

Endangered Species UPDATE

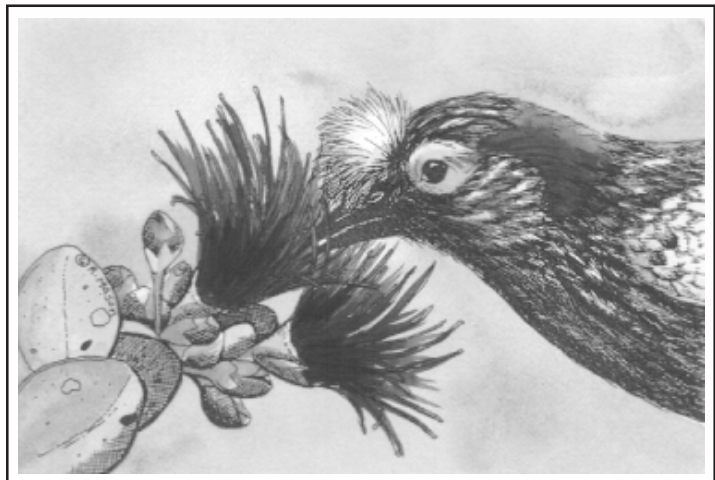
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Letter from the Editors

This issue marks a new beginning for the *Endangered Species UPDATE*, now under the advisement of Professors Bobbi Low, Steve Brechin, and Emily Silverman at the School of Natural Resources & Environment. However, the *UPDATE* staff also would like to acknowledge the guidance, tenacity, and tireless enthusiasm of Dr. Terry Root. Dr. Root was instrumental in establishing and sustaining the *UPDATE* for the last decade, steering it from reprints of the USFWS Endangered Species Bulletin to the expanded journal format of today. Thank you Terry!

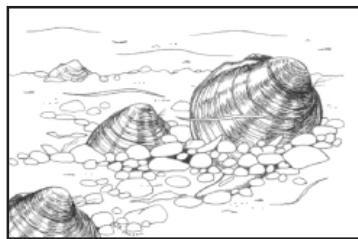
The *UPDATE* continues to evolve. We currently are working to perfect our electronic subscriptions and offer internet access to all of our readers. A complete archive of *UPDATE* articles should be available by the end of the summer.

And special thanks to you, our dedicated membership. We continue to welcome any and all comments, suggestions, Letters to the Editor, manuscripts, and other contributions.

Sincerely,

Beth Hahn & Jennifer MacKay

FOCUS ON NATURE™ by Rochelle Mason



The **HIGGINS EYE (PEARLYMUSSEL)** (*Lampsilis higginsii*) is a 3-3 1/2 inch freshwater bivalve. Its valves (shells) are yellowish-brown with dark growth ridges and greenish rays. As a mussel, it differs from a clam in that a mussel needs a host species to complete its life cycle. The glochidia (mussel larvae) of the Higgins Eye attach to the gills of two specific fish species for one to four weeks as their shells begin to form. Maturation and a lengthy lifespan require a clean gravel/mud riverbed without silt in the upper Mississippi River and its tributaries. Swift currents of the deep water provide dietary microorganisms. Because bivalves are filter-feeders, they are an important "barometer" of water health thus helping us to improve our water quality. Relocation efforts to rivers unaltered by dams, dredging or pollutants are attempting to help save this endangered mollusk. © 2001 by endangered species artist, Rochelle Mason. www.rmasonfinearts.com. (808) 985-7311

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Cover: The endangered crested honeycreeper, or 'Akohekohe, (*Palmeria dolei*) is endemic to Hawaii and is shown feeding on the blossom nectar of the 'ohi'a tree. ©2000 Rochelle Mason, Rochelle Mason Fine Arts, (808) 985-7311, www.rmasonfinearts.com

The views expressed in the *Endangered Species UPDATE* may not necessarily reflect those of the U.S. Fish and Wildlife Service or The University of Michigan.

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Technical Note

Federally Endangered Winged Mapleleaf Mussels Cultured and Placed in the St. Croix River, Minnesota

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The winged mapleleaf mussel (*Quadrula fragosa*) is a federally-listed endangered species that once inhabited at least 34 river systems in 12 Midwestern states. Presently, the only known reproducing population exists along a 10-kilometer stretch of the St. Croix River, Minnesota (Hornbach et al. 1996). The small isolated population is at risk from several factors, most notably a potential zebra mussel (*Dreissena polymorpha*) infestation and the effects of variable water releases from a hydropower dam just upstream (USFWS 1997).

The life cycle of most North American freshwater mussels is closely linked with fishes. The larvae (glochidia) attach to the gills or fins of host fish and transform into juvenile mussels able to survive on their own. Glochidia may attach to several different species of fish but die if they are not attached to the host species. If the host fish species are absent, adult mussels live, but the glochidia will perish and mussel beds eventually die off.

Over the last three years we have conducted laboratory trials to identify the fish species that serve

as hosts for winged mapleleaf glochidia. Winged mapleleaf glochidia are released in ribbon-like packets (Figure 1). We have exposed over 60 fish species to these glochidia but only select members of the catfish family (Ictaluridae) support extended glochidial attachment. Glochidia remain attached to yellow and black bullheads (*Ameiurus natalis* and *A. melas*), slender madtom (*Noturus exilis*), and flathead and channel catfish (*Pylodictis olivaris* and *Ictalurus punctatus*) for an extended period of time.

Winged mapleleaf glochidia are somewhat unusual in that they are very small and grow while attached to fishes. Glochidia doubled or tripled in size while attached to yellow and black bullheads, slender madtom, and flathead catfish. Juvenile mussels excysted from channel catfish and grew several times their original diameter (Figure 2).

This spring we collected 35 juvenile winged mapleleaf from 20 channel catfish. The juvenile mussels were returned to the downstream-most edge of the species' range in the St. Croix River, Wisconsin.

