America, ranging from 750 species in Mexico to 450 species in Arizona. The Sonoran Joint Venture works in a collaborative conservation network with Mexican non-governmental organizations and government agencies that the Sonoran Conservation Partnership can join with in binational bird conservation efforts that would benefit natural resources management on over three million acres of military lands in southern Arizona.

- Steve Helfert, U.S. Fish & Wildlife Service



U.S. Air Force Photo

Fall Migration: Picatinny Peak Hawkwatch

Somewhere in North America, on a tree in a forest, a Broad-winged Hawk, noticing a diminishing food supply and sensing the shortening daylight, flexes its wings, soars off the branch, and into the sky. The hawk is beginning a millennium-old journey from the northern forests to Central and South America. During their epic migration, Broad-winged Hawks look for and find thermals, rising warm air currents that are generated from the sun heating the earth. Broad-wings, other hawks, falcons, and eagles soar up on these thermals and once reaching the top of the thermal, glide south, losing altitude but gaining distance. Hardly ever flapping their wings, these warm-blooded gliders repeat this process all the way to their destination. On their journey, Broad-wings notice the thermals that other Broad-wings have found and slowly mass together, traveling in larger and larger groups until within a week period in late September, 2-3 million of these hawks pass over Corpus Christi, Texas, and Veracruz, Mexico.

From early September through December, almost all birds of prey, or raptors, vacate their breeding grounds in search of more



Hawkwatchers at Picatinny Arsenal
Photo by Susan Simovich

abundant prey sources to the south. The raptors typically follow natural boundaries, such as coastlines and mountain ridges, where they can use thermals and updrafts. They avoid flying over large bodies of water.

Picatinny Arsenal, in New Jersey, is located in a valley that is defined by two mountain ridges that run northeast to southwest. The Arsenal is a particularly good corridor for migrating raptors because Green Pond Mountain and the Mount Hope Ridge are the most sustained mountain ridges between the Atlantic Ocean and the Kittatinny Ridge, which defines the border between New Jersey and Pennsylvania. At Picatinny, we count raptors that are moving between the East Coast and the Kittatinny Ridge.

John Reed, Hawkwatch Coordinator, and his wife, Susan, volunteer their time to count hawks at Picatinny Peak Hawkwatch

Picatinny Peak Hawkwatch is part of a network of hawk watching sites in the Northeast that monitor and count migrating raptors and report that data to the Hawk Migration Association of North America (HMANA). If the many hawk watching sites consistently report a noticeable decline in the year-to-year counts of a specific raptor species, then there may be a problem. HMANA can alert biologists who will then conduct field work to try to determine what may be causing the decline, and if anything can be done to help. The best known example of cooperative efforts helping stop declines was for the Bald Eagle, Osprey, and Peregrine Falcon populations in the 1960s and 1970s. A more recent example is from the 1980s, when scientists noticed that many Swainson's Hawks were not returning to their breeding grounds in the Western U.S. This triggered an investigation. Scientists were able to determine that the hawks reached their wintering grounds in the Pampas of Argentina, but were then being poisoned by organophosphate insecticides. A coalition of public and private partners worked with the Argentine government to stop the poisonings that were causing dramatic declines in Swainson's Hawks.

Continued on next page

Fall Migration: Picatinny Peak Hawkwatch (cont.)

Picatinny Peak Hawkwatch was “born” in the fall of 1992. After reading about hawk watches in a local paper, visiting numerous watches from 1990 to 1992 to study identification techniques with experts, and noticing many raptors heading in a southerly direction along the Picatinny ridges, I set up a hawkwatch on Picatinny Peak for 27 lunch hours in 1992. Since then, my wife Susan has evolved from my “spotter” to a counter and compiler, and the hours have increased to about 300 each fall. We are in our 15th year as a full-time hawkwatch, defined by HMANA as 250+ hours per season. Our ten year rolling average of birds counted is 8,773. This includes an average of 66 Bald Eagles, 255 Osprey, 1,494 Sharp shinned Hawks, and 5,929 Broad-wings.

“[While hawkwatching, I once saw] 3 Bald Eagles rising on a thermal while a bagpiper played Amazing Grace on the first anniversary of the attacks of 9/11”
- Susan Simovich

Besides the sheer enjoyment of seeing a majestic bird of prey cruising overhead, there are two other reasons we continue manning the hawkwatch. First, the data we gather serves a valuable purpose for the natural world. The last five years or so have shown a steep decline in the number of migrating kestrels, our smallest falcon, at our site and all other east coast hawkwatches. Biologists are currently studying and trying to determine a cause for this decline. Second, the hawkwatch has garnered good publicity on the Arsenal, thereby educating many employees and military personnel and their families about the wonders of the natural world, and the value of the wild areas on post.

