



Natural Selections

Legacy Program Update

The Legacy Program faces unexpected funding cuts in 2009:

The Legacy Program is facing an unexpected additional reduction by the DoD Comptroller which may preclude any Round 2 Legacy funding distribution this year. We're doing our best to fight it, but the outlook isn't good. Many other DoD programs also are being hit by these unexpected cuts. The Office of the Assistant Deputy Under Secretary of Defense for Environment, Safety and Occupational Health has approved the release of Round 1 Legacy funding for 64 projects. This list is posted and updated periodically on the Legacy Tracker at <https://www.DoDLegacy.org>.

Legacy Project Highlight of the Month

Legacy Project 07-359 Unspoken Messages - Basque Arborglyphs: Methods for Recording and Documenting Arborglyphs on DoD Lands

In the spirit of this issue's theme of change, we offer a Legacy cultural resources topic, arborglyphs, as preserved on a natural resource, aspens. Our cultural resources managers deal with many of the same challenges as those who focus on natural resources, and in some cases are dual-hatted. We hope you enjoy this glimpse into a little known cultural resource.

Basque carvings, associated groves, and camps are cultural resources protected under the National Historic Preservation Act and the Archaeological Resources Protection Act and as such are potentially eligible for nomination to the National Register of Historic Places (NRHP). Basque sheepherders inscribed thousands of messages and representations on aspen trees in at least 10 states from California to Montana. Basque tree carvings and the data they contain represent a roughly 150-year period of Basque contribution to the American West from the last decades of the nineteenth

See Legacy, page 5



In The News

DoD Reaches New Audience with Message of Conserving Life on its Lands

By Alison Dalsimer
Booz Allen Hamilton

8:00 a.m. Tuesday, Nov 11, 2008... The same day that Egyptian archeologists discovered a 4,300-year-old pyramid belonging to Queen Sesheshet (<http://news.nationalgeographic.com/news/2008/11/081111-new-pyramid-egypt.html>) and the QE2 set sail on her final voyage (<http://blogs.travelmail.co.uk/2008/11/farewell-to-the.html>), attendees at The Wildlife Society's annual conference in Miami gathered to hear about Biodiversity Management in the Department of Defense. The session was organized by Peter Boice, DoD Conservation Team Leader, to inform and educate young ecologists that not only does DoD have incredible resources on its lands, but it cares for those resources to a very high standard.

After welcoming attendees, Peter opened the session by providing An Introduction to the Department of Defense's Integrated Natural Resources Management Program. His premise, which those who are unfamiliar with DoD do not

The Wildlife Society, page 6

INSIDE THIS ISSUE

- 1 [Legacy Program Update](#)
- 1 [Legacy Project Highlight of the Month](#)
- 1 [In The News](#)
- 2 [Naturally Speaking](#)
- 4 [Training, Announcements and Events of Interest](#)
- 9 [Photo of the Month](#)
- 10 [Did You Know?](#)
- 11 [Contact Us](#)



Adapting to Change



Peter starts the New Year looking to new challenges and opportunities.

Change – it's all around us. It was the rallying point of President Obama's successful campaign, and early indications are that it will be the foundation of much of the new Administration's agenda.

Change is everywhere. For many of us interested in natural resources management issues, it is perhaps most apparent in the broadening and deepening changes we see in global climate patterns. Rapidly changing energy generation and use patterns surely will be essential if we are to respond quickly to the urgent need to reduce carbon emissions. Change also is needed to respond to the tremendous economic challenges the world currently faces.

The article *On the Horizon: DoD's Conservation Program Looks Forward* on page 7 highlights several of the key tasks that DoD natural resources managers will face over the next decade. Those challenges and others like them have been on my mind for months, as I've tried to focus the Conservation Program's energies and resources on those areas that will best help all of you in your day-to-day activities.

As we start a new year, I'd like to give you a taste of what lies ahead for DoD Natural Resources Conservation – realizing that some of what I describe will likely be influenced by further change. As is true in practicing sound ecosystem management, we will be flexible, we will adapt, and we will continue to press forward.

Policies – with a great deal of help from the Military Services, we have been working to update the current DoD Instruction 4715.3. We will couple this with an INRMP manual that will provide detailed guidance on implementing Sikes Act provisions. We currently are circulating both documents for a final "informal" review by the Services; I plan to enter both into formal coordination as soon as our new DoD environmental leadership is on board.

