



# Natural Selections

## Legacy Program Update

### The Legacy Program initiates FY 2008 pre-proposal review with Service representatives:

The Legacy Program received 206 pre-proposals submitted through the Legacy Tracker in response to the RFP solicitation announced in May 2007. A total of 142 natural resources pre-proposals, and 64 cultural resources pre-proposals were received online. Invitations to submit full proposals will be announced through the Legacy Tracker at [www.DoDLegacy.org](http://www.DoDLegacy.org) by mid October, 2007.

**National Public Lands Day:** The National Environment Education Foundation (NEEF) is abuzz with organizing the 14th annual National Public Land's Day (NPLD). Last year, over 1,100 sites participated in celebrating NPLD. This year, NEEF predicts 1,300! This national partnership enlists volunteers to work with land managers to restore and enhance public lands and learn about resource conservation issues. They build trails, bridges and docks and remove invasive plants to make room for fragile native species. Volunteers also restore habitat for wildlife, install signage, and make facilities universally accessible.

The Legacy program is funding a total of 36 NPLD events, 29 of the sites involve natural resources, and 7 involve cultural resources. Be sure to reserve 29 September to volunteer. For details visit <http://www.publiclandsday.org/>

## Legacy Project Highlight of the Month

### Legacy Project 00-147 Cooperative Ecosystem Studies Unit Network.

The Department of Defense through a series of Legacy funded projects joined several units of the Cooperative Ecosystem Studies Unit Network (CESU) since 2000. This issue of *Natural Selections* highlights the CESU Network and DoD's participation in perhaps the world's largest ecosystems oriented network. [See Legacy, page 4](#)



## In The News

### Thomas Fish Selected as National Coordinator of the Cooperative Ecosystem Studies Units Network

By Kathy Kupper  
National Park Service, U.S. Department of the Interior

(Washington, D.C.) – Dr. Thomas Fish will become the new National Coordinator of the Cooperative Ecosystem Studies Unit (CESU) Network on September 17, 2007.

The CESU program coordinates in-depth ecosystem studies that combine the resources and expertise of 17 host universities, 13 federal agencies and more than 200 partner organizations. The collaborations provide resource managers throughout the federal government with high-quality research, educational support, and technical assistance.

Dr. Michael Soukup, National Park Service Associate Director for Natural Resource Stewardship and Science and member of the CESU Council, led the search committee for the new coordinator. "The CESU Council members worked very hard to find

[New CESU Coordinator, page 5](#)

## INSIDE THIS ISSUE

- 1 [Legacy Program Update](#)
- 1 [Legacy Project Highlight of the Month](#)
- 1 [In The News](#)
- 2 [Training](#)
- 3 [Announcements and Events of Interest](#)
- 8 [Recent Natural Resources Documents On DENIX](#)
- 9 [Did You Know?](#)
- 9 [Contact Us](#)

## Training

### **NEW! Safe Harbor Agreements/Candidate Conservation Agreements, CSP3144 (Replaces ECS3144):**

November 5-9, 2007 at NCTC Campus, Shepherdstown, West Virginia. This course will cover three key Fish and Wildlife Service voluntary agreements for listed and candidate species: Candidate Conservation Agreements, Candidate Conservation Agreements with Assurances, and Safe Harbor Agreements. Topics will include appropriate situations in which to use these agreements; how they can support recovery of species listed under the Endangered Species Act (ESA) or prevent the need to list species; strategies, mechanics, and purposes of developing and implementing them; legal and policy requirements; basic components of the agreements; how to evaluate their effectiveness; and benefits to participating landowners. Case studies and group discussion will be used to illustrate course concepts. This course is best suited for FWS biologists; land managers and biologists from other Federal agencies, State agencies, and Tribes; private property owners; individuals involved in community-based cooperative conservation planning; and other partners interested in and/or responsible for developing, implementing, and/or reviewing any of these agreements. For details on this course please visit: <https://www.denix.osd.mil/denix/Public/Library/NCR/interagency.html?fm-dodcp>.