This research project will be expanded next year. Likely host fish species that are naturally infested with glochidia will be collected from the St. Croix River to verify laboratory results. We will work with other organizations to expand the effort to identify suitable glochidial hosts. Roger Gordon and biologists at the U.S. Fish and Wildlife Service (USFWS) Genoa National Fish Hatchery, Wisconsin, and Pam Thiel and biologists at the USFWS Fishery Resources Office, at Onalaska, Wisconsin, will be working with our research team to expose flathead catfish, blue catfish (*Ictalurus furcatus*), and channel catfish, among other species, to determine if they will facilitate glochidial transformation in the laboratory.

For additional information on winged mapleleaf visit our web pages at: <http://www.fw.umn.edu/Personnel/staff/Hove/Outreach/2000/winged.mapleleaf.report> and <http://www.macalester.edu/~hornbach/Qfragosa.html>.

Acknowledgements

Lynn Lee and his colleagues at the Upper Midwest Environmental Science Center contributed channel catfish that supported glochidial

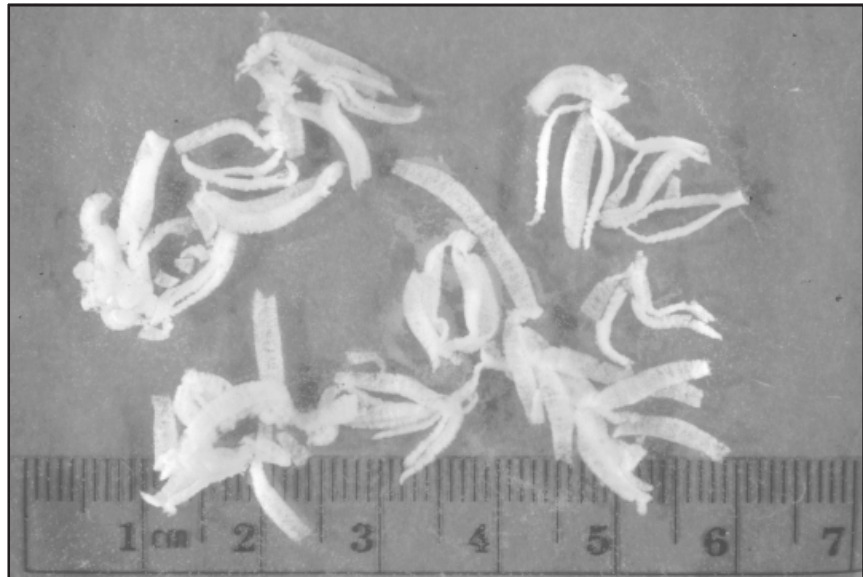


Figure 1. Winged mapleleaf glochidia are released from the female in ribbon-like packets.

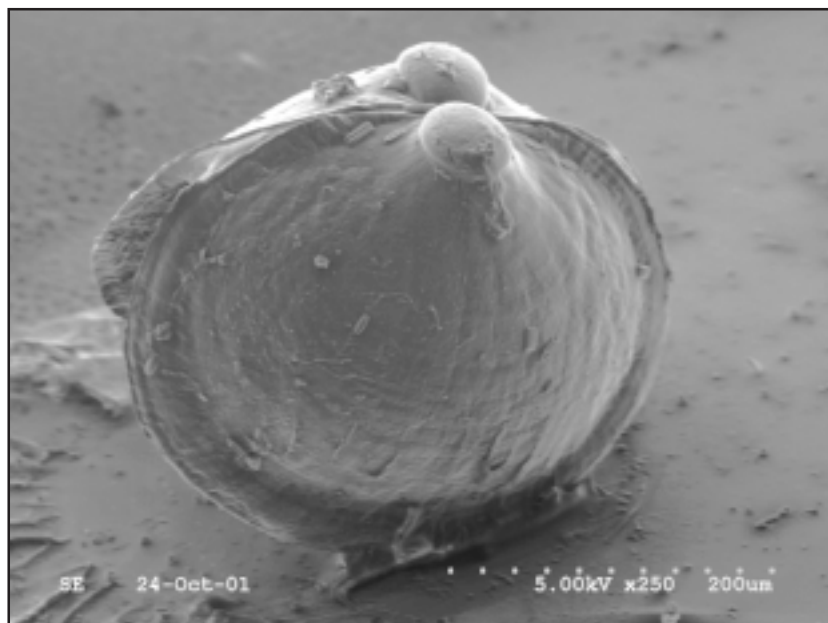


Figure 2. Winged mapleleaf glochidia grow while attached to channel catfish. Note the glochidial shell at the top of the valves. The length of the white dotted line is 200 microns.

metamorphosis. Financial support was provided by the NRPP-Threatened and Endangered Species Fund.

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Factors influencing the distribution and abundance of the endangered winged mapleleaf *Quadrula fragosa* in the St. Croix River, Minnesota and Wisconsin. *American Midland Naturalist* 136(2): 278-286.

Legislative UPDATE

Klamath River Basin

Recent severe drought in the Klamath River Basin has caused problems for farmers, endangered species, and the U.S. government. The primary factor is that there simply is not enough water to go around. The farmers need it, the fish need it, the birds need it, the plants need it — and the government does not know where to get it.

Background information

In 1906 the U.S. Bureau of Reclamation established the Klamath Project in order to make use of barren land in the Klamath River Basin. The Project provided irrigation for about 204,000 acres in the Basin via the diversion of water flow from three lakes and two rivers (Quinn 1999).

Environmental concerns were expressed by the U.S. Fish and Wildlife Service as early as 1912. It observed a decline of birds at the lower Klamath National Wildlife Refuge, and by 1930 conditions had also deteriorated at Tule Lake's refuge (Quinn 1999).