Natural resources metrics – a parallel initiative will institutionalize the framework of the Department of the Navy's conservation metrics across DoD. Our natural resources management programs have matured sufficiently that we should be able to capture our successes – and our challenges – in measures more meaningful than whether we've completed planning level surveys or a management plan. These metrics, which will be incorporated into the new Instruction, will encompass seven focal areas – INRMP implementation; partnership effectiveness; team adequacy; INRMP impact on the installation mission; listed species and critical habitats; ecosystem integrity; and fish and wildlife management and public use.

Funding – additional funding will be critical for many of our installations to keep pace with changing and more complex management requirements. Unfortunately, many other programs will be competing for the same limited funds. We need to change the various paradigms that work against adequate funding for natural resources issues. We've all heard that some "must funds" aren't. We've heard that programs that would be more cost effective in the long-term, such as invasives control or species at risk management or vegetation management, can't be funded until they've become crises. And, we've heard that jobs must take precedence over the long-term sustainment of life's building blocks (i.e., biodiversity). We will work to change attitudes and policies, and to advocate for increased on-the-ground funding for all critical projects.

Legacy – the DoD Legacy Program is the primary means to fund multi-Service and DoD-wide natural and cultural resources projects. The current demonstrated need for funds is more than twice the FY 2009 funding level. We need to change current thinking to reflect true program needs. In addition to advocating for additional Legacy funds, we also will be updating the current areas of emphasis for the FY 2010 call for Legacy pre-proposals. Global climate change and ecosystem services are two probable new focal areas.

Outreach – we cannot be successful in advocating for our programs if we speak only to the committed, or use techniques that have no chance of reaching much of our target audiences. We need to be more effective in reaching out to our young soldiers, sailors, airmen and marines and their families. And, we need to provide outreach materials and other information that our younger resource managers are comfortable using, not only because the scope and complexity of natural resources issues continues to increase, but also because the range and power of communications tools also are changing. I have been so struck by the power and the reach of various Web 2.0 materials that I have just added two offerings of a workshop on communicating effectively with new media at the Sustaining Military Readiness (SMR) 2009 conference this summer.

Further we will be extending our opportunities to publicize success stories, starting with this newsletter. As we announce elsewhere on these pages, we want to hear about – and promote – your success stories, and not just in Natural Selections. We also are committed to fixing and upgrading DENIX, or finding other appropriate outlets for materials. For example, we are starting to post all bird-related Legacy products on the DoD Partners in Flight (PIF) website .

Partnerships –partnerships have and will continue to be essential. No time is this truer than now, when global climate change, ecosystem services, and other far-reaching issues necessitate a broad range of government, corporate, and nonprofit participation. In addition to adding new partners, we also will build and modify existing partnerships. For example, we are working to expand our relationship with The Wildlife Society, focusing first on increasing TWS members' awareness of DoD's natural resources programs.

The topics I've outlined might seem overwhelming; however, the needs are urgent and delay would be both intolerable and inexcusable. I have never been as awed by the needs and the responsibility – nor as energized by the potential for meaningful, long-term action – as I am right now. We can be the agents for change in DoD's natural resources conservation program and beyond. I invite you to join us and embrace the challenge.



Training, Announcements & Events of Interest

Workshops, Interagency Training Announcements and Future Events of Interest to the Conservation Community



NEW! National Invasive Weed Awareness Week (NIWAW-10): February 22-27, 2009, in Washington, DC. The tenth annual National Invasive Weed Awareness Week (NIWAW) will be held February 22-27, 2009. With a new administration in Washington, coupled with the development of the Healthy Habitats Coalition, this will be an excellent opportunity to learn about and have input on invasive weed management efforts. The Invasive Weeds Awareness Coalition (IWAC) invites you to Washington DC for a week of events focused on educating our federal policy makers and elected officials about the environmental and economic losses caused by invasive weeds. For additional NIWAW information contact Dr. Lee Van Wychen, 202-746-4686, Lee.VanWychen@wssa.net.

NEW! 2009 NMFVA Training Workshop: March 16-21, 2009 in Crystal City, Virginia. This workshop provides an excellent opportunity for DoD personnel specializing in fish and wildlife management to meet and discuss challenges and solutions to managing these resources. It also affords an opportunity for DoD natural resource managers to meet with counterparts from the U.S. Fish and Wildlife Service (USFWS) and State fish and wildlife agencies who work on Sikes Act issues and many other areas of common concern. For details visit the National Military Fish and Wildlife Agencies announcement at http://www.nmfwa.org/2009_Meeting/index.cfm

Pollinator Workshop: What's a Land Manager to Do! Are you a DoD Natural Resource Manager? Do you have plants and pollinators on your base—or would you like to learn how to get more? Do you like coffee, chocolate, or nuts? Are you wondering why beekeepers have been losing one third of their colonies every year, and what you can do about it? If you answered “yes” to any of these, then this is the workshop for you!

