

Department of Defense (DoD) BIODIVERSITY CONSERVATION TOOLBOX:
*An Annotated List of Online Resources Related to
Biodiversity Conservation on Department of Defense Lands*

I. Chapter 1 – Biodiversity and the Military Mission

1. Convention on Biological Diversity: Signed by 150 government leaders (but not the United States) at the 1992 Rio Earth Summit, the Convention on Biological Diversity is dedicated to promoting sustainable development. Conceived as a practical tool for translating principles of biodiversity into reality, the Convention recognizes that biological diversity is about more than plants, animals and micro organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. A website on the Convention provides a complete text of the Convention and many references on current efforts to conserve biological diversity throughout the world, including the most widely used definition of the term “biodiversity.”

<http://www.cbd.int/>

2. DoD Biodiversity Initiative: In 1995, DoD joined with The Nature Conservancy and the Keystone Center to explore the issue of biodiversity management on military lands. In a major national policy dialogue, more than 60 military trainers/operators, natural resources managers, representatives of other federal and state management agencies, and several private sector interests, discussed the importance of biodiversity conservation on military lands and how to integrate it successfully with requirements of the military mission. The initiative produced the following four documents:

- **A Keystone Center Policy Dialogue on a DoD Biodiversity Management Strategy:** This report contains recommendations for integrating biodiversity conservation activities that are compatible with the military mission, many of which were subsequently incorporated into the DoD conservation instruction at that time (DoD Instruction 4715.3, *Environmental Conservation Program*) and have been carried forward into the current DoD natural resources instruction (DOD Instruction 4715.03, *Natural Resources Conservation Program*). The report is available at: <http://www.keystone.org/spp/environment/natural-resources>
- **A DoD Commander's Guide to Biodiversity:** This brochure provided key DoD decision makers with a summary of the importance of biodiversity conservation, and how it can be successfully integrated with military mission requirements. An updated version of this guide was published in 2008 as part of the DoD Biodiversity Handbook. <https://www.denix.osd.mil/portal/page/portal/NaturalResources/ConservationProgramInformation/ReportsandPublications/79C970DBF8ADF3C9E040A8C00B160F24>
- **A Handbook for Natural Resources Managers: Conserving Biodiversity on Military Lands, 1996:** The Handbook provided DoD natural resources managers with background information and practical guidance needed to practice biodiversity conservation and ecosystem management. Although the handbook was prepared

specifically for DoD land managers, TNC provided copies to its land managers as well. Other federal agencies, including Departments of the Interior and Agriculture, environmental organizations, and academic institutions also benefited from this document.

Note: Website will be added as soon as handbook is scanned and put into DENIX

3. Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers, 2008: This is a completely revised and updated version of the 1996 Biodiversity Handbook and was prepared by NatureServe and The Nature Conservancy working in cooperation with the DoD and the Military Services.
<http://dodbiodiversity.org/>

4. The Biodiversity Outreach Toolkit (BOT): This integrated set of tools provides natural resources managers with an important teaching aid for communicating the importance of biodiversity as well as a valuable source of reference materials. It consists mainly of three different PowerPoint presentations that aim to introduce the concept of biodiversity to three different audiences: installation leaders, the business and civic neighbors, and the incoming DoD personnel and families. The official titles of each presentation are:

- **Information for Installation Leaders:** Provides information about DoD's leadership role in conserving natural resources and biodiversity on military lands, and how this supports the mission
- **Beyond the Perimeter:** Provides an overview of the need for military installations and their civilian neighbors to work collaboratively for the sustainable management of the shared resources
- **The Military Community:** Provides information for military personnel and their families on the importance of biodiversity, the natural resources DoD maintains, and how they can participate in their stewardship for the future

The presentations are fully narrated and animated and are available in PowerPoint or Flash formats. These functions can be turned off if desired. Each presentation is broken down into modules so that one can customize a presentation. Slide templates are available so that additional custom slides can be added for a specific presentation. In addition to the templates, a suite of royalty-free images and some fact sheets are included in the supplemental material.
<https://www.dodlegacy.org/Legacy/Intro/factsheets/05-273.pdf>

5. The Department of Defense Environmental Network & Information eXchange (DENIX): This is DoD's central platform and information clearinghouse for environment, safety, and occupational health (ESOH) news, information, policy, and guidance. Serving the worldwide greater DoD community, DENIX offers ESOH professionals a vast document library, a gateway to web-based environmental compliance tools, an interactive workgroup environment, a variety of groupware tools and an active membership community numbering thousands. DENIX provides ESOH professionals an up-to-date, multi-functional resource to assist in preserving and protecting the natural environment, achieving greater energy efficiency,

providing a safer and healthier work environment and meeting readiness and compliance needs of Congressional and DoD ESOH requirements.

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

6. DoD Natural Resources Conservation Program: Defending Our Nation's Resources: The DoD Natural Resources Program (NRP) provides policy, guidance, and oversight for management of natural resources on approximately 30 million acres of military land, air, and water resources owned or operated by DoD. The NRP's goal is to ensure continued access to habitats which provide realistic conditions to support the military's combat readiness mission, while simultaneously working to ensure the long-term sustainability of our nation's priceless natural heritage. The NRPs primary responsibilities are to:

- Oversee development and implementation of natural resources-related policy, guidance, procedures, and metrics
- Ensure Military Service compliance with policies, executive orders, and legislative obligations
- Respond to Congressional inquiries
- Manage natural resources allocation programs
- Coordinate with external stakeholders, including non-governmental organizations (NGOs), states, and other federal agencies

More information about the DoD NRP and some of its key resources, programs, tools, and fact sheets may be found at the DoD NRP website which also provides links to DoD workshops (e.g. Threatened, Endangered, and At-Risk Species; Climate Change Tools for Adapting Management Strategies), and DoD training courses, including Sikes Act 101 and Sikes Act Implementation training courses. <http://www.dodnaturalresources.net>

7. The DoD Legacy Resource Management Program: This program provides financial assistance to the DoD efforts to preserve natural and cultural resources. The program assists DoD in supporting military readiness while protecting and enhancing resources. Three principles guide the Legacy program: **stewardship**, **leadership**, and **partnership**. Stewardship initiatives assist DoD in safeguarding its irreplaceable resources for future generations. By embracing a leadership role as part of the program, the DoD serves as a model for respectful use of natural and cultural resources. Through partnerships, the program strives to access the knowledge and talents of individuals outside of DoD. Since its inception in 1990 the Legacy Program has sponsored hundreds of projects and initiatives focusing on the conservation of biological diversity on DoD lands. <https://www.dodlegacy.org/legacy/index.aspx>

8. The Strategic Environmental Research and Development Program (SERDP): This is the DoD's environmental science and technology program, planned and executed in full partnership with the Department of Energy and the Environmental Protection Agency, with participation by numerous other federal and non-federal organizations. To address the highest priority issues confronting the Army, Navy, Air Force, and Marines, SERDP focuses on cross-service requirements and pursues high-risk/high-payoff solutions to DoD's most intractable environmental problems. <http://www.serdp.org>

9. The Environmental Security Technology Certification Program (ESTCP): This is DoD's program to demonstrate and validate promising, innovative technologies that target the most urgent environmental needs through their implementation and commercialization. ESTCP's strategy is to select lab-proven technologies with broad DoD and market application. These projects are aggressively moved to the field for rigorous trials that document their cost, performance, and market potential. Successful demonstration leads to acceptance of innovative technologies by DoD end-users and the regulatory community. To ensure that the demonstrated technologies have a real impact, ESTCP incorporates these players in the development and execution of each technology. ESTCP funds projects in the following areas:

- Environmental restoration
 - Munitions management
 - Sustainable infrastructure
 - Weapons and systems platforms
- <http://www.estcp.org/>

10. U.S. Army Sustainability Website: This website provides information on the Army *Strategy for the Environment: Sustain the Mission – Secure the Future* which establishes a long-range vision that enables the Army to meet its mission today and into the future. Sustainability is the foundation for this strategy and a paradigm that focuses our thinking to address both present and future needs while strengthening community partnerships that improve the ability to organize, equip, train, and deploy soldiers as part of the joint force. It contains links to:

- Army Compatible Use Buffer Program (ACUB)
 - Sustainable Range Program (SRP)
 - Environmental Management System (EMS)
 - Green Procurement
 - Leadership in Energy and Environmental Design (LEED)
 - Pollution Prevention (P2)
 - Army Installation Sustainability Planning Guide
- www.sustainability.army.mil

11. Coral Reef Conservation Guide for the Military: This publication's purpose is to create awareness and outline procedures the military services should use to ensure safe and environmentally responsible behavior in and around coral reefs. Coral reefs are important for environmental, economic, recreational and strategic reasons. They are both beautiful and fragile resources which must be treated with respect. This guide is intended to help military forces conduct their operations in these sensitive areas while minimizing the potential for adverse impacts to coral reefs.

https://www.denix.osd.mil/portal/page/portal/NaturalResources/ConservationProgramInformation/ReportsandPublications/Coral_Reef_Conservation_Guide_for_the_Military.pdf

II. Chapter 2 – Science

The following references relate to the field of conservation biology which is the scientific study of the nature and status of the Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction.