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

**Health & Environmental Risk Communication Workshop:** January 22-24, 2008 in Barstow, CA & April 1-3 in MCB Quantico, VA. This 3-day ISEERB approved course provides attendees with basic knowledge and tools to effectively communicate risk and risk management issues to stakeholders of diverse interests. This includes developing a proactive program to establish and maintain a sound relationship through dialogue with stakeholders based on mutual trust and credibility. Instruction focuses on how to have open discussions on environmental restoration issues, establish confidence in communicating key messages, develop effective media and public meeting techniques, improve verbal and non-verbal communication skills, and revitalize stakeholder dialogue. Although the course was originally designed to meet the needs of restoration personnel, other environmental personnel can benefit from this training. Eligible personnel include Military and civilian personnel responsible for communicating environmental risk management issues to the public, regulators and/or media stakeholders including remedial project managers, BRAC Environmental Coordinators, Base Closure Team members, installation environmental program managers, experts, engineers, scientists, health and safety personnel, natural resource personnel, and others. For more information visit <https://www.cecos.navy.mil/coursedetail.cfm?courseid=67>.

**Natural Resource Compliance:** January 15-18, 2008 in Corpus Christi, TX. This course offers instruction in specific natural resource laws, regulations, policies, Executive Orders, DoD Instructions, and other guidance, noting Service-specific requirements. Course addresses stewardship, preservation, and process; fish, game, and wildlife management laws; protection of wetlands, waterways, and other protected ecological areas; forest and land use management laws; and interservice cooperation. Practical exercises and guest speakers are included. This course is approved by the Interservice Environmental Education Review Board (ISEERB). For details visit <https://www.cecos.navy.mil/coursedetail.cfm?courseid=42>.



## Announcements and Events of Interest

**NEW! Request for Proposals for Hawai'i Invasive Species Council Research and Technology Projects:** The Hawai'i Invasive Species Council seeks to promote effective tools for the control and management of alien invasive species using the best available scientific information. Research proposals that provide clear links between management and research or the effective application of technology will be given first priority. Research and Technology proposals are being accepted for projects targeting the following HISC goals: develop research projects that address problems in the State created by alien invasive species Implement technology programs that prevent the establishment or improve the control of invasive species in Hawai'i, develop effective, science-based management approaches to control alien invasive species, and effectively communicate the results of research to the field where it can be applied Promote interagency collaboration and stimulate new partnerships Proposal submission deadline is October 5, 2007. For details contact Christopher Buddenhagen at [christopher.e.buddenhagen@hawaii.gov](mailto:christopher.e.buddenhagen@hawaii.gov). You may also contact Karmin Kime at [DLNR.HISC@hawaii.gov](mailto:DLNR.HISC@hawaii.gov), or visit <http://www2.hawaii.gov/bidfiles/RFP%20DOFAW%2DHISC%2DRT%2D08%2Epdf> for details.

**NEW! Request for Proposals for Hawai'i Invasive Species Council Coqui Frog Research and Technology Projects:** Research and Technology proposals are being accepted for projects targeting the following HISC goals related to Coqui Frog control and management: develop research projects that address problems in the State created by Coqui Frogs, implement technology programs that prevent the establishment of Coqui Frogs in the State, develop effective, science or technology based management approaches to control Coqui Frogs in the State, and effectively communicate the results of research to the field where it can be applied, promote interagency collaboration and stimulate new partnerships. Proposal submission deadline is October 5, 2007. For details on how to register contact Christopher Buddenhagen at [christopher.e.buddenhagen@hawaii.gov](mailto:christopher.e.buddenhagen@hawaii.gov) or visit <http://www2.hawaii.gov/bidfiles/RFP%20No%2E%20DOFAW%2DHISC%2DCF%2D081%2Epdf> for details.

**NEW! Request for Proposals for Hawai'i Invasive Species Council Coqui Frog Research and Technology Request for Proposals for Public Outreach Projects for the Hawai'i Invasive Species Council:** Through the Public Outreach grant program, the HISC seeks to augment the coordinated invasive species media plan for HISC member agencies and maximize the effects of the HISC's shared resources and responsibilities in terms of outreach. Public outreach proposals are being accepted for projects targeting the following HISC goals: support educational efforts that target specific invasive species, develop activities that communicate the consequences of invasive species to the public, increase voluntary compliance of quarantine laws, inform public to minimize the possibility of introductions of invasive species, increase awareness to improve reporting of pests, increase community involvement in invasive species control projects. Proposal submission deadline is October 5, 2007. Please direct inquiries relating to this solicitation to Chris Buddenhagen at [christopher.e.buddenhagen@hawaii.gov](mailto:christopher.e.buddenhagen@hawaii.gov) or visit <http://www2.hawaii.gov/bidfiles/RFP%20DOFAW%2DHISC%2DPO%2D081%2Epdf>

**Wildlife Habitat Council 19<sup>th</sup> Annual Symposium "The Value of Green":** November 12-13, 2007 at the Hyatt Regency Baltimore, MD. Each year, WHC brings together record numbers of corporate, government and conservation leaders from around the globe. Learn how to build an awareness, understanding and commitment to biodiversity. Innovative sessions will explore economic benefits, volunteerism, invasive species, educational resources...plus much more! Participate in hands-on outdoor workshops or attend indoor conservation training. For registration details and general information visit <http://www.wildlifehc.org/events/symposium.cfm>.