Join us for a half-day interactive workshop that will provide information on the science, the policy, the legislation, and the advocacy. The workshop will: offer presentations and poster sessions on great work being done at installations across the country; provide resources for conducting pollinator-friendly management, restoration, and outreach; and (best of all) will allow YOU the opportunity to ask the experts all the questions that have been buzzing around in your land manager bonnets!

This workshop will be featured during the 2009 NMFVA Training Workshop, in Crystal City, Virginia. Reservations will be required, but there is no fee thanks to the Legacy Program! Look for more information in the March edition of *Natural Selections*, available March 2nd.



Call for Articles and Success Stories

Submit your articles and interesting stuff to *Natural Selections*



Interested in seeing your name or your installation name in print? *Natural Selections* is starting two new features. First, we'd like to know what's been working well for you – other readers might find some timely hints! Send us your Success Stories, large or small. Second, we're planning to expand upon and improve last year's Themed Issues, and we'll like to invite your contributions. This month, in the spirit of a new Administration, we are focusing on change. For the March issue we'll look at how natural resources support the mission; submissions will be due to us by COB February 26. Next month we will also announce the themes and due dates for the rest of 2009.

Legacy, continued from page 1

century through the 1970s. The focus for this project is on presenting a consistent method for recording tree carvings created by Basque shepherds. This study presents a thematic landscape approach that will facilitate a programmatic approach to determining NRHP eligibility for historic aspen tree carvings (arborglyphs) found on Department of Defense (DoD) properties. The proposed system was developed with the hope that it will be used on a range of federal properties, including U.S. Forest Service and Bureau of Land Management holdings, and by individual state historic preservation offices.



Experts consider this arborglyph to probably be a self portrait.

Study methods included archival research, literature review, development of a historic context, a review of existing DoD facility in terms of the potential for Basque resources, data analysis, a review of existing recording methods, and the development of a recording method using video cameras. The data collected from a three-year study at the U.S. Marine Corps (USMC) Bridgeport Training Facility (Grouse Meadows) was used as a test case to determine the efficiency of the recommended recording methods and in developing a historic context for other DoD facilities.

This study is an evaluation tool for the management of cultural resources in compliance with federal laws and regulations. Furthermore, it helps comply with Section 110 of the NRHP, which requires federal agencies to identify and catalogue their cultural resources and assess them for NRHP eligibility.

By undertaking the steps defined here, the DoD will be taking a proactive approach to managing their cultural resources, which can minimize and even avoid delays for federally sponsored projects that require consultations with State Historic Preservation Officers (SHPOs) and other parties in compliance with Section 106, the National Environmental Policy Act (NEPA), and other related federal laws and regulations. As a result, the information provided in this report will help the DoD make informed decisions regarding cultural resources, specifically historic arborglyphs.

Development of a historic context, refinement of a computer/data retrieval system for recording and managing new and existing data, and preparation of an instructional video showing how to record and document individual arborglyphs. The research and conclusions presented in this document provide sufficient information to determine and identify the historic and cultural significance of arborglyphs that might be found on individual installations.



Miscellaneous symbols include stars, heart figures, crosses, and a variety of cartouches, which people carved to enhance their name but more often their initials. Above is a picture of one of such symbols (star), as well as the carver's initials, and the year carved (1935).

The Wildlife Society, continued from page 1

know, was that DoD is required by the Sikes Act to “carry out a program to provide for the conservation and rehabilitation of natural resources on military installations.” At the heart of the Sikes Act and DoD’s natural resources management program is the Integrated Natural Resources Management Plan (INRMP), which provides the basis for landscape-level management of DoD’s natural resources and the basis for a host of proposed installation actions. Peter described the INRMP and how it is used on installations. In doing so, he set the stage for the presentations that followed. In all, attendees learned about

- ❖ the status of biodiversity conservation on DoD’s nearly 30 million acres of land, as well as air and water resources;
- ❖ the benefits of regional partnerships in promoting sustainable development;
- ❖ a series of DoD-sponsored regional threatened, endangered, and at-risk species workshop;
- ❖ DoD’s commitment to ecosystem-based approaches in the desert Southwest;
- ❖ cooperative initiatives to successfully support conservation and military training;
- ❖ migratory bird conservation efforts;
- ❖ monitoring the success of DoD’s various conservation efforts;
- ❖ partnership efforts including the Cooperative Ecosystem Studies Units (CESU) Network;
- ❖ tools including the newly released Biodiversity Outreach Toolkit (copies of which attendees took home!); and
- ❖ how one installation strives daily to manage for both endangered species and the military mission.