1. **Biodiversity and Conservation**: This is a hypertext book by Peter J. Bryant, School of Biological Sciences, University of California Irvine. It outlines the origin, nature and value of biological diversity, the threats to its continued existence, and approaches to preserving what is left. Most of the links presented leave the book in order to take advantage of documents produced and updated elsewhere. <http://darwin.bio.uci.edu/~sustain/bio65/Titlepage.htm>

2. **American Museum of Natural History**: The Biodiversity Informatics Facility at the American Museum of Natural History's Center for Biodiversity and Conservation strives to utilize information technologies in biodiversity research and applications while developing and promoting the effective use of these technologies for biodiversity conservation around the world. They are a leader in developing and freely distributing resources in the form of software, methods, and training material and promoting their effective use in the conservation community through training and web-based technologies. Biodiversity informatics is the application of information technologies to organize and analyze biological data from research collections, experiments, remote sensing, modeling, and databases. The importance of using information technology to support biodiversity conservation is unquestioned. Through the efforts of the Biodiversity Informatics Facility, professional and amateur conservation practitioners have increased access to the data, software, and methods required to benefit from these important resources. <http://biodiversityinformatics.amnh.org/>

3. **Conservation Biology Institute (CBI)**: CBI provides scientific expertise to support the conservation and recovery of biological diversity in its natural state through applied research, education, planning, and community service. A non-profit 501(c)(3) organization founded in 1997 in Corvallis, Oregon, it has expanded with the main office still located in Corvallis and a branch office in San Diego, California. They utilize GIS and remote sensing data to conduct research, assessments, and planning in support of conservation projects globally. <http://www.consbio.org/>

4. **International Union for Conservation of Nature (IUCN)**: IUCN's work on biodiversity includes comprehensive research on the status of biodiversity and thousands of individual animal and plant species; action to protect specific species; managing and restoring natural areas, national parks and other protected areas; and promoting the sustainable use of natural resources. IUCN also provides the knowledge, standards and tools for biodiversity conservation for governments, community organizations, the United Nations and business. The resources provided by the IUCN, including the Red List of Threatened Species (cited and outlined in Chapter 6, *Endangered Species*) which are of particular benefit to overseas military installations. <http://www.iucn.org/what/biodiversity/>

5. USGS Biological Resources Division (BRD): The BRD works with others to provide the scientific understanding and technologies needed to support the sound management and conservation of biological resources. The BRD develops scientific and statistically reliable methods and protocols to assess the status and trends of biological resources. It utilizes tools from the biological, physical, and social sciences to understand the causes of biological and ecological trends and to predict the ecological consequences of management practices. As such it leads in the development and use of the technologies needed to synthesize, analyze, and disseminate biological and ecological information, often working with scientific collaborators to produce high-quality scientific information for users of scientific information to ensure this information's relevance and application to real problems. The BRD website provides an excellent overview of the application of many biodiversity conservation principles to real world situations. <http://biology.usgs.gov/>

6. National Biological Information Infrastructure (NBII): The NBII is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. <http://www.nbio.gov/portal/server.pt>

III. Chapter 3 – Policy

1. Ecosystem Management Policy Memorandum, 1994: Issued by the Deputy Under Secretary of Defense (Environmental Security), this policy memorandum initially established the biodiversity conservation policy embraced by the DoD and the military departments in DoD Instruction 4715.3 and military services' implementing policy. The goal is to: "Maintain and improve the sustainability and native biological diversity of terrestrial and aquatic, including marine, ecosystems while supporting human needs, including the DoD mission." Several reviews of the policy performed by the Army Environmental Policy Institute (AEPI) offer an assessment of the effectiveness of efforts to implement ecosystem management, as outlined in this directive, on Army lands.

<http://www.aepi.army.mil/internet/army-eco-mgmt-policy-study.pdf>

<http://www.aepi.army.mil/internet/dod-ecosystem-mgmt-policy-eval.pdf>

2. DoD Instruction 4715.3, Environmental Conservation Program, 3 May 1996: This is the basic DoD policy document for natural resources programs. An updated document, DoD Instruction 4715.03, *Natural Resources Program*, will be formalized in 2010.

<http://www.dtic.mil/whs/directives/corres/pdf/471503p.pdf>

3 Service Instructions: Following are the individual Service natural resources policy directives and instructions:

- **Army:** Army Regulation 200.1, *Environmental Protection and Enhancement*. Chapter 4, *Environmental Asset Management*, 13 December 2007. http://www.army.mil/usapa/epubs/pdf/r200_1.pdf

- **Navy:** OPNAVINST 5090.1C, *Environmental Readiness Program Manual*. Chapter 24, 30 Oct 2007. http://www.navy.mil/oceans/5090_1C_Manual.pdf
- **U.S. Marine Corps:** Marine Corps Order P5090.2A, *Environmental Compliance and Protection Manual*, 21 May 2009. http://www.navy.mil/oceans/5090_1C_Manual.pdf
- **Air Force:** Air Force Instruction 32-7064: *Integrated Natural Resources Management*, 17 Sept 2004. <http://www.af.mil/shared/media/epubs/AFI32-7064.pdf>

4. Overseas Environmental Compliance Manuals: The military services use compliance assessment manuals in maintaining compliance with environmental, safety, and occupational health laws and regulations at military installations overseas. These manuals contain information critical to conducting the Army's Environmental Performance Assessment System (EPAS) Program and the Air Force's Environmental, Safety, and Occupational Health Compliance Assessment and Management Program (ESOH CAMP) overseas. They each contain chapters outlining natural resources compliance requirements and references. These broadly applicable compliance manuals are the result of efforts by several agencies: the U.S. Army Environmental Command (USAEC), Headquarters, Air Force Center for Engineering and Environment (HQ AFCEE), Headquarters, U.S. Air Forces, Europe (HQ USAFE), and the U.S. Navy's LANTNAVFACENCOM. The manuals are designed for use by DoD agencies overseas. Outside the continental United States (OCONUS) Compliance Assessment Protocols (OCAP) are based exclusively on the host nation's Final Governing Standards (FGS), where they exist. OCAP protocols have been developed based on the FGS for the Azores, Bahrain, Belgium, the Federal Republic of Germany, Italy, Japan, Republic of Korea, Kuwait, the Netherlands, Qatar, Saudi Arabia, Spain, Turkey, and the United Kingdom.

http://www.erd.usace.army.mil/pls/erdcpub/!www_fact_sheet.PRODUCT_PAGE?ps_product_numb=5416&tmp_Main_Topic=&page=All

5. The Sikes Act: Dating to 1960, the Sikes Act is the basic federal law governing the management of natural resources on DoD lands. It has been amended and strengthened a number of times, most significantly in 1997.

<http://www.fws.gov/habitatconservation/2004SikesAct%20NMFWA.pdf>

6. DoD Sikes Act Policy and Guidance Memoranda: Over the years the Office of the Deputy Under Secretary of Defense (Installations and Environment) has issued numerous policy and guidance memoranda relating to compliance with the Sikes Act. These guidance documents have been integrated into the new DoD Instruction 4715.03.