**NatureServe Conservation Conference:** October 1 - 3, 2007 at the Denver Marriott West, in Golden, Colorado. The NatureServe Conservation Conference 2007 is an international training, education, and networking event for the environmental conservation community. Conservation leaders, thinkers, and doers come together for three days of education, discussion, idea exchange, and professional networking. This conference joins natural resource management professionals from the non-profit, government, and corporate sectors to learn from each other, share innovations, and discover useful opportunities for collaboration. For more details visit the conference website at [http://www.natureserve.org/visitLocal/cons\\_conference2007.jsp](http://www.natureserve.org/visitLocal/cons_conference2007.jsp).

**10<sup>th</sup> Watershed & Wetlands Workshop:** October 22-25, 2007 at the Carousel Resort Hotel, Ocean City, MD. Watershed and wetland protection and restoration are now more crucial than ever and have been made part of the EPA's list of priorities. Protection and restoration using the watershed approach is an important venue for all who strive to protect our vital aquatic resources. This workshop will increase dialogue and foster partnerships among federal, state, and local agencies, tribal nations, non-governmental organizations, the scientific community, private industry, and all other stakeholders involved in the management of aquatic resources. Topics important to our aquatic resources such as sea-level rise, limited funding for research, monitoring, and restoration, population increase, guidance subsequent to the RAPANOS decision, and other relevant and current issues confronting all interested in aquatic environments are open for discussion. For details visit <http://www.wetlandsworkgroup.org/>.

**Partners in Environmental Technology Technical Symposium & Workshop:** December 4-6, 2007 at the Marriott Wardman Park Hotel in Washington, D.C. This conference assembles environmental researchers and technology developers with the defense user and regulatory communities to showcase cutting edge environmental technologies and ideas, as well as communicate the most difficult challenges of our defense establishment. The conference has a comprehensive technical program consisting of concurrent sessions highlighting proven environmental technologies, as well as technologies needed to address emerging DoD environmental challenges. Full registration in advance is \$415. For online registration and details visit <http://www.serdp-estcp.org/symposium/>.

**Annual Conference on Ecosystem Restoration and Creation:** The 34th anniversary of The Annual Conference on Ecosystems Restoration and Creation will be held November 1 - 2, 2007 at the Trinkle Building located on the Plant City campus of Hillsborough Community College (Plant City, Florida). The Annual Conference provides a forum for the nationwide exchange of results of the latest scientific research on restoration, creation, and management of not only freshwater and coastal systems but total ecosystems including upland and transitional areas. For more details visit their website at <http://www.hccfl.edu/depts/detp/ecoconf.html>

**Coming Soon! 2007 EPA/State/DoD Region III Environmental Colloquium:** October 30 - November 1, 2007 at the Radisson Plaza Lord Baltimore in Baltimore MD. There is a pre-conference reception on the evening of October 29 at the National Aquarium. The theme for this year's Colloquium is "COMPLIANCE AND BEYOND – Merging Mission and Environment." This is two and half day environmental forum and an excellent partnering and training for environmental professionals at all levels within DOD, state and EPA. Online conference registration is not yet active, but for full conference agenda details visit [http://www.bakerprojects.com/r3\\_envconf/](http://www.bakerprojects.com/r3_envconf/).



## The Cooperative Ecosystem Studies Unit Network

In 1998, P.L. 105-391 (Sec. 203) authorized and directed the Secretary of the Interior “to enter into cooperative agreements with colleges and universities, including but not limited to land grant schools, in partnership with other Federal and State agencies, to establish cooperative study units to conduct multi-disciplinary research...”. In response and under existing cooperative agreement authorities, Interior developed a network of Cooperative Ecosystem Studies Units (CESU).