In all, attendees learned a great deal about the diverse, sometimes extreme, and often difficult activities DoD personnel undertake on a daily basis to protect, manage, and enhance biodiversity – literally, the diversity of life – on military installations. They also heard about the many challenges to biodiversity conservation that military natural resources managers face every day, and the various tools and methods DoD utilizes to overcome those challenges, many of which are partnership-based collaborations to achieve objectives of mutual interest.

Whether for long-term sustainability of lands for training or as habitat for endangered species, conservation success cannot be done in a vacuum. DoD’s greatest successes are based on collaborative processes founded on a science-based vision. By reaching out to states, NGOs, and other military and federal agencies, this session clearly articulated how DoD has achieved and will continue to achieve success in the conservation of biodiversity on military lands.

NOTE: Abstracts for each presentation in the session are available on *The Wildlife Society’s website* (www.wildlife.org).
Select “conferences” from sidebar, click “past conferences” then “abstracts” for the 15th Annual Conference.
Search for session 34.

Biological Systems Sustain the Mission and Our Livelihoods

By Kyra Wiens,
Booz Allen Hamilton

DoD has a unique relationship with the environment because warfighters require land, air, and water resources in order to train and test weapons systems. Healthy and diverse vegetation allow for realistic training, clean airspace allows for flightline visibility, and natural buffers help reduce impacts from encroachment (such as noise, excess light, and habitat modification). Recognizing that training activities create a significant impact on the environment, DoD maintains robust and functioning ecosystems that will continue to sustain military readiness despite training impacts.

There are other benefits that DoD’s natural resources provide to society as a whole, and in particular to landowners neighboring military installations. More general benefits include water filtration and flood control, crop pollination, and carbon sequestration in trees, plants, and marine ecosystems.

The above examples are all ecosystem services. Ecosystem services is a concept that emphasizes the relationship between humans and the environment. It refers to the direct and indirect benefits humans obtain from biological systems. The term is a new one, but is expected to gain wider currency in the future among policy makers, conservation groups, and land managers. Just in December of 2008, an Environmental Services Board was created out of the Farm Bill and all federal agencies have been invited to participate.

DoD is assessing potential military applications of ecosystem services for the military mission. The Strategic Environmental Research and Development Program (SERDP) and The Nature Conservancy co-sponsored a workshop

in April 2008 at Eglin AFB entitled Ecosystem Services and Environmental Management and Conservation on Military Lands. Research priorities and other outcomes are fully described in the outcomes document, available at: <http://www.serdp-estcp.org>.



Wetlands provide a buffer from military activities, a natural water filter, and habitat for many important species.

One area of study induced by ecosystem services is valuating ecosystem services as environmental credits. Environmental credits measure improvements to ecosystem services. For example, McGuire Air Force Base engaged in pollution prevention activities to gain environmental credits. They then traded these credits (in a process referred to as mitigation banking) in order to accommodate expanded mission requirements that would increase air pollutant emissions.

In 2005, the Office of the Deputy Under Secretary of Defense established the Natural Infrastructure Capabilities Workgroup (NICWG). NICWG evaluates the relationship between natural infrastructure and the ability to live at installations and conduct training missions. The working group is developing a voluntary guide to natural infrastructure valuation banking that expands on environmental credits and mitigation banking.

The DoD Legacy Program has already funded projects related to water quality credits in the Chesapeake Bay. Virginia and Maryland have instituted environmental banking programs and, through studying the Chesapeake, Legacy hopes to assess potential applications for military installations.

There are challenges, however, to implementing policy on environmental credits across DoD. NICWG recognizes several, including that legal authorities for DoD to use environmental credits are unclear and that DoD staff need to be made aware of environmental credits and must know how to implement them. Working through these and other challenges will require leadership and substantial time and consideration.

The nation's natural resources have been considerably impacted by such factors as urbanization and extractive land uses. DoD is beginning to develop policy and guidance about using the term ecosystem services to underscore the connection between the environment and military readiness. There exists an opportunity to emphasize the value of clean water for drinking, forests for timber, and grasslands for military exercises. As utilization of the concept becomes more widespread, DoD may be able to set the groundwork for better policies and management initiatives that bolster available ecosystem services and thereby strengthen national security.