- **Implementation of Sikes Act Improvement – Updated Guidance, 10 October 2002.**
https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SIKES_MEMO_SIGNED_101002.PDF

- **Supplemental Guidance for Implementation of the Sikes Act Improvement Act, 19 August 2004.**
https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SIKES_ACT_ADD_INRMP_GIUDANCE_081904.DOC
- **Updated Guidance for the Implementation of the Sikes Act Improvement Act, August 2004.**
https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SIKES_ACT_GUIDANCE_0810.DOC
- **Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning INRMP Reviews Memo, 1 November 2004.**
https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SIKES_MEMO_SIGNED_1104.PDF
- **Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands, 17 May 2005.**
https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SUPPLEMENTA_SIKES_GUIDANCE_LEASED_LAN DS.PDF
- **Supplemental Guidance for Implementation of the Sikes Act Improvement Act – Additional Guidance Concerning INRMP Preparation, 5 September 2005.**
https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SIKES_ACT_ADD_INRMP_GIUDANCE_090505.DOC
- **Sikes Act Tripartite Memorandum of Understanding, 31 January 2006.**
<https://www.denix.osd.mil/portal/page/portal/NaturalResources/LegislationandPolicy/LawsandStatutes/SikesAct/SIKES-TRIPARTITE-MOU-SIGNED-01-31-06.PDF>

7. **Migratory Bird Treaty Act Exclusion for Military Readiness Activities:** The FY04 National Defense Authorization Act (NDAA) exempts certain provisions of the Migratory Bird Treaty Act for DoD readiness activities. The final rule was issued in 2007 (50 CFR Part 21) for this action and requires the DoD to:

- Determine if proposed activities have a significant effect
- Confer and coordinate with USFWS on conservation measures where significant effects have been identified

Background information on this exclusion can be found at:

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=d760851630e5e3d7d37626e2e592b47b&rgn=div5&view=text&node=50:6.0.1.1.4&idno=50>

and

<https://www.policyarchive.org/handle/10207/1421>

IV. Chapter 4 – Encroachment

1. DoD Directive 3200.15, Sustainment of Ranges and Operating Areas (OPAREAs):

The basic policy guidance for the Sustainable Range Initiative.

<http://www.dtic.mil/whs/directives/corres/pdf/320015p.pdf>

2. The Engle Act of 1958 (Public Law 85-337, H.R. 5538): A wide ranging environmental law, the Engel Act specifically addresses issues of land acquisition that may play a role in addressing encroachment issues. Among many other things, the law provides that withdrawals of public land for military use in excess of 5,000 acres “shall not become effective until approved by Act of Congress.” <http://www.srn.arizona.edu/~gimblett/EngleAct.pdf>

3. Title 10 USC, Section 2684a: Agreements to Limit Encroachments and Other Constraints on Military Training, Testing, and Operations: This is the law that authorizes the Secretary of Defense or the Secretary of a military department to enter into an agreement with an eligible entity or entities to address the use or development of real property in the vicinity of, or ecologically related to, a military installation or military airspace for purposes of (1) limiting any development or use of the property that would be incompatible with the mission of the installation or preserving habitat on the property in a manner that (a) is compatible with environmental requirements; and (b) may eliminate or relieve current or anticipated environmental restrictions that would or might otherwise restrict, impede, or otherwise interfere, whether directly or indirectly, with current or anticipated military training, testing, or operations on the installation. Eligible entities with whom the DoD may enter into agreements include: (a) a state or political subdivision of a state, a private entity that has as its stated principal organizational purpose or goal the conservation, restoration, or preservation of land and natural resources, or a similar purpose or goal, as determined by the Secretary concerned. This is the enabling legislation for the Army Compatible Use Buffer Program and DoD’s Readiness and Environmental Protection Initiative..

http://www.sustainability.army.mil/tools/docs_acub/10%20USC%202684a.pdf

4. Army Compatible Use Buffer (ACUB) Program: The ACUB program is an integral component of the Army’s sustainability triple bottom line: mission, environment, and community. The program is an innovative tool to address encroachment and achieve conservation objectives by proactively addressing encroachment that causes costly workarounds or compromises training realism. An ACUB allows an installation to work with partners to encumber land to protect habitat and training without acquiring any new land for Army ownership. Through ACUBs, the Army reaches out to partners to identify mutual objectives of land conservation and to prevent development of critical open areas. The program allows the Army to contribute funds to the partner’s purchase of easements or properties from willing landowners. These partnerships preserve high-value habitat and limit incompatible development in the vicinity of military installations. The Army implements this authority through the ACUB program, which is managed jointly at Army Headquarters level by the offices of the Assistant Chief of Staff for Installation Management and the Director of Training.

http://www.sustainability.army.mil/tools/programtools_acub.cfm

5. DoD Readiness and Environmental Protection Initiative (REPI): Launched in 2004, REPI is part of DoD’s overall Sustainable Ranges Initiative, a multi-level effort designed to ensure the future use of military training land by addressing issues of potential encroachment on military training. This effort emphasizes the need for installations to look outside the fence to work constructively and creatively with communities and other stakeholders. REPI has funded over 100 conservation buffer projects that aim to foster partnerships with new allies, preserve test and training space, provide funding to assist military installations in working with state and local governments or nongovernmental organizations, acquire conservation easements from willing sellers, preserve high-value habitat, and limit incompatible development that threatens to jeopardize military readiness.

https://www.denix.osd.mil/portal/page/portal/content/range/Compatible/REPICongress/REPI2008_online.pdf

and

http://secnavportal.donhq.navy.mil/portal/server.pt/gateway/PTARGS_0_0_2408_302_37445_43/http%3B/portalcontent.donhq.navy.mil%3B7087/publishedcontent/publish/secnav_portal/dasne/natural_and_cultural_resources_conservation/ncr_programs_initiatives/fact_sheet_readiness_and_environmental_protection_initiative_sustainable_ranges_initiative.pdf

6. Mitigation Banking Handbook: This manual is designed to encourage DoD installations to integrate off-site mitigation banking and trading into land-use planning. Title 10 United States Code (U.S.C.) § 2684a authority is a land-use tool and initiator of important partnerships with eligible entities, such as state and local agencies, non-governmental organizations, and private corporations. These partnerships offer mechanisms for off-site mitigation banking and trading to permanently sustain military lands and resources for mission purposes and achieve greater conservation and ecosystem benefits. The manual includes an overview of current laws, regulations, and policies related to these activities and definitions to help navigate the complicated world of compensatory mitigation, banking, and trading. This manual is presented in the context of four emerging ecosystem markets—wetlands, streams, threatened and endangered species (TES), and water quality (WQ)—which have a regulatory driver and can help DoD identify and use regional or landscape planning opportunities and partnerships. Other environmental markets not included—such as forest and non-forest carbon, water quantity, and renewable energy credit trading; recreation; certified forest products; and genetic resources or bioprospecting—may be part of future updates, as needed and applicable. DoD installations are encouraged to refer to this manual during conservation land-use planning, from the beginning of an encroachment analysis and master planning through the easement closing and long-term management and monitoring arrangements.

https://www.dodlegacy.org/Legacy/project/productdocs/07-350%20Final_Draft_with%20cover%20FOR%20REVIEW_700b8e54-74da-46d8-9610-f49e4cd38c77.pdf

V. Chapter 5 – Multiple Uses:

1. Multiple Use Sustained Yield Act of 1960 (Public Law 86-527): This is the federal law that established the concept of “multiple use” of the natural resources on federal lands. It defines multiple use as the “harmonious and coordinated management of the various resources,

each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.” Multiple use implies a sustained yield of outdoor recreation, range, timber, watershed, and wildlife and fish values. Public Law 86-527 is specifically directed to the Secretary of Agriculture and requires implementation of “multiple use” principles on Forest Service lands. But this concept has been adopted by all other federal land management agencies.
<http://www.fs.fed.us/emc/nfma/includes/musya60.pdf>

2. Title 10 USC 2667. Leases: Non-excess Property of Military Departments and Defense Agencies: This is the law that authorizes the Secretaries of the military services to lease lands for agricultural purposes. To qualify lands must be (1) under the control of the Secretary concerned; (2) not for the time needed for public use; and (3) not excess property. The law outlines conditions on leases, types of in-kind consideration, and the deposit and use of proceeds among other things.
http://www.law.cornell.edu/uscode/10/usc_sec_10_00002667----000-.html

3. Title 10 USC Section 2665. Sale of Certain Interests in Land; Logs: This is the law that authorizes the sale of timber products on military lands. It allows, among other things, for the military to sell forest products produced on land owned or leased by a military department or the department in which the Coast Guard is operating. It further specifies the financial management procedures for the timber sale receipts, including that sales shall be at prices determined through a government selling agency and that appropriations of the DoD may be reimbursed for all costs of production of forest products from amounts received as proceeds from the sale of such products. Finally, it specifies the requirement for providing an entitlement of 40 percent of the net profit from timber sales to the state in which the sale was made.
http://www.law.cornell.edu/uscode/uscode10/usc_sec_10_00002665----000-.html