In 1999, the CESU Network was created with the signing of an interagency Memorandum of Understanding (MOU). The objective of the CESU network is to provide research, technical assistance, and training to federal land management, environmental and research agencies and their partners. The CESU Network’s broad scope includes the biological, physical, social, and cultural sciences needed to address natural and cultural resource management issues at multiple scales and in an ecosystem context.

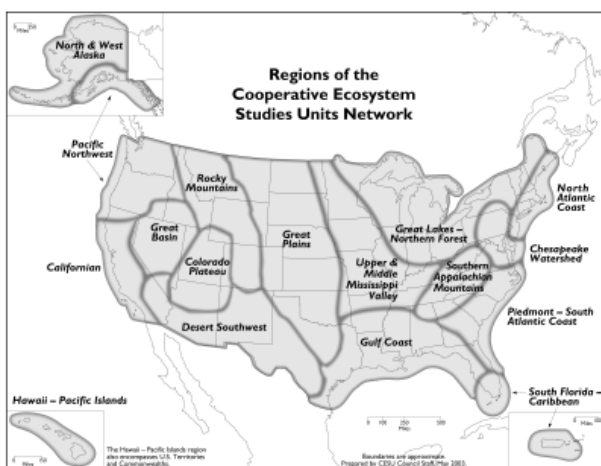
Three key elements comprise each CESU: federal agencies, the host university, and partner institutions (with a requirement of at least one minority institution in each region). Each CESU has a managers’ committee with the responsibility of defining the CESU’s role and mission statement, a strategic plan, and annual work plans. CESU agreements allow each of the participating federal agencies to efficiently transfer funds and duty station employees to university partners while maintaining responsibility for agency-sponsored activities within CESUs.

CESUs 17 biogeographic regions are linked together to form the CESU Network. The Department of Defense became a federal agency partner in the CESU network through an amendment to the MOU in 2000. The US Army Corps of Engineers joined in 2005 to use CESU on USACE managed lands.

### DoD’s participation in the CESU Network

The CESU Network is led by the National CESU Council comprised of representatives from each federal agency signatory of the CESU MOU.

As of 2007, DoD has joined in the Chesapeake Watershed, Desert Southwest, Gulf Coast, Upper and Middle Mississippi Valley, Hawaii-Pacific Island, Colorado Plateau, Californian, Piedmont South Atlantic, and the Southern Appalachian Mountain CESUs.



The CESU Network is organized through 17 Biogeographic Regions. DoD is a Federal member of the Desert Southwest, Gulf Coast, Chesapeake Watershed, Upper and Middle Mississippi Valley, Hawaii-Pacific Island, Piedmont South Atlantic, Colorado Plateau and Southern Appalachian Mountain CESUs.

### How to use CESU Agreements

Each CESU is competitively established under a single cooperative agreement. Each CESU’s cooperative agreement provides a detailed explanation of the conditions and provisions governing all CESU projects; each CESU agreement provides the basis for initiating cooperative projects between the participating federal agencies and partner institutions. An installation’s natural or cultural resource manager is responsible for developing a SOW for the desired project and for coordinating with the DoD CESU Regional Coordinator regarding the selection of a partner institution and the project’s principal investigator.

After selection of the principal investigator and partner institution, a grants officer is responsible for creating the modification to the existing Cooperative Agreement. All the terms and conditions of the agreement are already negotiated, thus reducing the amount of time before project implementation.



## **Partnership Objectives**

- Provide resource managers with high-quality scientific research, technical assistance, and training.
- Deliver research and technical assistance that is timely, relevant to resource managers, and needed to develop and implement sound adaptive management approaches.
- Ensure the independence and objectivity of research.
- Create and maintain effective partnerships to share resources and expertise.
- Encourage professional development of federal scientists.
- Manage federal resources effectively.

## **Benefits to DoD**

DoD's participation in CESUs allows all DoD Services to benefit from:

- Fast access to, and implementation of, cooperative agreements with partner institutions.
- Access to high quality science and training of Federal employees at universities.
- Opportunities to reduce cost through partnerships and interagency collaboration.
- A reduced, Network-wide overhead rate of 17.5%.
- A broadened scope of scientific services.
- Multidisciplinary problem-solving at several ecological scales.
- Increased partnership opportunities among federal agencies, universities and scientists.
- Increased research, technical assistance, and education for resource managers.
- Professional development opportunities for agency scientists and employees.
- Improved collaboration between natural and cultural resource managers.
- An expanded constituency for federal science.