We are volunteers for the Natural Resource Department. The Natural Resource Manager, Jonathan van de Venter, has been an ardent supporter of our effort, encouraging a spirit of volunteering by Picatinny Arsenal employees. In addition to the hawkwatch, some employees have volunteered for other natural resource efforts, such as the New Jersey Audubon breeding bird survey, monitoring bluebird nesting boxes, and maintaining a biweekly listing of birds of the Arsenal. The hawkwatch has inspired people to get involved to appreciate, enjoy, and contribute to the vast diversity of wildlife and natural areas that Picatinny nurtures and protects outside of our workday cubicles and duty posts.



Broad-winged Hawk
Photo by Susan Simovich

So the next time you are outside in the fall, take a look up and see what's flying overhead. Maybe you will see a majestic adult Bald Eagle soaring overhead; maybe you will get hooked like we did and start a hawkwatch of your very own.

- John Reed,
Picatinny Peak Hawkwatch

Technical Symposium & Workshop

The Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP) will hold the *Annual Partners in Environmental Technology Technical Symposium & Workshop* December 1-3, 2009, at the Marriott Wardman Park Hotel in Washington, DC.

This year's Symposium is focused on meeting DoD's environmental challenges and will offer a dynamic opening plenary session, 11 technical sessions, five short courses, and dozens of exhibit hall posters. Technical sessions will highlight research and innovative technologies that assist DoD in addressing increasingly complex environmental mission sustainability challenges. Three featured natural resource technical sessions will also be included.

For additional information, please visit:
www.serdp-estcp.org/symposium

Migratory Bird Course Offering

The National Conservation Training Center in Shepherdstown, WV, will host the next course on *Migratory Bird Conservation: A Trust Responsibility* on February 22-26, 2010.

This course is designed to give participants a working knowledge of the legal and conservation implications of the Migratory Bird Treaty Act for migratory bird conservation. Partnerships, resources and initiatives that address migratory bird conservation are explored in detail, providing participants with an excellent overview of how they can further implement migratory bird conservation. The course is open to DoD biologists, natural resource professionals, and law enforcement personnel responsible for implementing and administering federal agency actions that have potential for impacting migratory birds.

Registration will open by January 1, 2010: go to <http://training.fws.gov/> and type the course code, ECS2102, in the search box to register.

Policy Perch: The Strategic Importance of Species at Risk to DoD

Variations on a recurring theme:

"We can't fund species at risk."

Say those who are struggling to make tough funding decisions.

"Why can't we fund species at risk?"

Say those who are focused on managing vital on-the-ground natural resources.

I doubt a week goes by when I'm not faced with one or both sides of this fundamental funding dilemma. My unwavering response to all parties is that we must invest in the long-term sustainability and survivability of our irreplaceable biological resources. We especially cannot neglect those species on military lands that are most in need of our continued protection, including species at risk (SAR), and such closely related "cousins" as "species of conservation concern" and "candidates for listing."

However, as stewards of the military's natural resources, we need to provide our leaders with compelling reasons why it's important for DoD to protect SAR when there are so many competing priorities for scarce resources. Hence, as important as it is to speak about the ecosystem services SAR provide to society, ranging from potential medicinal values to wildlife viewing, we need to speak more directly to DoD concerns. Below are a few thoughts to consider when advocating for increased funding for SAR.

More SAR need our protection each year. The need for action is immediate and urgent, as bird species can be particularly vulnerable to a suite of changes. For example, species such as the Rusty Blackbird have been declining at an alarming rate for decades. In addition, diseases such as avian flu are having widespread and unexpected effects on bird species. And the decline of entire ecoregions, such as shortgrass prairie grasslands, is adding even more species to the list of SAR.

Protecting SAR protects the mission. With the increasing unpredictability associated with global climate change, development, and other forces, it becomes increasingly likely that additional SAR will be listed over the coming years. It is in DoD's immediate and long-term interest to invest now in conserving SAR and their habitats to decrease the potential for future listing actions.

It's cost effective. It requires less time and money to prevent species listings than to attempt to recover a species to achieve delisting. For example, on-the-ground measures can be conducted in a more measured manner. In addition, there are greater opportunities for ecoregion-wide planning and the potential for both multi-partner and multi-species collaborations.