4. DoD Financial Management Regulation 7000.14-R: This is the DoD regulation governing the management of receipts received from the sale of natural resources on DoD lands.
<http://comptroller.defense.gov/fmr/>

5. The Engle Act of 1958 (Public Law 85-337, H.R. 5538): This wide ranging environmental law is also listed in Chapter 4 (Encroachment) as it specifically addresses issues of land acquisition that may play a role in addressing encroachment issues. But it also clarifies the individual state’s ownership of wildlife on federal lands, an important consideration in military hunting and fishing programs. <http://www.snr.arizona.edu/~gimblett/EngleAct.pdf>

6. Executive Order 11989, Use of Off-Road Vehicles on the Public Lands: This E.O. requires all federal land management agencies to establish policies and provide for procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
<http://www.archives.gov/federal-register/codification/executive-order/11644.html>

VI. Chapter 6 – Endangered Species

1. **NOAA National Marine Fisheries Service (NOAA Fisheries Service):** The NOAA Fisheries Service, a division of the Department of Commerce, is responsible for the stewardship of the nation's living marine resources and their habitats. NOAA Fisheries Service is responsible for the management, conservation and protection of living marine resources within the United States' Exclusive Economic Zone (water three to 200 mile offshore). Using the tools provided by the Magnuson-Stevens Act, NOAA Fisheries assesses and predicts the status of fish stocks, ensures compliance with fisheries regulations and works to reduce wasteful fishing practices. Under the Marine Mammal Protection Act and the Endangered Species Act, NOAA Fisheries Service recovers protected marine species (i.e. whales, turtles) without unnecessarily impeding economic and recreational opportunities. Their website offers a number of useful references for the management of protected marine species. <http://www.nmfs.noaa.gov/>

2. **U.S. Fish and Wildlife Service (USFWS) Endangered Species Program:** The USFWS is the premier government agency dedicated to the conservation, protection, and enhancement of fish, wildlife and plants, and their habitats. They are responsible for implementing and enforcing some of the most important environmental laws, such as the Endangered Species Act, Migratory Bird Treaty Act, and the Marine Mammal Protection Act. The USFWS Endangered Species Homepage contains a wealth of information on all aspects of endangered species and compliance with the various environmental laws for which they are responsible. Topics covered on the homepage include:

- Species information
- Laws, policies, and Federal Register notices
- Candidate conservation
- Consultations
- Grants
- Habitat conservation plans
- International activities
- Listing
- Permits
- Publications
- Recovery
- The *Endangered Species Bulletin*
- Contact information
- Glossary

<http://www.fws.gov/endangered/>

3. **The USFWS *Endangered Species Bulletin*:** The USFWS created this publication in 1976 to meet the growing demand for endangered species program news. Through this publication, the USFWS disseminates information on rulemakings, recovery plans and activities, conservation partnerships, research developments, and a variety of other issues. It is distributed on-line four times per year. In the past ten years, three entire issues of the *Endangered Species Bulletin* have been devoted to DoD programs:

- **Jan-Feb 1997:** http://www.fws.gov/endangered/bulletin/97/jan_toc.html
- **Nov-Dec 2000:** <http://www.fws.gov/endangered/bulletin/2000/11-12/toc.html>
- **July 2006:** http://www.fws.gov/endangered/bulletin/2006/ES_Bulletin_07-2006.pdf

4. Threatened, Endangered, and At-Risk Species (TER-S) on DoD and Adjacent Lands Symposia and Workshops: A Strategic Environmental Research and Development Program (SERDP) and U.S. Army Engineer Research and Development Center sponsored symposium held in Baltimore, MD, brought together top researchers for endangered species to explore developing effective methods for sustaining the DoD training and testing missions, while simultaneously protecting TER-S. The focus of the workshop was to help in establishing and fostering such partnerships. The workshop brought together nearly 200 stakeholders to discuss TER-S conservation and research needs on DoD and adjacent lands. Useful DoD TER-S information can be found in the report summary: www.serdp.org/tes/National/. Following the national symposium, the DoD Legacy Program and SERDP cosponsored a series of regional workshops to explore conservation issues regarding TER-S on military lands and to identify specific management or research projects for funding consideration by these programs. The proceedings of those meetings are also a good source of regional TER-S conservation information. <http://www.serdp.org/tes/index.cfm>

- **Southeastern TER-S Workshop, 27 Feb-1 Mar 2007:**
<http://www.serdp.org/tes/Southeast/>
- **Southwestern TER- Workshop, 22-25 Oct 2007:**
<http://www.serdp.org/tes/Southwest/>
- **Pacific TER-S Workshop, 6-8 June 2006:**
<http://www.serdp.org/tes/Pacific/2006/>
- **Pacific TER-S Workshop, 2-4 Feb 2010:** In addition, the Legacy Program sponsored this follow-up workshop that focused on emerging management needs.
<http://www.serdp.org/tes/Pacific/2010/>

5. DoD Threatened and Endangered Species (TES) Document Repository Tool: The DoD's Strategic Environmental Research and Development Program, the U.S. Army Corps of Engineers Engineer Research and Development Center, and the U.S. Geological Survey's National Biological Information Infrastructure partnered to create a document repository for TES of interest to the military. The purpose of this repository is to provide online access to valuable gray literature on DoD's high-priority TES for installation natural resources managers and other personnel involved in managing relevant TES (e.g. the U.S. Fish and Wildlife Service) using a national infrastructure support system.

<http://dodtes.nbii.gov>

https://www.dodlegacy.org/Legacy/project/productdocs/Legacy_Fact_Sheet_Repository%2808-0402%29_488c06ec-aefd-404e-9974-ce4605a5ccc5.pdf

6. Summary of Threatened, Endangered, and At Risk Species (TER-S) Agency Research Programs: Available in fall 2010.

7. The International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (also known as the IUCN Red List or Red Data List): Founded in 1948, the Red List is the world's most comprehensive inventory of the global conservation of plant and animal species. The IUCN is the world's main authority on the conservation status of species. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit. The IUCN Red List is set upon precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. The aim is to convey the urgency of conservation issues to the public and policy makers, as well as help the international community to try to reduce species extinction. <http://www.iucnredlist.org/about/summary-statistics>

8. Federal Lands and Endangered Species: The Role of Military and Other Federal Lands in Sustaining Biodiversity: This article by Bruce A. Stein, Cameron Scott, and Nancy Benton published in *BioScience*, (April 2008, Vol. 58, No. 4) explores how endangered and imperiled species are distributed across the federal estate to determine the relative stewardship responsibilities of the major federal land management agencies. It contains a wealth of information on the occurrence and distribution of endangered and imperiled species on military lands.

https://www.denix.osd.mil/portal/page/portal/NaturalResources/OtherConservationTopics%28A-H%29/Biodiversity/Article%20published%20on%20BioScience_final.pdf

or

<http://caliber.ucpress.net/doi/abs/10.1641/B580409>

9. Species of Risk on Department of Defense Installations: This DoD Legacy Program sponsored report was prepared by NatureServe in 2002 and includes an assessment of the more than 520 Species at Risk on Department of Defense installations.

<http://www.natureserve.org/prodServices/speciesatRiskdod.jsp>

10. The Center for Plant Conservation (CPC) online Conservation Directory: This is a valuable resource for finding:

- Center for Plant Conservation contacts within each state
- Federal and state government contacts that can provide information about rare and endangered plants, permit procedures, and government programs
- Botanists and other contacts in state Heritage Programs, native plant societies, and others in national non-governmental organizations working on plant conservation
- Academic and affiliated research scientists who are active in conservation of rare plants and their areas of expertise
- Links to state laws (courtesy of Defenders of Wildlife) and U.S. Fish and Wildlife Service permits
- Links to maps and related fields

<http://www.centerforplantconservation.org/directory/Directory.asp>

An added feature is that you can now search by expertise, making it easy to find an expert in a particular field. Also updated are the maps and related fields. This provides valuable information on federal agency maps, links to their programs, the Endangered Species Act and Index Herbariorum: A Global Directory of Public Herbaria and Associated Staff.