## **DoD's Participation**

From 2001-2007 DoD has funded over 80 projects through the CESU totaling over \$11M. These projects have provided access to high quality scientists from a number of universities in the pool of over 180 member institutions in the CESU Network. In addition, DoD's CESU projects have resulted in savings through cost avoidance of approximately \$3 million in the past four years.

## **DoD's expansion through CESU**

As of August 2007, the Department of Defense is exploring the possibilities of expanding its presence in the CESU Network. Future plans for DoD may include membership in the Rocky Mountains, North Atlantic Coast, and Great Plains CESUs.

The US Army Corps of Engineers-Civil Works joined the CESU Network in June 2005. The Corps is a separate entity from DoD in the Network. Prior to 2005, the Corps' access to CESUs was permitted only for work on military installations through DoD participation.

In 2006 the US Army Corps of Engineers-Civil Works joined the Upper and Middle Mississippi Valley, Gulf Coast, the South Florida-Caribbean, and the Great Lakes-Northern Forest CESUs.

The DoD National CESU Coordinator's office is the primary point of contact to assist installation managers in contacting DoD Regional Coordinators.

someone with just the right skills to lead the network at this time in its development,” said Soukup. “Tom’s personality and background enable him to create and maintain the vital partnerships necessary to produce the timely and relevant information needed to make decisions on biological, physical, social, and cultural resource issues.”

Dr. Fish has worked in natural resource management, planning, research, and education for 20 years. Since 2000, he has directed professional development training, technical assistance programs, and applied research projects aimed at the integration of social and biophysical information for the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center in Charleston, South Carolina. He received a Ph.D. in conservation biology from the University of Minnesota.

## Did You Know?

**The Department of Defense is a Federal Agency member of the Cooperative Ecosystem Studies Unit (CESU) and is a member in 9 of the 17 Biogeographical Ecoregions that comprise the CESU Network. Find more details on DoD’s participation in CESU at [https://www.denix.osd.mil/denix/Public/Library/NCR/cesu\\_info.html?fm-cesu](https://www.denix.osd.mil/denix/Public/Library/NCR/cesu_info.html?fm-cesu)**

You should know, it says so on the Legacy Project Highlight of the Month!



## Recent Natural Resources Documents On [DENIX](#) and Web

**NEW! [Bald Eagle Management Guidelines](#)** This memorandum from the Office of the Assistant Deputy Under Secretary of Defense (Environment, Safety, and Occupational Health) provides guidance for all installation managers on Management Actions to Protect Bald Eagles after Delisting and provides additional information in the attached "Bald Eagle Recovery Questions and Answers," publication from the U.S. Fish and Wildlife Service. Find the MOU at [https://www.denix.osd.mil/denix/Public/Library/NCR/plantools\\_handbooks.html](https://www.denix.osd.mil/denix/Public/Library/NCR/plantools_handbooks.html).

**NEW! [Remote Monitoring of Island Foxes](#)** (Legacy 06-308): This report details an innovative radio-telemetry system for monitoring San Nicolas Island foxes through a DoD Legacy funded research and demonstration project on San Nicolas Island off the coast of California. It describes monitoring efforts and accomplishments using this system, summarize the results of the first year of intensively monitoring fox survival, and develop a preliminary set of monitoring-based criteria to trigger management actions based on these results. Includes a discussion of ways in which the system can be improved and new developments to be implemented in the second year of this project. For details visit [https://www.denix.osd.mil/denix/Public/Library/NCR/animals\\_birds.html?fm-natres](https://www.denix.osd.mil/denix/Public/Library/NCR/animals_birds.html?fm-natres).

**NEW! [Fact Sheet: Remote Monitoring of Island Foxes](#)** (Legacy 06-308): a 1 page fact sheet that summarizes the project to date. Visit [https://www.denix.osd.mil/denix/Public/Library/NCR/Animals\\_birds/FS\\_6-308\\_2007.pdf](https://www.denix.osd.mil/denix/Public/Library/NCR/Animals_birds/FS_6-308_2007.pdf).

**NEW! [Fact Sheet: The Role of DoD Lands for Endangered Species Protection](#)** (Legacy 06-302): NatureServe's update of its analysis of the distribution of imperiled and endangered species on federal lands based on current species locational GIS data. Over the past decade a number of changes have made such a reassessment timely, and this new analysis provides a current view of relative stewardship responsibilities of federal land management agencies, including DoD. Visit [https://www.denix.osd.mil/denix/Public/Library/NCR/endangered\\_sp.html?fm-natres](https://www.denix.osd.mil/denix/Public/Library/NCR/endangered_sp.html?fm-natres).