The Bureau of Reclamation, however, ignored these early warnings and proceeded to give the fertilized land to war veterans. It guaranteed water to the veteran farmers for the production of agriculture, which now includes alfalfa, wheat, potatoes, barley, sugar beets, and onions. The number of farmers in the Basin increased to approximately 1,500, and the Basin became so prosperous that, until recently, it provided about \$250 million in agriculture, a significant contribution to the region's economy (Herger 2001).

However, the Klamath Basin is

also home to several endangered and threatened species. These include the endangered shortnose suckerfish (*Chasmistes brevirostris*), lost river suckerfish (*Deltistes luxatus*), and Coho salmon (*Oncorhynchus kisutch*), as well as the threatened bald eagle (*Haliaeetus leucephalus*). The Endangered Species Act (ESA) specifies certain requirements for these species; the suckerfish require lake water levels to be between 4,137 and 4,143 feet, and the salmon need river flow rates of at least 1,300 cubic feet per second (Kepple 2001). Bald eagles feed on waterfowl in the basin, and these prey species also have high water requirements.

The recent drought, though, has drastically reduced water levels and flow rates below these required minimums. Therefore, on April 6, 2001 — in a decision that has come to be known as the "zero water" decision — the Bureau terminated irrigation to the farmers, redirecting it to the lakes and rivers to satisfy the species' habitat requirements (Herger 2001).

Thus a resolution and/or compromise between the farmers' needs and the ESA's requirements is necessary. The arguments for each side are outlined below.

The farmers' arguments

First, and most apparent, the farmers claim that the government has no right to revoke the guarantee of water they were given decades ago. According to farmer advocates, the farmers lawfully own the land and water. In taking it away, the government is violating the farmers' Fifth Amendment rights, which specify that the government cannot

take private property without fair compensation.

Second, some feel that endangered species should not take precedence over human health, safety, and economic well-being. In other words, the ESA should not place the needs of endangered species above the vital needs of humans. From the farmers' perspective, the fish are being given priority while the farmers are suffering immensely, having produced effectively no crops this season due to the lack of water. This equates to a total economic damage of approximately \$220 million (Herger 2001).

Arguments for endangered species

The ESA requires that the Bureau of Reclamation place the needs of endangered species first. Wildlife should not suffer at the hands of humans each time there is a drought; this leaves some species in a very fragile state, constantly in danger of extirpation (Quinn 1999). Moreover, the government initiated this irrigation system in 1906 and maintained it despite warnings that the system was not sustainable. The current predicament of these endangered fish species is the result of a human-induced problem.

It should also be noted that the Klamath Basin is home to six national wildlife refuges: a total of 192,322 acres of protected land and wildlife. These refuges are home not only to the aforementioned suckerfish, salmon, and bald eagles, but to many other species as well, including mule deer, golden eagle, peregrine falcon, numerous species of migratory birds, and one of only

two populations of white pelicans in California. A water shortage will affect all of these species; thus they need to be protected.

Plans for resolution

The initial concern in seeking to resolve this problem is government compensation for the farmers. The Klamath Basin Relief Act of 2001 is being proposed to compensate the farmers for their employment, crop, livestock, and land-value losses connected with the lack of irrigation. In addition, Oregon and California senators and representatives are seeking \$148 million for the Klamath crisis: \$110 million to provide immediate relief to the farmers and the other \$38 million to contribute to research for a solution to the water shortage and for restoration of wetlands (Burke 2001).

Also, some advocates believe that the ESA should be revised in order to assure that the protection of endangered species does not in-

volve harm to humans.

Conclusion

A long-term solution must be found for the water shortage in the Basin. This is not the first drought to occur (although it is the most severe), and it will not be the last. A compromise must be reached between the ESA and the farmers, and research must be done to investigate solutions. Thus far, possible solutions include: increasing water supplies and storage, supporting environmentally-sustainable sage farming through federal funding, re-vamping the Klamath Project to include the needs of fishes, and creating more farm-free acreage in the Basin's wildlife refuges (Quinn 1999). A solution must be decided upon soon, as the entire Klamath Basin is in a desperate struggle for survival.

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Information for Legislative UPDATE is provided by Ashley McMurray, an undergraduate student of public policy and the environment at the University of Michigan.

Southern Appalachian Biodiversity Project v. Fish and Wildlife Service: In Tennessee Critical Habitat Suit, Failure to Designate Critical Habitat for Endangered Species is a "Continuing Violation" of the Endangered Species Act

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Abstract

On Nov. 8, 2001, U.S. Magistrate Judge Dennis Inman (Eastern District, Tennessee) ordered the U.S. Fish and Wildlife Service to propose critical habitat for 16 Tennessee species. The case is significant because for the first time a court has found that the Service has an ongoing duty to designate critical habitat that is not subject to the six-year statute of limitations found at 28 USC 2401. Thus, the U.S. Fish and Wildlife Service cannot hide behind repeated or archaic "indeterminable" findings to avoid their duties to protect the habitat of threatened and endangered species.

Critical habitat background

As readers of the *Endangered Species UPDATE* well know, habitat destruction is the most serious threat to species' survival. This fact was noted by Congress when it debated passage of the Endangered Species Act (ESA) in 1973: "The loss of habitat is universally cited as the major cause for the extinction of species worldwide."¹

For this reason, Congress implemented several overlapping and incremental mechanisms to protect the habitat of threatened and endangered species. These include the formal designation of critical habitat;² prohibition of "take" of species through habitat modification;³ habitat acquisition;⁴ the requirement for advance consultation with the U.S. Fish and Wildlife Service (FWS) before federal agencies destroy or adversely modify critical habitat;⁵ and the mandated development and implementation of recovery plans for endangered and threatened species.⁶

Because the designation of critical habitat is supposed to occur when a species is listed,⁷ it is designed to

protect species' habitat immediately by preventing federal agencies from taking any action that would destroy or adversely modify the critical habitat.⁸ This is often essential because many newly-listed species face a plethora of development projects that could affect their survival. Critical habitat also provides for future colonization of areas not occupied at the time of listing, thus encouraging the species' recovery.⁹