11. NatureServe: NatureServe is a non-profit conservation organization whose mission is to provide the scientific basis for effective conservation action. NatureServe and its network of natural heritage programs are the leading source for information about rare and endangered species and threatened ecosystems. NatureServe represents an international network of biological inventories-known as natural heritage programs or conservation data centers-operating in all 50 U.S. states, Canada, Latin America and the Caribbean. They collect and manage detailed local information on plants, animals, and ecosystems, as well as develop information products, data management tools, and conservation services to help meet local, national, and global conservation needs. The objective scientific information about species and ecosystems developed by NatureServe is used by all sectors of society, including conservation groups, government agencies, corporations, academia, and the public-to make informed decisions about managing our natural resources. <http://www.natureserve.org/>

12. NatureServe Explorer: This is an authoritative source for information on more than 70,000 plants, animals, and ecosystems of the United States and Canada. Explorer includes particularly in-depth coverage for rare and endangered species. <http://www.natureserve.org/explorer/>

13. The PLANTS Database: This site is maintained by the Natural Resources Conservation Service and provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. <http://plants.usda.gov/>

14. Bald Eagle Management Guidelines Management Memo, 30 Aug 2007: This DoD memo provides management guidelines following the delisting of the Bald Eagle as an endangered species throughout most of its range. https://www.denix.osd.mil/portal/page/portal/NaturalResources/NRTrainingMaterials/BALD_EAGLE_RECOVERY.PDF

15. Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and other Recommendations in Support of Golden Eagle Management and Permit Issuance, February 2010: This document has two principal purposes:

- Identifies and describes the inventory and monitoring effort recommended for determining and evaluating potential golden eagle use of habitat, including locations during breeding and non-breeding seasons
- Outlines recommended monitoring techniques to ascertain occupancy and reproductive success at golden eagle territories

http://steinadlerschutz.lbv.de/fileadmin/www.steinadlerschutz.de/terimGoldenEagleTechnicalGuidanceProtocols25March2010_1_.pdf

16. ESA Implementation Training Course: The DoD Natural Resources Conservation's Legacy Program sponsors a one-day ESA Implementation course intended for

experienced DoD natural resources managers. This interactive course clarifies the listing and delisting process, includes topics such as critical habitat exemptions and exclusions, and offers lessons learned through case study examples. The course provides plenty of time for questions and answers, and features instructors who are experienced natural resources professionals. The course is offered several times annually in different regions of the country, often in conjunction with other DoD natural resources meetings and symposia.

For course schedule and registration information, contact DoDNRCconservation@bah.com

For DoD Natural Resources Conservation's Legacy Program information, see <https://dodlegacy.org>

For specific information on DoD Natural Resources Conservation Program workshops and training, see <http://www.dodworkshops.org/Training.html>

VII. Chapter 7 – Invasive Species

1. Executive Order 13112, Invasive Species: This E.O. was signed on 3 February 1999 and established the National Invasive Species Council. It requires that a council of departments dealing with invasive species be created. Currently there are 13 departments and agencies on the council. The E.O. contains definitions of a number of key terms relative to invasive species. <http://www.invasivespeciesinfo.gov/laws/execorder.shtml>

2. National Invasive Species Council (NISC): The NISC was established by E.O. 13112 to ensure that federal programs and activities to prevent and control invasive species are coordinated, effective, and efficient. NISC members are the secretaries and administrators of 13 federal departments and agencies to provide high-level coordination on invasive species. The NISC is co-chaired by the Secretaries of Commerce, Agriculture, and the Interior. Its website contains a great deal of invasive species information. <http://www.invasivespecies.gov/>

3. The National Invasive Species Information Center (NISIC): Was established in 2005 by the National Invasive Species Council (NISC) at the National Agricultural Library to meet the information needs of users, including the NISC. The NISIC creates and manages a website that serves as a reference gateway to information, organizations, and services about invasive species. <http://www.invasivespeciesinfo.gov/>

4. National Invasive Species Management Plan (2008-2012): This is the first revision of the 2001 plan, as mandated by E.O. 13112. This document directs federal efforts (including overall strategy and objectives) to prevent, control and minimize invasive species and their impacts. If necessary, it may be updated more frequently to reflect changes in circumstances, agency plans and priorities. The 2008 plan is focused upon five strategic goals:

- Prevention
- Early detection and rapid response
- Control and management
- Restoration

- Organizational collaboration.

Each of the five strategic goals specifies on-going objectives and the long-term vision for success in that area. Under each strategic goal, “objectives” describe what is to be accomplished over the next five years, and “implementation tasks” describe what agencies expect to do in order to accomplish that objective. Within the “implementation tasks,” there are “performance elements” which allow for measurement of progress towards accomplishing identified tasks. This plan provides an outline of strategies and undertakings by federal agencies to control invasive species that may be useful in developing installation-level invasive species control programs. http://www.invasivespecies.gov/main_nav/mn_NISC_ManagementPlan.html

5. The Armed Forces Pest Management Board (AFPMB): This DoD organization provides numerous resources regarding invasive species and other pests impacting military lands and operations. The AFPMB has developed best management practices, standard pesticide use guidelines, resources for identifying invasive species, and links to research activities. It also publishes technical guidance for installation personnel who are responsible for pest management plans. <http://www.afpmb.org/>

6. Under Siege: Invasive Species on Military Bases, C. Westbrook and C. and K. Ramos. 2005: This report published by the National Wildlife Federation provides excellent background information on invasive species programs on DoD lands. http://www.necis.net/necis/files/nwfunder_seige_1005.pdf

7. Harmful Non-Indigenous Species in the United States, U.S. Congress, Office of Technology Assessment. 1993: Although not a recent publication, this report still contains very useful information on the threats imposed by non-indigenous species and strategies for their control. http://govinfo.library.unt.edu/ota/Ota_1/DATA/1993/9325.PDF

8. Military Installations Threatened by Invasive Species, Currents Magazine. Winter 2006: This is a useful article on the status of invasive species in the Navy. *Currents* is the Navy’s quarterly environmental magazine sponsored by the Chief of Naval Operations Environmental Readiness Division (N45). http://www.enviro-navair.navy.mil/currents/winter2006/Win06_Military_Invasive_Species.pdf

9. Center for Invasive Plant Management (CIPM): This organization promotes ecologically sound management of invasive plants by facilitating collaboration and partnerships among scientists, educators, and land managers. The vision is to build and support a network of well-informed invasive plant professionals who have the contacts, information, and resources necessary to accomplish their goals. Their website provides information on inventory/survey workshops, improving science literacy through visual communication, and many other useful tools. <http://www.weedcenter.org>

10. The Aquatic Nuisance Species Task Force (ANS): The ANS is an intergovernmental organization dedicated to preventing and controlling aquatic nuisance species,

and implementing the Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990. The various NANPCA mandates were expanded later with the passage of the National Invasive Species Act (NISA) in 1996. The task force consists of 13 federal agency representatives and 12 ex-officio members, and is co-chaired by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration. The task force coordinates governmental efforts dealing with ANS in the United States with those of the private sector and other North American interests via regional panels and issue-specific committees and work groups. Their website offers assistance with prevention, monitoring, control, education, research and an invasive species expert's database. <http://www.anstaskforce.gov/default.php>

11. Aquatic Nuisance Species Hotline: This hotline is sponsored by the U.S. Fish and Wildlife Service and the U.S. Geological Survey. You can use the hotline:

- To report sightings of new or unusual species of plants, animals, or other organisms.
- To request information about the 100th Meridian Initiative to prevent westward spread of zebra mussels, or you can obtain this information online at: <http://100thmeridian.org/>.
- Information about regional panels of the Aquatic Nuisance Species Task Force or local, state, and federal aquatic nuisance species, contacts can be found online at: <http://ANSTaskForce.gov>.