It is the right thing to do. DoD lands are home to some 420 federally-listed species and more than 520 additional SAR. In dozens of cases, DoD has either the only remaining populations of a species, or the best remaining examples of a species. DoD has a moral responsibility to provide for long-term stewardship of these special resources.

It is the "DoD way." DoD has taken a leadership role on many critical national and international environmental issues over the years. DoD must continue to embrace opportunities to be a leader in protecting our nation's priceless biological resources.

How can you best use these and other arguments to protect SAR?

- ✦ Plan and program now for FY 2011 and future years.
- ✦ Hone your justifications to make the most compelling case possible in order to compete effectively against other important budgetary needs.
- ✦ Follow through with briefings to your budget personnel and your installation commander.
- ✦ Familiarize yourself with projects the DoD Natural Resources Conservation Program, other parts of DoD, and other federal and state agencies have funded in support of SAR and listed species. These may provide additional information to assist your justifications for funding SAR projects.

We face formidable challenges in the years ahead – and incredible opportunities – to assist in the long-term sustainability and survival of our priceless natural heritage. We all must embrace and act on these opportunities. Our children will expect nothing less.

- L. Peter Boice, Deputy Director, Natural Resources



L. Peter Boice, Deputy Director, Natural Resources, surrounded by Red-footed Boobies

Coordinated Bird Monitoring Plan Update

The DoD Partners in Flight (PIF) Research and Monitoring Working Group is working diligently to forge a path forward for making the right decisions for where, when, and how to monitor birds. In the last newsletter, I provided an overview of the progress of two Legacy-funded projects designed to (a) develop a Coordinated Bird Monitoring (CBM) Plan for DoD, and (b) archive DoD bird monitoring data. The CBM Plan outlines procedures for ensuring that bird monitoring and assessment address important DoD issues; follow accepted procedures for design, data collection, and analysis; and that the data be preserved in long-term archives. I am pleased to report that draft revisions have been made to the Plan, and it is now in internal review by the U.S. Geological Survey (USGS). Once the USGS review is completed it will be submitted to DoD for final review and acceptance.

Recently, I met with Dr. Jon Bart (USGS), Chris Eberly (DoD PIF), and Drs. David Pashley and Ed Laurent (American Bird Conservancy) to develop a conceptual model for completing a CBM Implementation Plan. Our strategy over the next two years will be to work directly with installation personnel to ensure that they do the right amount and kind of monitoring by assisting with the design of new monitoring projects or to help streamline existing projects. Thus far, we have assisted installations such as Fort Benning, GA, Fort Dix, NJ, Fort Riley, KS, and Fort Wainwright (Donnelly Training Area), AK. We are also preparing a tool to estimate what fraction of a Bird Conservation Region (BCR) population, of one or more Species of Concern (SOC), is present on selected DoD installations. This will allow (a) identifying installations that contribute significantly to SOC populations within BCRs, (b) prioritizing installations within

BCRs for monitoring and making recommendations for monitoring those SOC, and (c) assessing DoD responsibilities relative to National Environmental Policy Act (NEPA) requirements. A ten-step process for producing the tool has been agreed to, in consultation with multiple partners within DoD.

Finally, the DoD bird data archiving project is entering the final year of implementation. Avian inventory and monitoring data are important to DoD for compliance with a variety of federal laws and regulations. Thus far, 237 potential data sets have been identified for archiving. Of those, 52 have been obtained and provided to USGS for formatting and archiving into the CBM Database. Dozens of additional data sets are being obtained through direct coordination with natural resources managers through assistance by DoD PIF Regional Representatives. These data, made available in the CBM Database and Avian Knowledge Network, will assist natural resources managers in conducting installation-wide or region-wide analyses necessary for complying with NEPA, Migratory Bird Treaty Act, Endangered Species Act, Executive Order 13186, and Migratory Bird Rule, when assessing potential impacts of military readiness and non-readiness activities on bird communities.

Please contact Dr. Richard Fischer if you can contribute data to this archiving effort (Richard.A.Fischer@usace.army.mil).

- Dr. Richard A. Fischer,
Research Wildlife Biologist,
U.S. Army Engineer Research
and Development Center,
Environmental Laboratory

Eagle Final Rule

The U.S. Fish and Wildlife Service announced a final rule on two new permit regulations that would allow for the take of eagles and eagle nests under the Bald and Golden Eagle Protection Act. The regulations will take effect on November 10, 2009.

The permits will authorize limited, non-purposeful take of Bald Eagles and Golden Eagles in the course of conducting lawful activities. Most permits issued under the new regulations would authorize *disturbance*. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is taken to avoid physical take. Removal of eagle nests would usually be allowed only when it is necessary to protect human safety or the eagles.