Critical habitat designation: process and substance

Because critical habitat is supposed to be designated when a species is listed, the appropriate process for FWS to follow would involve consideration of the habitat needs of the species while it is evaluating the species' current condition. Unfortunately, this has rarely been the case, and FWS has made a bad habit of invoking the two statutory exemptions to critical habitat designation. These are that critical habitat is either 1) imprudent or 2) indeterminable. If a determination of imprudence is

made, FWS basically is saying that establishing critical habitat would harm the species by providing location information which would allow unscrupulous members of the public to collect or hunt the species. No further determinations are required, but imprudence can be challenged in court. An "indeterminable" finding means that FWS has insufficient information to make a decision, and this situation must be resolved within one year of the listing of the species.¹⁰

Background on SABP's critical habitat litigation

In the Southeast, the FWS has repeatedly failed in its duties to designate critical habitat. In North Carolina, FWS has not designated critical habitat for *any* of the 25 species listed as threatened or endangered since 1988, and in Tennessee the same is true for the 53 species listed since 1986.

Southern Appalachian Biodiversity Project (SABP) began to address this situation in 1999, when we sued FWS for its failure to designate critical habitat for four spe-

cies in North Carolina.¹¹ This case was settled with a court-enforced schedule to withdraw the four "imprudence" determinations and reconsider the benefits of critical habitat.

The successful North Carolina action was followed by the current case involving 16 Tennessee species,¹² including 14 freshwater mussels and two plants. The proliferation of endangered freshwater mussels in this region is no mystery; the area has been confirmed as a "hotspot" of biological diversity for endemic freshwater mussels.¹³

One of the plants, Eggert's sunflower (Figure 1), also occurs in Kentucky. One of the largest Kentucky populations, found along U.S. 70 in Mammoth Cave National Park, was subject to forced relocation to allow for highway widening in the fall of 2001. While the success of this relocation is still unknown, it is important to note that if the site of the population had been designated as critical habitat, the forced relocation would not have occurred, as the road widening project is certainly "adverse modification" of the habitat.

The 16 Tennessee species were divided between seven "imprudent" determinations made between 1995 and 1997 and nine "indeterminable" findings in 1993, all nine of which involved mussel species.¹⁴ We realized at the outset that these nine species were listed more than six years ago and could be subject to the Statute of Limitations, 28 U.S.C. §2401. Our intent was to extend the boundaries of Critical Habitat designations by forcing FWS to follow up on supposedly "stale" determinations.

For the seven "imprudent" species, FWS admitted that its original determinations warranted reconsideration and asked for a voluntary remand from the Court. Our position was that in light of past refusal to designate critical habitat, FWS could not be trusted to undertake any "vol-

untary" actions, and a court order with a time schedule for designating critical habitat was necessary.

The heart of the case: the nine "indeterminable" species

The nine "indeterminable" mussel species were listed as endangered on March 17, 1993,¹⁵ and in the same document, FWS determined that "[c]ritical habitat may be prudent but is not *now* determinable" (emphasis added).¹⁶ The Secretary then invoked the one-year extension and stated further on the same page, "The Service [FWS] will make a decision on designation of critical habitat and assess whether designation of critical habitat is prudent."¹⁷

We argued to the Court that such language was clearly prospective,



Figure 1. Eggert's sunflower (*Helianthus eggertii*). Photo by Renee Slaughter.

and at the filing of the action on October 12, 2000, no determination or decision had been made. Moreover, the FWS admitted in its response to our 60 day notice that it was still considering critical habitat for the indeterminable species and anticipated publishing a proposal early the following year.¹⁸ Implicitly, the FWS admitted its ongoing duty and claimed to be taking action, yet no final action has been taken.

Our position was that the six-year statute of limitations, 28 U.S.C. Section 2401(a) had not yet commenced to run because the FWS's continuing failure to designate critical habitat

was a "non-action" which did not trigger the statute; or, alternatively, the statute had been tolled by congressional action.

First, we asserted that the congressional moratorium from April 10, 1995, to April 26, 1996,¹⁹ tolled the six-year statute of limitations for filing a civil action against the United States of America for failure to designate critical habitat. This moratorium expressly rescinded funds available for making threatened and endangered species determinations and for critical habitat determinations. The Ninth Circuit found that although the Rider did not repeal the Secretary's duty to make final determinations, it did effectively restrict his ability to comply with his statutory obligation by denying him funding.²⁰

The FWS argued that even though the congressional moratorium prevented it from acting and complying with its mandatory duties due to lack of funding, such a moratorium certainly would not prevent a citizen suit from being filed. The government's argument ignored the expressed language of the moratorium, which clearly prevented any Court from granting any relief against the United States for failure to act. The statute of limitations was, in effect, tolled.

Alternatively, we argued that the FWS's continuing failure to designate critical habitat for the species at issue equates to a continuing violation of an obligatory, mandatory duty, and that failure tolls the statute of limitations because the statute never commences to run. The ESA at 16 U.S.C. Section 4(a)(3)(A) and 4(b)(6)(C) creates that mandatory, obligatory duty. The Secretary's continued violation of those sections by neither designating critical habitat nor making a decision not to designate critical habitat is not a decision or an action which would commence the statute of limitations to run.