The phone number to report sightings is: 877-STOP-ANS or you can report sighting on the website. http://fl.biology.usgs.gov/Nonindigenous_Species/Stop_ANS/stop_ans.html

12. DoD's Customs and Border Clearance Program Regulations: These regulations include agricultural cleaning and inspection requirements for military equipment entering the country from overseas.

http://www.afpmb.org/pubs/misc/dod_4500.9-r_pt_v_customs_border_clr_jan01.pdf

13. Pulling Together Initiative: This National Fish and Wildlife Foundation program provides funding on a competitive basis to public-private partnerships to manage invasive weeds. <http://www.nfwf.org/AM/Template.cfm?Section=Search&template=/CM/HTMLDisplay.cfm&ContentID=5124>

14. The Nature Conservancy's Global Invasive Species Team: Maintains a website that outlines: TNC projects, planning/strategies, control methods, galleries, red alerts, global resources, list serves/events, and links. <http://tncinvasives.ucdavis.edu/>

15. The National Biological Information Infrastructure (NBII): The NBII is a broad, collaborative program to provide increased access to data and information on the nation's biological resources. Their website contains a wealth of information on invasive species, including:

- Data bases for individual states
- Resources

- Science
- Management
- Public policy
- Funding
- Education

www.nbii.gov

16. Ecology and Management of Invasive Plants Program: Managed by Cornell University, this program conducts research to assess the ecological impacts of introduced plant species, primarily in the eastern United States. They focus specifically on potential mechanisms of how non-indigenous plants may affect native ecosystems and the species living in them. Their work involves long-term monitoring, field, common garden and laboratory experiments, and the use of many different terrestrial and aquatic taxa as indicator organisms. Also, they assist in development and implementation of biological weed control programs and study the mechanisms allowing introduced plant species to become invasive. Their website includes, among other things, monitoring protocols and recommendations for biological controls of invasive species in the eastern United States. <http://www.invasiveplants.net/>

17. The Invasive Species Specialist Group (ISSG): The ISSG is a global network of scientific and policy experts on invasive species, organized under the auspices of the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN). The ISSG was established in 1994 and currently has 196 core members from over 40 countries and a wide informal global network of over 2000 conservation practitioners and experts who contribute to its work. The ISSG promotes and facilitates the exchange of invasive species information and knowledge across the globe and ensures the linkage between knowledge, practice and policy so that decision making is informed. Their website offers tools and resources, publications, and suggestions for networking. <http://www.issg.org/>

18. Weeds Gone Wild: Alien Plant Invaders of Natural Areas: This National Park Service sponsored web-site provides information for the general public, land managers, researchers, and others on the serious threat and impacts of invasive alien (exotic, non-native) plants to the native flora, fauna, and natural ecosystems of the United States. The website provides:

- A national list of invasive plants infesting natural areas throughout the United States
- Background information on the problem of invasive species
- Illustrated fact sheets that include plant descriptions, native range, distribution and habitats
- Management options
- Suggested alternative native plants
- Selected links to relevant people and organizations.

<http://www.nps.gov/plants/alien/index.htm>

19. Noxious and Nuisance Plant Management Information System (PMIS) and Aquatic Plant Management Information System (APIS): The U.S. Army Engineer Research and Development Center, Vicksburg, MS, has produced two plant management

information/expert systems that allow ready information access to information on the identification and management of invasive plant species. These two systems allow for information access on a variety of plant management topics, including plant identification, plant biology, as well as on various management techniques, including an in-depth section on biocontrol. The systems come in two formats including CD and web-based versions. A new version of APIS is currently in beta testing and runs entirely on handheld personal data assistants and smart phones using Windows Mobile technology. This mobile format allows for information access in even the most remote locations.

<http://el.ercd.usace.army.mil/pmis/> for Noxious and Nuisance PMIS

<http://el.ercd.usace.army.mil/aqua/apis/intro.aspx> for Aquatic PMIS (APIS)

20. Invasive Species Outreach Toolkit: DoD developed an Invasive Species Outreach Toolkit to help installation natural resources managers and others protect the natural resources on military lands. This toolkit provides a framework to support natural resources efforts and a variety of tools, including brochure and poster templates, and resources to help understand and meet DoD's commitment to conservation leadership. <http://dodinvasives.org/>

21. Bird Aircraft Strike Hazard (BASH): While BASH issues do not necessarily involve invasive species, they are often an important part of military natural resources programs. The management of BASH can directly affect biodiversity on military installations. The Navy and Air Force maintain BASH teams that can assist with specific BASH issues. Each maintains a website with important and useful information.

- Navy: <http://www.safetycenter.navy.mil/aviation/operations/bash/default.htm>
- Air Force: <http://www.afsc.af.mil/organizations/bash/index.asp>

VIII. Chapter 8 – Disturbance Regimes:

1. Natural Disturbance Regime Indicator: This Environmental Protection Agency-sponsored website helps in understanding the natural disturbance regime of a watershed and allows for the development of management and protection measures that will maintain the watershed in as natural a condition as possible. It includes a description of the fire regime condition class standard landscape worksheet method and mapping method that provide tools for fire regime and vegetation assessment at the landscape and stand levels. It also discusses the Rocky Mountain landscape simulator, a computer software program designed to simulate natural (e.g., fire) and anthropogenic (e.g., logging) disturbances and succession processes in the Rocky Mountains. This software could be used to aid planners in the evaluation of the historic range of variation in landscape structure and wildlife habitat, and the potential consequences of alternative future land management scenarios.

http://www.epa.gov/healthywatersheds/examples/natural_disturbance_regime.html

2. Managing Disturbance Regimes: This U.S. Forest Service website provides new insights and scientific knowledge about the role of disturbance regimes in ecosystems and the degree to which they can be effectively managed to restore and maintain ecosystem integrity and

productivity. It includes the results of current research on managing disturbance regimes by various teams at the Pacific Northwest Research Station.

<http://www.fs.fed.us/pnw/about/programs/mdr/index.shtml>

3. Fort Collins Science Center (FORT): FORT provides sound scientific data and technical assistance to Department of the Interior bureaus and other natural resources agencies. Located at sites in the U.S. Geological Survey Central Region, their research and support staff of over 150 works closely with other federal and state/territorial agencies, universities, and private organizations to generate science products and services relevant to clients' needs. Those include research reports and journal publications, predictive models and software, database applications, maps and GIS products, seminars and workshops, training, and technical assistance. In addition to help with the analysis of disturbance regimes and ecosystem dynamics, they also offer assistance on invasive species, endangered and sensitive species, information science, and policy analysis and science assistance. <http://www.fort.usgs.gov/default.asp>

4. Restoration of Piñon-Juniper Vegetation in Western North America: Piñon-juniper vegetation is one of the major vegetation types in western North America. It covers a huge area, provides many resources and ecosystem services, and is of great management concern. Management of piñon-juniper vegetation has been hindered, especially where ecological restoration is a goal, by inadequate understanding of the variability in historical and modern ecosystem structure and disturbance processes that exist among the many different environmental contexts and floristic combinations of piñon, juniper and associated species. This website provides a synthesis of what is currently known, and not known, about historical and modern stand and landscape structure and dynamics in three major and fundamentally different kinds of piñon-juniper vegetation in the western U.S.: persistent woodlands, savannas, and wooded shrublands. It is the product of a workshop that brought together fifteen experts from across the geographical range of piñon-juniper vegetation. The intent of this synthesis is to provide information for managers and policy-makers, and to stimulate researchers to address the most important unanswered questions. The website is maintained by the Colorado Forest Restoration Institute, Colorado State University, Fort Collins, CO. http://www.ltrr.arizona.edu/~tswetnam/tws-pdf/PJSynthesis_6-08.pdf

5. Integrated Training Area Management (ITAM): The U.S. Army's ITAM program provides capabilities to manage and maintain training and testing lands by integrating mission requirements with environmental and land management practices. The objectives of the ITAM program are to:

- Achieve optimal sustained use of lands for the execution of realistic training and testing by providing a sustainable core capability that balances usage, condition, and level of maintenance
- Implement a management and decision-making process that integrates Army training and other mission requirements for land use with sound natural resources management
- Advocate proactive conservation and land management practices by aligning Army training land management priorities with the Army training and readiness priorities

The four major components of the ITAM program are Training Requirements Integration; Range and Training Land Assessment; Land Rehabilitation and Maintenance, referenced below; and Sustainable Range Awareness. These components combine to provide the means to understand how the Army's training requirements impact land management practices, what the impact of training is on the land, how to mitigate and repair the impact, and how to communicate the ITAM message to soldiers and the public. As such the ITAM program plays a major role in addressing land disturbance caused by Army testing and training activities.

http://www.sustainability.army.mil/function/training_itam.cfm

6. Land Rehabilitation and Maintenance (LRAM): The LRAM component of the ITAM program repairs, enhances, and sustains the Army's training lands. LRAM draws from multiple best management practices and techniques to provide a sustainable landscape for training and testing. Sustainment of training and testing lands is essential to meet and support soldier training requirements. LRAM ensures training and testing lands meet mission standards now and in the future. <http://aec.army.mil/usaec/range/sustainment01.html>