For more information, please go to:
www.fws.gov/migratorybirds.

Call for NEPA Examples

Have you used NEPA for your bird-related projects? Or have you had any problems or questions about NEPA and your bird projects? If so, we would like to use your examples to create a step-by-step guidance document about how to properly execute NEPA when dealing with migratory birds.

Please send your examples to Chris Eberly (ceberly@dodpif.org) no later than **December 15, 2009**.

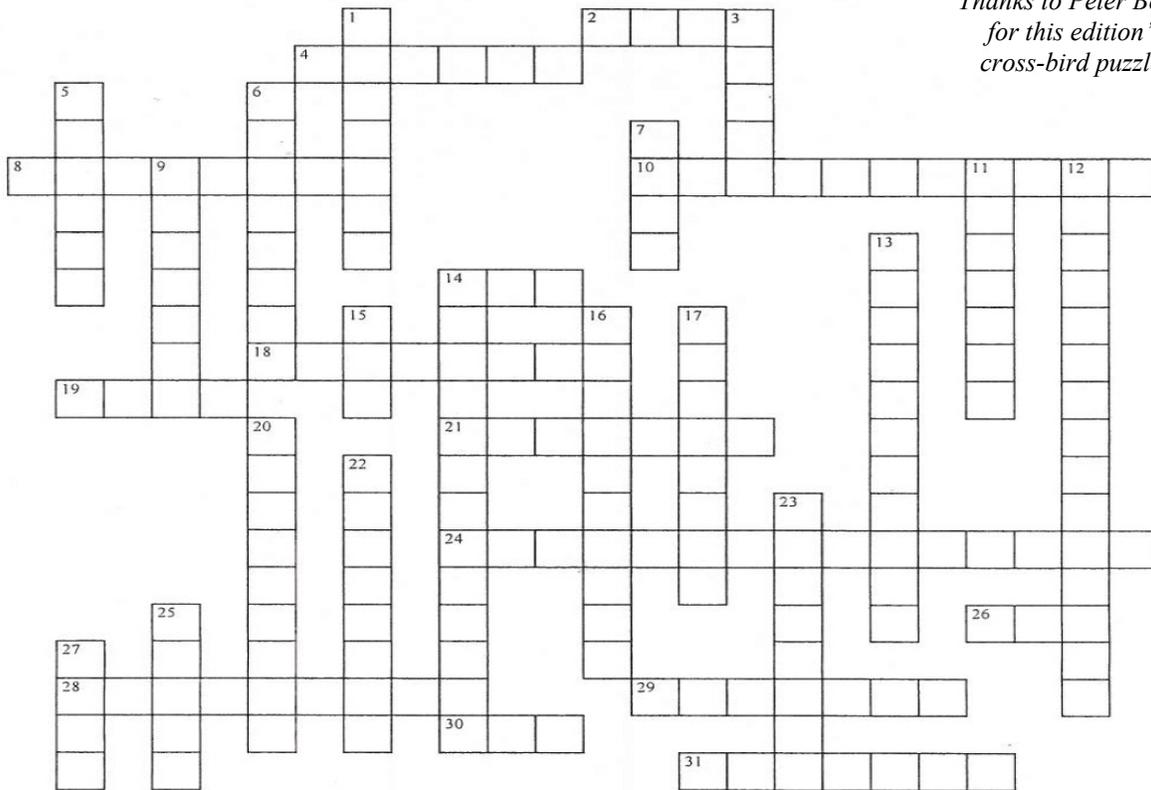


Bald Eagle chicks
Photo: U.S. Fish & Wildlife Service

Cross-Bird Puzzle

Moving Out

*Thanks to Peter Boice
for this edition's
cross-bird puzzle!*



ACROSS

- 2 These seabirds swim until they fledge, then continue migrating by air
- 4 A well-used migration pathway
- 8 Great rarities, sometimes found thousands of miles from their breeding grounds
- 10 The "longest" North American flyway
- 14 Its content often doubles from 3-5% during migration prep
- 18 A place for food and shelter
- 19 Legislation enacted in 1918 to implement the convention between the U.S. and Great Britain (for Canada)
- 21 Southern migrant; north to breed, then south at end of breeding season
- 24 This species was confirmed in March 2007 as the continuous flight champ – 10,200 km in 9 days
- 26 Flight pattern used to conserve energy
- 28 Tiny particles found above birds' nostrils; may help in migration
- 29 A second North American "path"
- 30 One of three "compass" aids used in migration
- 31 One of four North American bird "paths"