The FWS argued that there was a "discreet event" the day after the expiration of the one-year extension, when the statute of limitations began to run, and that it would be improper "to construe that discreet event as a continuing violation that would hold the statute of limitations in abeyance for time in memorial and leave the federal government forever vulnerable to stale claims..."²¹

The Court did not accept that argument. The Court ruled that 16 U.S.C. Section 1533(b)(6)(C) unequivocally directs the FWS to designate critical habitat within one year of listing a species as endangered, and there was no statutory exception to that directive. "The Service's [FWS] non-action logically can only be construed as a continuing violation of 16 U.S.C. Section 1533(b)(6)(C). The statute of limitations commences to run anew each and every day that the Service does not fulfill the affirmative duty required of it. In short, the statute of limitations has never commenced to run."²² Other District Courts have ruled similarly against the U.S. Environmental Protection Agency (EPA) in Clean Water Act decisions when the EPA fails to perform a non-discretionary duty mandated by Congress.²³

Remedy

In our briefs, SABP offered several cases in which the court ordered critical habitat designations to occur anywhere from a few days to several months. Because most of these cases involved one or a few species, and ours involved 16, we asked the Court to order FWS to complete the designations within one year. The FWS, in turn, argued that monetary and staffing limitations precluded them from beginning the process until 2003, and offered a schedule with its request for a voluntary remand.

Conclusions

In resolving the question of the appropriate remedy, it seems that the Court was acting cautiously and adopted the delayed schedule of FWS for beginning and completing the new designations. However, the Court did incorporate SABP's request for an enforceable schedule for the sixteen species. For the "imprudent" species, FWS will retract and reconsider their "imprudent" findings beginning in May 2003, while the nine "indeterminable" species will have final designations by March 2003.²⁴

Notwithstanding this schedule, what is most important about this case is that FWS will not in the future be able to hide behind repeated or old "indeterminable" findings. Habitat protection was afforded by Congress for a reason, and in the 21st Century, it is essential that biodiversity activists enforce this protection to the maximum extent possible.

Acknowledgements

Marty Bergoffen is Campaign Coordinator and Staff Attorney for Southern Appalachian Biodiversity Project (SABP). Mr. Bergoffen's last article for the *UPDATE* (June 1996) concerned the application of NEPA to critical habitat designations. Joe McCaleb is an environmental lawyer in central Tennessee.

Endnotes

1 S. Rep. No. 307 at 1-2, 93d Cong., 1st Sess. (1973), reprinted in 1973 U.S.C.C.A.N. 2989.

2 See 16 U.S.C. §1533(a).

3 "Harm in the definition of 'take' in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. §17.3. See also *Babbitt v. Sweet Home Chapter of Communities for a Greater Oregon*, 515 U.S. 687, 708, 115 S.Ct. 2407, 2418, 132 L.Ed.2d 597 (1995).

4 See ESA Section 5, 16 U.S.C. §1534.

5 "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary . . . to be critical . . ." 16 U.S.C. §1536(a)(2).

6 See 16 U.S.C. §1533(f).

7 16 U.S.C. §1533(a)(3)(A).

8 16 U.S.C. §1536(a)(2).

9 The U.S. Court of Appeals, 5th Circuit, affirmed the recovery aspects of critical habitat. The court held that FWS interpretation of the "adverse modification" standard improperly restricted Section 7 consultation to projects affecting the only the survival of a species by critical habitat destruction, while ignoring impacts to recovery of the species. The court therefore ordered FWS to reconsider their critical habitat designation for the Gulf sturgeon to include areas not currently occupied, but available for recovery. *Sierra Club v. U.S. Fish and Wildlife Service*, 245 F.3d 434 (5th Cir. 2001).

10 16 U.S.C. §1533(b)(6)(C)(ii).

11 *SABP v. USFWS*, Case No. 1:99CV01777 (JR) (District of Columbia, Feb. 29, 2000)

12 The full list of sixteen species includes: Braun's rock cress (*Arabis perstellata*), Eggert's sunflower (*Helianthus eggertii*), the Cumberland elktoe (*Alasmidonta atropurpurea*), Cumberlandian combshell (*Epioblasma brevidens*), Oyster mussel (*Epioblasma capsaeformis*), Purple bean (*Villosa perpurpurea*), Rough rabbitsfoot (*Quadrula cylindrica strigillata*), Upland combshell (*Epioblasma metastriata*), Southern acornshell (*Epioblasma othcaloogensis*), Coosa moccasinshell (*Medionidus parvulus*), Southern clubshell (*Pleurobema decisum*), Southern pigtoe (*Pleurobema georgianum*), Ovate clubshell (*Pleurobema perovatum*), Triangular kidneyshell (*Ptychobranthus greeni*), Fine-lined pocketbook (*Lampsilis altilis*), and Alabama moccasinshell (*Medionidus acutissimus*).

13 See *Of Sneezeweeds and Hot-spots*, by Kerry Goldstein, found at <http://www.urich.edu/~journalm/outlook/goldstein2.html>; *Wildlands Recovery in a Human-dominated Landscape: Foundations of a Central Appalachian Restoration Strategy* by Nathaniel P. Hitt and Thomas P. Rooney, <http://www.mtnforum.org/resources/library/hittx97a.htm>.

14 See 60 F.R.56 (1995), 62 F.R. 27973 (1997), 62 F.R. 1647 (1997), and 58 F.R.

14330 (1993).
15 58 F.R. 14330.
16 58 F.R. 14338
17 *Id.*
18 Letter to Marty Bergoffen, dated August 29, 2000, p.2, from Sam D. Hamilton, Regional Director, on file with authors.
19 ESA Appropriations Rider, PL 104-

6(1995), in pertinent part.
20 Environmental Defense Center v. Babbitt, 73 F.3d 867, 871-872 (9th Cir. 1995)
21 The FWS's Supplemental Brief, p. 2, Document 29, on file with authors.
22 Memorandum of Opinion, Case No. 2:00-CV-361, filed November 8, 2001, pp. 6-7.
23 See Sierra Club v. USEPA, 2001 US Dis-

trict Lexis 14582; Kingman Park Civic Association v. USEPA, 84 F. Supp. 2d 1, 7 (DC DC 1999); Natural Resources Defense Council v. Fox, 909 F.Supp. 153, 159 (SD NY 1995).
24 See the Court's Judgment and Order, attached to the Memorandum of Opinion.