On the Horizon: DoD Conservation Program Looks Forward

By Kyra Wiens,
Booz Allen Hamilton

From the western deserts to the beaches of Virginia, the DoD Conservation Program enables military readiness and protects our nation's natural heritage. The 30 million acres of lands that DoD manages include some of the last healthy habitats for a wide variety of imperiled species. These same lands also are critical to sustaining the military's testing and training mission.

As the Conservation Program turns the page to 2009, it is planning for what are sure to be the most critical tasks DoD land managers will face over the next decade:

- ❖ The ecological impacts from climate change have become increasingly dominant and, without proactive management, may result in irreversible landscape degradation and species endangerment. Scientists expect that streams will become warmer, shorelines will rise, and climatic events will become more severe and extreme. Land managers must develop an innovative set of tools and a visionary conservation plan to meet these and other challenges.
- ❖ Globalization coupled with a changing climate will foster the spread of non-native invasive species, threatening native species and the integrity of ecosystems. Cheatgrass, for example, out-competes native grasses when conditions are drier, wiping out native species on western prairies and altering fire regimes. Detecting and

eradicating invasives before they become widespread and costly to remove benefits both the resource and military readiness.

- ❖ Threatened, endangered, and at-risk species are coming under increasing pressure. As society intensifies its industrial base and land use becomes more urbanized, DoD lands have been and will continue to be critical to the success of many vulnerable species. Henslow's sparrow, for example, relies on Fort Riley in Kansas because the installation has one of the last remaining expanses of healthy tallgrass prairie in the country.

To address these and other emerging issues, the Conservation Program is developing a strategic plan to guide priorities over the next few years. Issues of relevance include: ecosystem services, informing policy, promoting partnerships and outreach, and developing quantitative methods for evaluating program success.

Already underway are efforts to update conservation policies, develop metrics and guidance, and solicit input on needed new policy initiatives. Once completed, these and other actions should help installations by facilitating their ability to manage their natural resources.

Across the country, people and organizations are preparing for the new Administration. The Conservation Program is tapping into this new buzz by preparing white papers, briefings and other materials to inform the incoming Administration about the natural resource related issues of greatest importance to DoD. Critical to implementing new conservation initiatives will be sufficient staff and a robust budget for natural resources programs at all levels. Adequate personnel and funds form the foundation the Natural Resources Conservation Program needs to continue meeting congressionally mandated requirements for conservation benchmarks and environmental compliance.

The calendar may be changing, but one thing is not: to ensure national security and achieve its military missions, DoD must protect our nation's priceless natural heritage.

A First – Military Joins with a Binational Joint Venture in Migratory Bird Conservation

Sonoran Desert Military Ranges Conservation Partnership Team Joins with Sonoran Joint Venture

By Steve Helfert
USFWS

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 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 Barry M. Goldwater Range, Marine Corps Air Station Yuma, and Yuma Proving Ground in southern Arizona. All four military services, Army, Air Force, Marine Corps and the Navy are represented on the team along with the U.S. Fish and Wildlife Service, Arizona Game and Fish Department, Bureau of Land Management, National Park Service, Tohono O Odham Nation, the Bat Conservation International, and the Nature Conservancy.

The Sonoran Joint Venture covers Arizona, southern California, and northwestern Mexico, which covers diverse landscape from over 3,000 miles of coastline areas across several major sky island (forested) mountain ranges and desert basins. This includes four major binational watersheds shared with the United States.

The Sonoran Joint Venture is a considered a successful role model for international bird conservation and is closely involved with the Partners in Flight initiative and the Arizona Bird Monitoring initiative. Bird diversity is some of 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 (NGOs) and government agencies that the Sonoran Conservation Partnership Team 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.



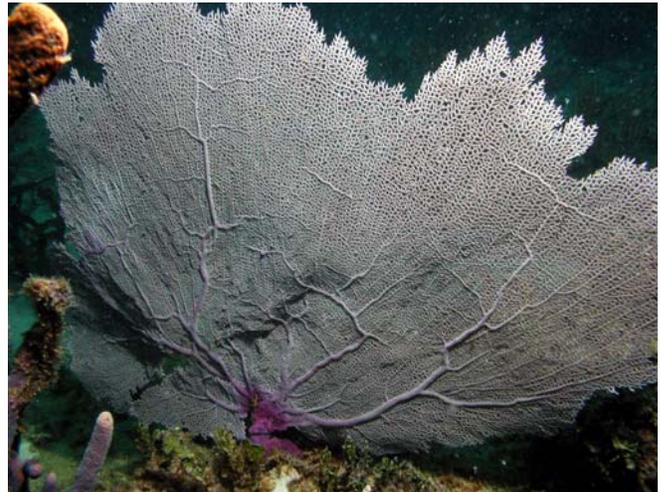
Sonoran Conservation Partnership Team field site visit on north end of BMGR in desert scrub habitat of binational bird species, Leontes thrasher. Photo by John Arnett

Call for Photos

Now is Your Chance to Be Heard or Seen!