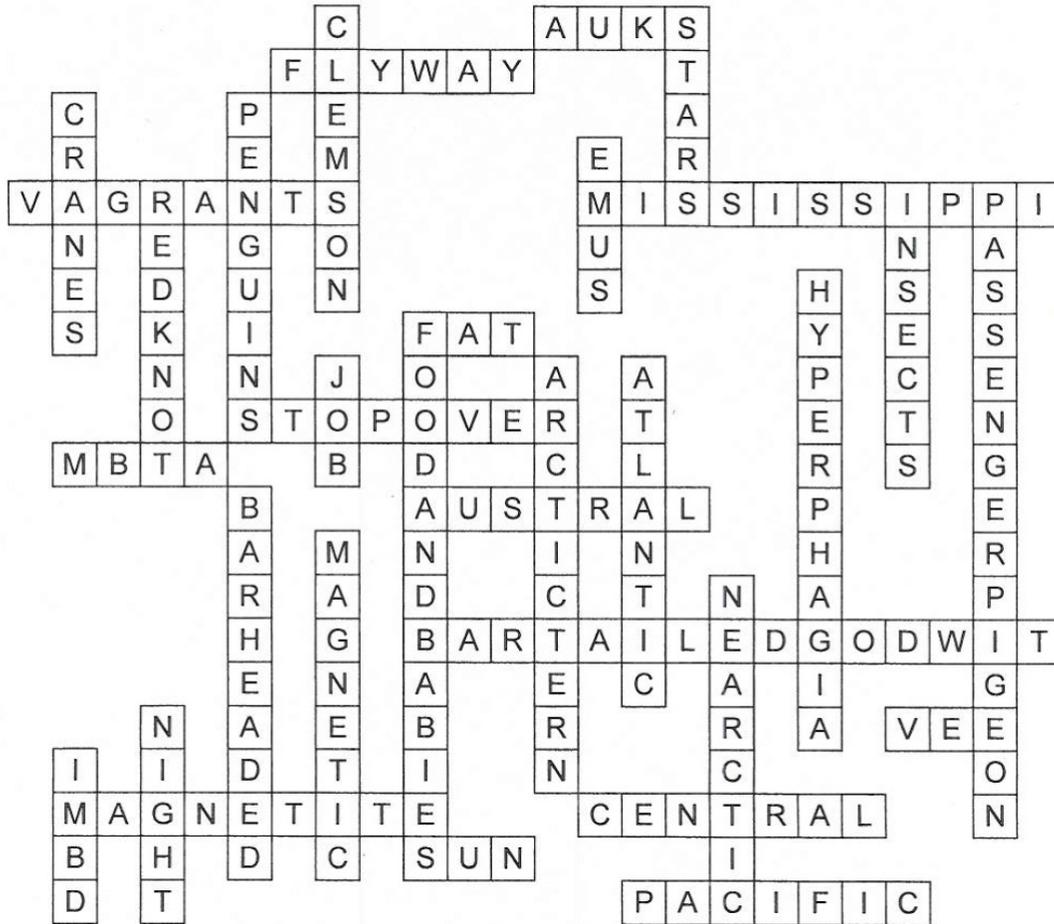
DOWN

- 1 University where Sid Gauthreaux tracks migrants via radar
- 3 A second "compass" aid
- 5 Birds noted by Aristotle to travel to the Nile's headwaters
- 6 These birds migrate in the ocean
- 7 These flightless birds migrate from rainy season breeding sites to more permanent locations in the dry season
- 9 Notable but declining Delaware Bay migrant
- 11 Birds preparing to migrate usually prefer these fat-rich protein food sources
- 12 Once probably the most abundant and obvious migrant (two words)
- 13 Often an eating disorder, but for birds preparing to migrate a necessary condition
- 14 The two main reasons for migrating (three words)
- 15 OT Book that includes this verse – Does the hawk take flight by your wisdom and spread his wings toward the south?
- 16 Renowned long-distance migrant (two words)
- 17 A third North American "path"
- 20 Goose species known to migrate over the Himalayas
- 22 A third "compass" type
- 23 Arctic and temperate North American destination points
- 25 Flight time for most songbirds
- 27 A day to celebrate all migrants

See page 9 for answers

Cross-Bird Puzzle Answer Key

Moving Out



CONTRIBUTING TO THE DoD PIF NEWSLETTER IS EASY!

*Want to highlight bird conservation efforts on your installation?
Have a great bird image you just have to share?
Send your ideas and images to Chris, Alison, or Erica.*



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www.dodpif.org

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www.partnersinflight.org/contactus.cfm

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