IX. Chapter 9 – Funding:

1. DoD Natural Resources Funding Manual: This 2009 publication offers useful introductions to federal, state, and nonfederal grant programs that can be used to fund DoD conservation programs and projects. It also includes a discussion of potential land protection partners and offers references, a quick reference guide, and contract information

<https://www.dodlegacy.org/Legacy/project/productdocs>

2. Army Funding Resource Manual: Prepared by the U.S. Army Environmental Command, this manual provides guidance on obtaining grants from federally funded sources as well as from foundations and other nongovernmental organizations (NGOs). It also offers suggestions for establishing partnerships with NGOs.

http://www.sustainability.army.mil/tools/docs_acub/Funding%20Resource%20Manual.pdf

3. The DoD Legacy Program: The Legacy Resource Management Program provides financial assistance to the DoD's efforts to preserve natural and cultural resources. The program supports military readiness while assisting the DoD in protecting and enhancing resources for future generations. <http://www.dodlegacy.org>

4. The Strategic Environmental Research and Development Program (SERDP): This is the DoD's environmental science and technology program, planned and executed in full partnership with the Department of Energy and the Environmental Protection Agency, with participation by numerous other federal and non-federal organizations. The program is a source of funding for efforts that address the highest priority issues confronting the Army, Navy, Air Force, and Marines. SERDP focuses on cross-service requirements and pursues high-risk/high-payoff solutions to DoD's most intractable environmental problems. <http://www.serdp.org>

5. The Environmental Security Technology Certification Program (ESTCP): ESTCP funds projects that test promising, innovative technologies that target the DoD's most urgent environmental needs. The FY 10 call for proposals included the following focus areas:

- Protection and remediation of contaminated groundwater
- Military munitions detection, discrimination, and remediation
- Ecosystem service methodologies and tools for DoD installations
- Energy efficiency and renewable energy for DoD installations.

<http://www.estcp.org/>

6. The National Fish and Wildlife Foundation (NFWF): The NFWF’s “Pulling Together Initiative” provides funding on a competitive basis to public-private partnerships to manage invasive weeds.

<http://www.nfwf.org/AM/Template.cfm?Section=Search&template=/CM/HTMLDisplay.cfm&ContentID=5124>

7. The U.S. Fish and Wildlife Service Grants Programs: The Fish and Wildlife Service administers a variety of natural resources assistance grants to governmental, public and private organizations, groups and individuals. This website offers links to the following grants programs: Federal Assistance, North American Wetlands Conservation Act, Neotropical Migratory Bird Conservation Act, coastal wetlands conservation, endangered species, and international affairs. <http://www.cfws.gov/grants/>

8. Department of Defense Grant and Agreement Regulations: DoD regulations establishing procedures issuing grants and establishing cooperative agreements for funding natural resources projects are located at this website.

<http://www.dtic.mil/whs/directives/corres/html/321006r.htm>

- **DODGAR, Part 22:** DoD Grants and Agreements – Awards and Administration. <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div6&view=text&node=32:1.1.1.3.17.1&idno=32>
- **Circular A-110 & DoDGAR Part 32:** Requirements for grants and agreements with institutions of higher education, hospitals, and non-profit organizations. <http://www.dtic.mil/whs/directives/corres/pdf/321006r32p.pdf>

9. United States Army Medical Research Acquisition Activity (USAMRAA): This organization provides outstanding assistance in establishing cooperative agreements with a wide range of organizations for military conservation projects.

<http://www.usamraa.army.mil/>

10. Economy Act Transfers: Authorizes federal agencies to enter into agreements with other federal agencies for services when they are rendered in a more convenient and cost effective manner by the other agency.

https://www.acquisition.gov/far/html/Subpart%2017_5.html

X. Chapter 10 – Partnerships

1. Cooperative Ecosystem Studies Units: Authorized by P. L. 105-391 (Sec. 203) in 1998, this law authorized and directed the Secretary of the Interior to enter into cooperative agreements with colleges and universities in partnership with other federal and state agencies to establish cooperative study units to conduct multi-disciplinary research. The CESU Network's broad scope includes the biological, physical, social, and cultural sciences needed to address natural and cultural resources management issues at multiple scales and in an ecosystem context. The DoD is an active member of 11 of the 17 units of the network. During 2001-2009 DoD has funded over 175 projects through the CESU Network totaling over \$38M. These projects have provided access to high quality scientists from a number of universities in the pool of over 200 member institutions in the CESU Network. In addition, DoD's CESU projects have resulted in savings through cost avoidance of approximately \$4 million in the past eight years.

[https://www.denix.osd.mil/portal/page/portal/NaturalResources/CESU/CESU-DoD%20 Final %20Fact%20sheet.pdf](https://www.denix.osd.mil/portal/page/portal/NaturalResources/CESU/CESU-DoD%20Final%20Fact%20sheet.pdf)

<https://www.denix.osd.mil/portal/page/portal/NaturalResources/CESU>

2. The Nature Conservancy (TNC): The largest conservation organization in North America has a long history of partnering with the DoD. TNC's mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. The 1988 DoD-TNC cooperative agreement was the first such agreement between the DoD and a private conservation organization and has helped facilitate hundreds of mutually beneficial undertakings. The current cooperative agreement between the DoD and TNC was updated in April 2010. www.nature.org

3. The Nature Conservancy Magazine. Winter 2004: This issue features an article on partnerships with the DoD. <http://www.nature.org/magazine/winter2004/features/>

4. Partners in Flight (PIF): The international PIF is a cooperative, non-advocacy partnership among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. PIF was initiated in 1990 in response to declining populations of migratory birds, and to emphasize the conservation of birds not covered by existing conservation initiatives. The DoD bird conservation programs are a vital part of this initiative. The DoD PIF Program, established in 1991, supports and enhances the military mission while it works to develop cooperative programs and projects with PIF partner organizations ensuring a focused and coordinated approach for the conservation of resident and migratory birds and their habitats. The DoD PIF website contains a wealth of information regarding the conservation of neotropical birds and many other biodiversity conservation issues. Included in the website is the DoD PIF strategic plan, fact sheets, newsletters, bird conservation plans, maps, bird conservation databases, bird checklists, important bird areas, and much more. <http://www.dodpif.org/>

5. National Public Lands Day (NPLD): The NPLD began in 1994 with three sites and 700 volunteers. Coordinated by the National Environmental Education Foundation, National Public Lands Day (NPLD) is the nation's largest hands-on volunteer effort to improve and enhance the public lands American's enjoy. In 2010 the organization estimates that they will engage approximately 170,000 volunteers working at approximately 2,300 sites in all 50 states,

Puerto Rico, Guam, and the District of Columbia. Currently nine federal agencies and many state and local lands participate in this annual day of caring for shared lands. Generally, NPLD takes place on the last Saturday of September. The DoD Legacy Resource Management Program joined the NPLD partnership in 1999 to support volunteer habitat restoration projects on military installations and numerous military installations have participated in this partnership ever since. In 2010, the Legacy Program funded 48 NPLD projects in 23 states.

<http://www.publiclandsday.org/>

6. The Conservation Registry (CR): The CR is an online, centralized database that records, tracks and maps on-the-ground conservation projects. The purpose of the CR is to help users understand the context, distribution, and effectiveness of collective efforts to protect and restore ecosystems. It captures three project types:

- Projects designed to protect or restore habitat, fish and wildlife, or an ecological process
- Projects to change land designation to enhance the focus on conservation management
- Monitoring, research and education projects tied to a location

It is a synthesis tool that gathers project information from multiple sources. Natural resources managers can choose to manually enter a project and also can electronically transfer data for import into the CR. Benefits of using the CR include:

- Helping natural resources managers understand the context in which they are working and in determining the degree to which actions are taking place within identified priority areas
- Determining if projects are effectively conserving habitat for at-risk species
- Aiding in understanding where public and private money is being spent
- Helping natural resources managers find partners, funding, and advice
- Communicating successes and challenges experienced by others doing similar projects
- Tracking the implementation of state wildlife action plans across the country

Although only recently established, the CR currently lists hundreds of projects from across the country and could serve as a useful planning tool of military natural resources managers contemplating a conservation project by identifying other conservation projects in their area and suggesting potential partners. <http://nfwf.conservationregistry.org/>

7. Student Conservation Association (SCA): SCA provides college and high school-aged members with hands-on conservation service opportunities in virtually every field imaginable, from tracking grizzlies through the Tetons to restoring desert ecosystems and teaching environmental education at Washington, D.C.'s Urban Tree House. Each military service has established cooperative agreements with the SCA and successfully partnered with them to provide young people to perform conservation work on military installations.