Book Review

Discovering Endangered Species

By Nancy Field and Sally Machlis. 1990.
Dog-eared Publications, Middletown WI, 40+ pp. Illustrated.

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Our children are our future – and a sustainable future increasingly depends upon a citizenry of ecological stewards. Thus, it is important to educate children about all aspects of conservation biology. *Discovering Endangered Species* is a comprehensive yet simple introduction to the concept of endangered species and habitat conservation. Geared for children aged 7 to 10, this book is in workbook format and contains a new topic on each page. The topics are presented through exercises, which encourage interaction by provoking thoughts and discussion about species, ecosystems, and the role of human beings in the natural environment. Illustrations are all black and white and are mostly line drawings, which allow for coloring by younger readers.

Discovering Endangered Species is an excellent supplement for environmental education curricula at the primary level. Some of the terminology covered includes biological diversity, endangered versus threatened versus extinct species, captive breeding, migration, and reintroduction.

Specific endangered species (e.g., black footed ferret, Hawaiian goose, blue whale, African elephant, Arizona agave) are highlighted throughout the book, and including details such as physical characteristics, habitat requirements, and reasons for endangerment.



These reasons for endangered species are also highlighted individually and explained conceptually, such as ex-

otic species introductions, poaching, pollution, and habitat loss. Wetlands are given special attention with a board game called "Wandering Through Wetlands."

The book ends with a large illustration entitled, "What Can We Do," which has specific action items for engaging and empowering young people, such as volunteer at a zoo, plant trees, and visit a wildlife refuge. The last page contains blank lines for students to map out their personal plans for helping endangered species.

Discovering Endangered Species is also part of the Discovering Nature Library, which includes other titles, such as *Discovering Wolves*, *Discovering Salmon*, and *Leapfrogging Through Wetlands*. Discounts for large orders are available for schools, gift sets, fundraising, or other events. For more information contact Dog-Eared Publications at: <http://www.dog-eared.com>, or call (888) DOG-EARS.

Special Series Part I – Education in Action

An Evaluation of the Endangered Species Act and Private Landowner Assurances

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Editor's Note

The UPDATE presents a three-part series of educational essays from Nancy Mathews' Wildlife Ecology class at the University of Wisconsin. We are presenting a selection of position papers regarding Section 10 of the Endangered Species Act. This educational exercise is an example of how the next generation of conservation biologists is being trained. In particular, the essay set reflects an emphasis on remaining sensitive to the perspectives of multiple stakeholders. Perhaps some novel ideas are embedded in these essays as well, as fresh eyes often bring new insights to old controversies.

Wildlife Ecology students were given sample Habitat Conservation Plans and were instructed to assume the identity of the associated landowner, who also happened to be a trained wildlife biologist. The role-playing assignment was then given as follows:

Please write a position paper to be presented at a Senate sub-committee hearing on reauthorization of the Endangered Species Act. Support or refute the intent of the Section 10 administrative policies that attempt to make conservation planning more palatable to private property owners. Give a brief overview of the policies and present the pros and cons of the private landowner assurances. Support your position using what you have learned in class, the Endangered Species Act, and the assigned Habitat Conservation Plan.

Introduction

Good afternoon. My name is Corinne Conner. I am a Fish and Wildlife Service biologist in Austin, Texas. I am also a joint owner and manager of Bee Cave Oaks Development, Inc., a development company that operates out of Austin. Except for my four years in college, I have been a lifelong resident of Austin. I grew up on the south side of town; my father worked for the city until I was six, when he bought a small ranch about six miles east of Austin. We lived on that ranch my entire life; it was his sweat and blood. I now own that ranch and live there with my husband and two children. Since my father's passing, my husband and I have acquired the land adjacent to my family's ranch as well. This area is known as the Seven Oaks

Ranch. With Austin expanding rapidly in our direction, Seven Oaks' northernmost boundary now almost lies within the city limit.

Today I am here to discuss reauthorization of the Endangered Species Act (ESA). You may wonder why a small town rancher would care about the Endangered Species Act at all. There are two reasons. First, I received a bachelor's degree in wildlife ecology from the University of Wisconsin at Madison. While a student, I studied endangered species and habitat conservation. In fact, my final project as a senior was to develop a habitat conservation plan for an endangered bird. I currently work as a biologist in the Ecological Services department of the U.S. Fish and Wildlife Service ("the Service").

Secondly, the Endangered Species Act directly affects how I am allowed to manage and develop my land. Bee Cave Oaks Development, Inc., has intended to develop Seven Oaks Ranch for several years, until the discovery of breeding pairs of golden-cheeked warblers (*Dendroica chrysoparia*) on the property. The warbler has been listed as endangered since 1990. As a biologist, I was thrilled to discover at least six more breeding pairs of these rare birds. As a landowner and developer, I was devastated. I was the author of the Environmental Assessment and Habitat Conservation Plan for the Incidental Take of an endangered species on my own property. Today, I am hoping to use my experiences and knowledge to convince the Senate that

changes should be made to the ESA before re-authorization. In particular, I will address private landowner tools, and argue that the administrative policies associated with Section 10(A)(1)(a) should be maintained in the ESA, while those associated with Section 10(A)(1)(b) should be removed.

The ESA has been in poor favor with private landowners since its creation in 1973. A good proportion of the United States' endangered, threatened, and declining species are found on private lands and rely on sound management and conservation of these lands for restoration. While many private landowners are cooperative in managing their lands to benefit natural resources, increased financial commitments and regulations on use of their land has made other landowners reluctant to implement conservation measures. For example, if the landowner's conservation measures are a success, the species may increase in number or other endangered species may inhabit their land. This could cause increased restrictions on their private land — land which many westerners (in particular the Wise Use movement) already view as overly regulated and restricted.