Our first Photo of the Month, a Venus Sea Fan, appeared in the October 2008 issue. We encourage you to give your best shot for a future issue. All photos should be copyright free, taken by the submitter and of a natural resources subject. We will try to match photos with the theme of the month when possible. Photos need not be taken on a military installation. For further information, and to submit your photos please contact Pedro.Morales.ctr@osd.mil.



October 2008 Photo of the Month winner! Venus Sea Fan (*Gorgonia flabellum*), a gorgonian at U.S. Naval Base Guantanamo Bay, Cuba, c. 2003. Photo by Ken Deslarzes

Photo of the Month

Capturing the beauty of our natural resources



January 2009 Photo of the Month Winner!
Submitted by *Natural Selections* reader: Daryn Moyer
Oahu, HI

Did You Know?

Little Did You Know Conservation Could Be So Much Fun!



Animals and Plants are Adapting to Climate Change— Over the past century, Earth's average temperature has risen by about 1 degree Fahrenheit and many scientists believe greenhouse gases and carbon dioxide emissions from human activities are to blame. Left unattended, temperatures may rise by an additional 2-10 degrees by the end of the century. In the leading computer models, it follows that polar ice will melt and seas would rise drastically, threatening coastal communities around the globe.

Terry Root, an environmental science and policy professor at Stanford University, says that as humans argue about thermometer readings, animals are providing evidence that should be figured in to scientific and political decisions.

Animals are "just reacting to what's going on out there," Root says. "And if their behavior is very similar to what we expect with what's going on with global warming -- if they're shifting and they're moving, if they're changing their breeding time by 5 days in 10 years -- we can use that information to support what the thermometers are also showing."

Climate change can occur naturally, but what worries many scientists the most -- and the reason why they don't think this is part of a natural cycle -- is the rapid rate at which the current changes are happening -- changes that are being reflected in the responses of wildlife.

In a 2003 study published in the journal *Nature*, Root and her colleagues analyzed numerous studies involving wild plant and animals for changes due to global warming. Out of the nearly 1,500 species examined, the researchers found that about 1,200 exhibited temperature-related changes consistent with what scientists would expect if they were being affected by global warming.

Many scientists believe a number of changes occurring among plants and animals point to unnatural climate change, examples among them are the following:

Reindeer are expected to disappear from large portions of their current range by the end of the century. Marmots are ending their hibernations about three weeks earlier than they did 30 years ago. Canadian red squirrels are breeding about 18 days earlier. Red foxes are spreading northward, encroaching on territory normally occupied by their arctic cousins. North American Fowler's toads are breeding six days later than they did a decade ago. Polar bears today are thinner and less healthy than those of 20 years ago.

Coral reefs around the world are predicted to increase by up to a third in size. Elephant seal pups are leaner because their prey is migrating to cooler waters. Loggerhead sea turtles are laying their eggs about 10 days earlier than they did 15 years ago. Rising temperatures are influencing the sex of Hawksbill turtle hatchlings, with more females than males being born. Tidal organisms like rock barnacles, mollusks, and tidal snails commonly found in warm southern waters are moving northward. Many fish species are moving northward in search of cooler waters. The diet of some songbirds are changing, with some avoiding insects that consume leaves exposed to high levels of carbon dioxide. North American tree swallows are laying their eggs about nine days earlier than they did 40 years ago.

Common murrelets are breeding 24 days earlier than they did a decade ago. Some plants are thriving in areas where their growth was limited before, thanks to temperature changes that provide more water, heat and sunlight. American flowering plants like columbines and wild geraniums are blooming earlier than before. Edith's checkerspot butterflies are moving northward in search of cooler temperatures. A gene in the fruitfly *Drosophila* normally associated with hot, dry conditions has spread to populations living in traditionally cooler southern regions.



The red fox is spreading northward in response to a warmer climate, scientists say. Photo by John J. Mossesso



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Who we are and where to find us!



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