<http://www.thesca.org/>

8. National Military Fish and Wildlife Association (NMFWA): NMFWA was officially chartered in 1983 by a small group of DoD natural resources management professionals. These individuals recognized the critical need for enhanced awareness of natural resources conservation requirements in order to provide for both long term sustainability of resources diversity and the successful accomplishment of the military training mission on public lands administered by the DoD. NMFWA, which can trace its roots of organized involvement back to 1977, is a non-profit organization consisting of professional resources managers working to protect and manage wildlife and other natural resources on DoD lands. Through publication of a quarterly newsletter (The FAWN), and an annual training workshop, members and other interested parties remain actively involved and engaged in issues of national and local importance to the objectives of the association. <http://nmfwa.org>

9. DoD Partners in Amphibian and Reptile Conservation (PARC): PARC is an inclusive partnership dedicated to the conservation of the herpetofauna--reptiles and amphibians--and their habitats. Membership comes from all walks of life and includes individuals from state and federal agencies, conservation organizations, museums, pet trade industry, nature centers, zoos, energy industry, universities, herpetological organizations, research laboratories, forest industries, and environmental consultants. A DoD PARC initiative was begun in April 2010 with a scoping workshop to develop a strategic plan which will provide:

- A comprehensive introduction to herpetofauna on DoD lands
- A summary of DoD's role in protecting and managing herpetofauna
- An outline of the potential benefits of a partnership between DoD and the national PARC organization
- A clear direction for actions that DoD can take to improve and coordinate management of herpetofauna on its lands

As the DoD PARC strategic plan is finalized, DoD will provide additional information regarding participation by individual military natural resources manager in the PARC program. <http://dodnaturalresources.net/DoD-PARC.html>

XI. Chapter 11 – Integrated Natural Resources Management Plans (INRMPs)

1. U.S. Fish and Wildlife Service (USFWS) Sikes Act Website: The USFWS maintains a website entitled “The Sikes Act—a Dynamic Partnership” which contains links to the important components of INRMPs, such as endangered species, fisheries, invasive species, migratory birds, law enforcement, wetlands, and environmental contaminants. http://www.fws.gov/habitatconservation/sikes_act.html

2. Resources for INRMP Implementation: A Handbook for the DoD Natural Resources Managers: This 235-page handbook provides guidance on all aspects of INRMP development and implementation. Three separate printable forms are associated with the handbook: a briefing checklist, an INRMP master update list, and an INRMP update report. <https://www.denix.osd.mil/portal/page/portal/NaturalResources/IntegratedNaturalResourceManagementPlan/INRMPhB.PDF>

3. INRMP Strategic Action Plan: A Comprehensive Plan for Using Integrated Natural Resource Management Plans at Active Military Installations and Ranges to Sustain

Readiness: This DoD, U.S. Fish and Wildlife Service, and Association of Fish and Wildlife Agencies document describes a set of activities related to the implementation of INRMPs that will ensure the DoD's ability to properly manage the valuable natural resources entrusted to its care and to sustain the readiness of its force. The plan is designed to be a living document and is updated and refined based on annual review meetings between the three agencies.

https://www.denix.osd.mil/portal/page/portal/NaturalResources/IntegratedNaturalResourceManagementPlan/INRMP_STRATEGIC_ACTION_PLAN_020305.DOC

4. State Wildlife Action Plans: Congress required each state and territory with developing a wildlife action plan by October 2005 in order to receive funds through the Wildlife Conservation and Restoration Program and the State Wildlife Grants Program. These proactive plans, known technically as "comprehensive wildlife conservation strategies," assess the health of each state's wildlife and habitats, identify the problems they face, and outline the actions that are needed to conserve them over the long term. Such plans now exist for all 56 states and territories. These plans must always be consulted during the preparation or revision of an INRMPs and DoD natural resources managers should consider areas of mutual conservation concern that are identified through such consultations. <http://www.wildlifeactionplans.org/>

5. State Wildlife Action Plans (SWAPs) and Integrated Natural Resources Management Plan (INRMP) Workshops: In January 2006, the DoD, the Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service signed a memorandum of understanding that required the three parties to work more collaboratively to conserve wildlife while protecting the military mission. To further that goal, the DoD sponsored five regional workshops:

- Northeast - Boston, MA: May 2008
- Mid-Atlantic - Arlington, VA: November 2007
- Southern plains - Albuquerque, NM: May 2007
- Southwest - Phoenix, AZ: December 2006
- Southeast - Atlanta, GA: May 2006

Participants discussed communications barriers and possible solutions, common conservation goals, and ways to integrate SWAPs and INRMPs. The workshops used breakout groups (either by state, common species or habitat interest – their choosing), to consider potential projects that participants could embark on together to help conserve wildlife and preserve the military mission. These workshops have enabled DoD, USFWS and the state wildlife agencies to work on planning and implementation efforts, to prioritize how conservation dollars are spent, to implement projects that are mutually beneficial, and to begin information and data sharing. The five regional workshops have resulted in at least 20 new projects. Project topics range from examining species at risk to conducting partnership workshops to restoring key habitats for species of conservation priority. Each group determined a way forward for their project and initial action items were discussed during the workshops.

<http://www.dodworkshops.org/About-SWAP-INRMP.html>

6. Department of the Navy Natural Resources Metrics Builder (NNRMB): This program is a web-based solution for facilitating and documenting the progress of the annual INRMP review as well as for assessing the overall health of Navy/Marine Corps' natural resources conservation programs. The metrics builder consists of seven focus areas:

- INRMP project implementation
- Listed species and critical habitat
- Partnerships effectiveness
- Fish and wildlife management
- Public use
- Team adequacy
- Ecosystem integrity and INRMP impact on the installation mission

The NNRMB makes the annual review process of reporting easier and more meaningful. In addition, these metrics further encourage a working dialogue and improve relationships with regulatory agencies and partners http://www.enviro-navair.navy.mil/currents/fall2005/Fall05_New_Conservation_Metrics.pdf

The DoD has expanded the Navy's metrics to include all installations with INRMPs. The Military Departments began reporting on these new metrics in FY 2009.

7. Critical Habitat Exemption: Under the Endangered Species Act (ESA), the Secretary of the Interior (and in some circumstances the Secretary of Commerce) can designate "critical habitat" after taking into account economic or "any relevant impacts." P.L. 108-136, the National Defense Authorization Act for Fiscal Year 2004, precludes designation of critical habitat on DoD lands "subject to" an Integrated Natural Resources Management Plan (INRMP) prepared under the Sikes Act if the Secretary determines in writing that the plan provides

- A benefit to the species for which critical habitat is proposed for designation
- Certainty that the management actions specified will be implemented
- Certainty that the conservation effort will be effective

Also, consideration of impacts on national security must now be considered when critical habitat is designated. Agency compliance with the consultation and prohibition sections of the ESA is retained. Background on this important aspect of INRMP compliance is at: <https://www.policyarchive.org/handle/10207/1421>

8. Maintaining and Implementing Sustainable INRMPs Training Courses: The DoD Natural Resources Conservation's Legacy Program sponsors both a one day Sikes Act 101 course and a Sikes Act Implementation course. The Sikes Act 101 training course is intended for new DoD natural resources managers and operations personnel, as well as personnel who work with DoD INRMP approval and implementation, such as those from the U.S. Fish and Wildlife Service and state fish and wildlife agencies. This introductory course highlights the importance of cooperation on INRMPs from development through final review, and serves as a meeting ground for tripartite partners. The Sikes Act Implementation training course is an interactive

course intended for experienced DoD natural resources managers and operations personnel. The course clarifies the difference between reviews and revisions, includes topics such as how to monitor and track projects successfully, and offers lessons learned from case study examples. Both courses provide plenty of time for questions and answers, and feature instructors who are experienced natural resources professionals. The courses are offered several times annually in different regions of the country, often in conjunction with other DoD natural resources meetings and symposia.

For course schedule and registration information, contact DoDNRCconservation@bah.com

For DoD Natural Resources Conservation's Legacy Program information, see <https://dodlegacy.org>

For specific information on DoD Natural Resources Conservation Program workshops and training, see <http://www.dodworkshops.org/Sikes--home.html>