**[North American Pollinator Protection Campaign Memorandum of Understanding \(MOU\)](#)**: signed June 26, 2007: this MOU's purpose is to commit to cooperation between the Department of Defense and the Coevolution Institute in matters relating to the management and conservation of pollinators and their ecosystems in DoD's natural resource management plans and practices. Visit <https://www.denix.osd.mil/denix/Public/Library/NCR/policy.html?fm-dodcp>.

**[DoD Partners In Flight Fact Sheets](#)**: The following fact sheets have been posted on the DoD Partners In Flight page on DENIX, the updated versions of Bird Aircraft Strike Hazard (BASH), International Conservation: DoD's Connection to Neotropical Migrants in Latin America and the Caribbean, Important Bird Areas: DoD lands benefit priority bird species, and the newly released fact sheets: Bird Species of Concern: Identifying Priority Bird Species of Conservation Concern on DoD Lands, Bird Conservation Database: Web-based Access to Bird Research and Management Information on DoD Lands, and West Nile Virus: Minimizing the threat to humans and birds. All this fact sheets are available at <https://www.denix.osd.mil/denix/Public/Library/NCR/dodpif.html>.

### Redesign Notice

**DENIX is currently being redesigned and an intensive analysis, cleansing, and migration of web site content is currently in process. The planned launch of the redesigned web site is scheduled for November 1, 2007. In preparation for the launch, the current DENIX website will be 'frozen' and no new content will be posted effective October 1, 2007.**



## Did You Know?

**Eeeeelss!** - Moray eels are large cosmopolitan eels of the family Muraenidae. There are approximately 200 species in 15 genera. The typical length for a moray is 1.5 m (5 ft), with the largest being the slender giant moray, *Strophidon sathete*, at up to 4 m (13 ft). Morays frequent tropical and subtropical coral reefs to depths of 200 m, where they spend most of their time concealed inside crevices and alcoves.

The dorsal fin of the moray extends from just behind the head, along the back and joins seamlessly with the caudal and anal fins. Most species lack pectoral and pelvic fins, adding to their snake-like appearance. Their eyes are rather small; morays rely on their highly developed sense of smell, lying in wait to ambush prey.

The body of the moray is patterned, with camouflage also being present inside the mouth. Their jaws are wide, with a snout that protrudes forward. They possess large teeth, designed to tear flesh as opposed to holding or chewing.

The Reticulate Moray eel, *Muraena retifera*, have a second set of jaws in their throat called pharyngeal jaws, which also possess teeth. When feeding, morays launch these jaws into the oral cavity, where they grasp struggling prey and transport it into the throat and down to the rest of the digestive system. Moray eels are the only known type of animal that uses pharyngeal jaws to actively capture and restrain prey. This is the first described case of a vertebrate using a second set of jaws to both restrain and transport prey. The extreme mobility of the moray pharyngeal jaws is made possible by elongation of the muscles that control the jaws, coupled with reduction of adjacent gill-arch structures. The discovery that pharyngeal jaws can reach up from behind the skull to grasp prey in the oral jaws reveals a major innovation that may have contributed to the success of moray eels as apex predators hunting within the complex matrix of coral reefs.

Morays are capable of inflicting serious wounds to humans. Some moray species secrete toxic protective mucus over their smooth scaleless skin. Morays have much thicker skin and high densities of goblet cells in the epidermis that allows mucus to be produced at a higher rate than in other eel species. This allows sand granules to adhere to the sides of their burrows in sand-dwelling morays, thus making the walls of the burrow more permanent due to the glycosylation of mucins in mucus. Their small circular gills, located on the flanks far posterior to the mouth, require the moray to maintain a gape in order to facilitate respiration.

Morays are carnivorous and feed primarily on other fish, cephalopods, mollusks, and crustaceans. Groupers, other morays, and barracudas are among their few predators. There is a commercial fishery for several species, but some have been known to cause ciguatera fish poisoning.



The Reticulated Moray Eel, *Muraena retifera*. Photo by NOAA

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## Contact Us

For further information about the Legacy Resource Management Program please contact:

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## Disclaimer

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