Because private lands constitute such a great proportion of endangered species habitat, it is important for the Service to compromise and cooperate with private landowners for the benefit of species. In addition, private landowners need to feel that their private rights will be maintained and that they have freedom of action on their own land. It was for these reasons that Enhancement of Survival Permits and Habitat Conservation Plans were created.

Essentially, there are three options provided to private landowners in the ESA and through the new policies associated with Section 10. All three have been developed, under the Clinton Administration, as amendments to Section 10 of the ESA.

Enhancement of survival

Enhancement of Survival Permits with Candidate Conservation Agreements are preventative measures that went into effect on July 19, 1999, under Section 10(A)(1)(a) of the ESA. The goal is to offer incentives for non-Federal property owners to utilize conservation measures for species that are candidates for listing as endangered or threatened, as well as species that are likely to become candidates for listing in the near future. Basically, if a landowner signs an Agreement to enhance his or her property to prevent listing of a proposed species, then the landowner is offered an assurance that land, water, or resources won't be further restricted should the species later become listed under the ESA. Conservation measures utilized by the landowner vary depending on the type, amount, and condition of existing habitat on the property and other biological characteristics of the listed species. This allows property owners to maintain land use and development flexibility while increasing the chance that simple and relatively inexpensive conservation options will still be feasible and successful.

Enhancement of Survival Permits with Safe Harbor Agreements are another option available to private landowners, also under Section 10(A)(1)(a) of the ESA. The Safe Harbor policy relies upon landowners entering into voluntary agreements with the Service. The landowner agrees to enhance habitat for listed species in exchange for a promise that no additional future regulatory restrictions will be imposed upon the landowner or their land. The landowner is guaranteed no additional restrictions, even if more species are listed or discovered on the land, as long as the population of the initial species does not fall below a predetermined baseline number. This assumes that habitat enhancement for one

species will benefit others on the land.

The necessity of the Enhancement of Survival Permits stems from the fears of private landowners; they believe that if listed species either colonize their land or increase their numbers, development will be increasingly restricted. Therefore, many landowners avoid land management practices that could enhance, or even maintain, their land. The objective of Enhancement of Survival Permits is to provide a motive for enhancing habitat and maintaining species occupancy on private land.

In dire situations, such as when continuing the permitted activity could jeopardize a species covered by permit in a Candidate Conservation Agreement with assurances, the Service may revoke the landowner's permit. This allows the Service an extreme means to enforce its mandate of species protection.

However, Section 10(A)(1)(a) its associated policies are often criticized for a number of reasons. Because they are direct agreements between non-Federal landowners and the Fish and Wildlife Service, there is no opportunity for public review and comment on the situation. The landowner is generally unable to terminate the agreement. The agreement does not have to address other species of plants and animals on the property, only the listed species. In the case of Safe Harbor Agreements, it can be very difficult for the Service to determine a baseline population. There is also concern that entering into an Agreement may preclude adaptive management that may become necessary for species management.

In addition, many individuals believe that these policies are inconsistent with Section 7 of the ESA, which requires Federal agencies to sue their authorities to conserve endangered and threatened species. They feel that assuring landowners against new restrictions may limit

management capability later, even if conservation needs appear to be adequately addressed in the Agreement.

Habitat Conservation Plans

The third option available to private landowners is a Habitat Conservation Plan with a No Surprise clause. This is the only option available to a landowner, like myself, who wishes to conduct activities on his or her land that might result in an incidental take of a listed species. The landowner must first obtain an incidental take permit from the U.S. Fish and Wildlife Service. After obtaining a permit, the applicant must develop a Habitat Conservation Plan (HCP) — a detailed report stating all environmental consequences of the proposed activity and its alternatives. The HCP is designed to offset harmful effects that the activity might have on the listed species. The No Surprise clause provides regulatory assurances to the landowner, under Section 10(A)(1)(b) of the ESA. It states that in the case of "unforeseen circumstances," private landowners will not be required to commit additional resources to comply with additional restrictions other than those agreed to in the HCP. As long as the landowner complies with the conditions of the HCP, the government will honor these assurances.

Like Enhancement of Survival Permits, HCPs benefit threatened and endangered species by providing incentives for private landowners to employ long-term conservation measures, while also enabling landowners to proceed with development. By increasing understanding and partnerships with private landowners, the Service also has been able to ease its friction with private landowners. A poorly crafted HCP will not pass; proposed HCPs must meet specific criteria found in Section 10(A)(2)(b) of the ESA. The Service considers whether the habitat of the species and

the long-term conservation of the species will be improved or enhanced by the process.

HCPs with No Surprise clauses are also similar to Enhancement of Survival Permits in that they have been highly criticized. They have been charged with putting economics above species preservation by allowing species habitat to be developed. HCPs negate the use of adaptive management and don't account for social changes. Often the government is incapable of financing mitigation or monitoring that is involved in the development and implementation of HCPs. Because the plans involve private land and lack specific means for monitoring, biologists often have no control or way to monitor the impacts associated with the permitted development.

Because the purpose of an HCP is to allow development to proceed, inevitably habitat is lost. The HCP process also has been charged with focusing on the species and not the habitat. Therefore, claims that HCPs provide a broad-based, landscape-level planning tool are said to be inadequate.

Weighing the issue

Certainly, these three tools make the ESA more palatable to some private landowners. Speaking as both a developer and a biologist, I believe my involvement and personal experiences should serve to validate my expertise in this field. The Endangered Species Act should be reauthorized without a provision for Habitat Conservation Plans. These plans initially seem ideal; like the one I prepared for Seven Oaks Ranch, they allow the landowners to proceed with development. I spent a tremendous amount of time, energy, and financial resources planning for the development of a residential community on this land. Now I am able to proceed with development, with minimal, possibly no, impact to warbler

populations. Restriction from development would have caused additional costs in land purchasing, planning, infrastructure costs, tax burdens, time delays, and legal costs. The project would have been unfeasible. As a landowner, I would have been extremely frustrated.

HCPs are detailed plans, describing every aspect of the proposed activity and its potential impacts. These plans can be hundreds of pages long. They often require assistance from physical and biological scientists, land use specialists, population modelers, and economic advisors. HCP preparation is very burdensome and takes a high degree of commitment from the Applicant. On the other hand, I have seen HCPs that have been written sparsely. The applicants are not always thorough, resulting in poorly constructed plans with little or no ecological justification for why development should be allowed to proceed. This is a reflection of continuing resentment on the part of private landowners, who dislike the burdens associated with developing on their own land.

Further, HCPs exempt private landowners from additional financial expenses associated with endangered species conservation. Although permit holders are not required to list all unforeseen circumstances, even in these cases the Federal government pledges compensation. However, the ability of the Fish and Wildlife Service to guarantee funding for additional conservation measures is questioned. Instead, the Service must work with property owners to create mutually acceptable modifications to agreed-upon HCPs.

Finally, monitoring is a key component of any successful conservation program. Candidate Conservation Agreements usually include a designated monitoring plan. There is no mandate for monitoring built into HCPs. The HCP that I authored for

Seven Oaks Ranch does not contain any mention of the words "monitor" or "evaluate." Often the sites are not visited or inspected, and impacts go undocumented. If there are stochastic changes that affect the population, biologists are unable to modify management practices for the benefit of the species. Without habitat enhancement efforts, or a mechanism for population monitoring, there is no way to assure that HCPs achieve their goal in species conservation.

Speaking as a biologist, I believe that the most important element of endangered species conservation is habitat conservation. While Enhancement of Survival permits are meant to enhance habitat, HCPs emphasize the development of habitat, sometimes offering exchange of land parcels or conservation practices as an easement to the habitat loss. For example, in my HCP, I address limitations on pesticide and herbicide applications and landscaping practices for the proposed development. I also propose to cooperate with Davenport, Ltd., another Austin developer, to exchange 128 acres of an area known as the Vaughan Tract to develop

Seven Oaks Ranch. The Vaughan Tract will be managed as a golden-cheeked warbler habitat preserve. In this case, habitat of equal quality would be exchanged. In some cases, however, habitat is offered that is not of equal value to the species. In many cases, no proactive measures are taken, and the agreement thereby fails to meet the requirements of the Endangered Species Act and demonstrates an inconsistency with Section 7. Thus, Section 10(A)(1)(b) undermines the authority and mission of the ESA. Section 2(A)(1) of the ESA states that "various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation." HCPs only allow such economic growth and development to continue on species habitat.

Speaking as a developer, I realize the shortcomings of the HCP process. Because it is time consuming and burdensome to produce, many landowners will inevitably fail to pursue an extensive examination of the potential impacts of development to

species conservation. Many landowners resent the time and resources that must be committed to such an undertaking. HCPs offer no minimization of development; they only allow it to continue. Without monitoring or inspection, it is difficult to determine if the conservation plan is being followed effectively or at all. The development of an HCP appears only to be more bureaucratic red tape that must be passed through, even on my own private lands.

For these reasons, I believe that the Endangered Species Act should be reauthorized to include Section 10(A)(1)(b) and the policies (Candidate Conservation Agreements and Safe Harbor Permits) enacted by the Clinton Administration, which are voluntary agreements for habitat enhancement between landowners and the Federal government. Section 10(A)(1)(a) with the No Surprise clause should be excluded, due to its economic bias and lack of biological assurances.

Thank you for your time. Have a good afternoon.

Coral Disease and Monitoring in the Florida Keys

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Introduction

In 1943, Emile Gagnan and Jacques Cousteau invented the "aqua lung," which for the first time gave divers freedom of movement beneath the sea. It is astonishing to realize that the first generation to SCUBA dive and interact with the world beneath the sea may be the last to experience coral reefs unaffected by modern civilization's pollution. A study on coral reefs released in 2001 by the United Nations Environment Program's World Conservation Monitoring Center reported that the world's coral reefs cover a much smaller area than once thought and that coral reefs around the world are disappearing at alarming rates. Globally, coral reefs cover 113,720 square miles, less than one tenth of one percent of the oceans, yet are home to 25% of all of marine life that has been identified by man.

Threats to corals

The world's oceans are affected by 2.3 trillion gallons of sewage effluent that is dumped into coastal waters every year and 2.8 billion gallons of industrial wastes that are discharged into the oceans every day (Boesch et al. 2001). Both of the above-mentioned sources of pollution are point sources of pollution because of the way they reach the water, through pipes and/or channels.

Nonpoint sources of pollution reach the ocean as surface runoff, atmospheric deposition, and through ground water. It is misleading to think that point source pollution is the only pollution affecting the marine

environment. In 1993, it was reported that 77% of the total nutrients reaching Chesapeake Bay were from nonpoint sources (Olivieri 1997). Nonpoint sources of pollution are most likely responsible for escalating the incidence of coral disease on remote reefs throughout the world. The incredible amount of atmospheric pollution generated from Mexico City alone was estimated at 12,000 tons per day in 1997. A 1998 report released by the World Health Organization indicated that, in China, 21 million tons of sulfur dioxide, 14 million tons of smoke-filled dust, and 13 million tons of suspended particulate matter were released into the atmosphere in a one-year period (EIA 2001). An ongoing study by Dr. Eugene A. Shinn of the US Geological Survey has been observing the connection between African dust and coral disease in the Caribbean (Shinn 2000). Hundreds of millions of tons of this dust, laden with mercury, pesticides and bacteria are atmospherically transported across the Atlantic Ocean every year, potentially creating one of the largest nonpoint sources of pollution affecting Caribbean coral reefs.

Corals are stationary animals and can only be as healthy as the water that passes over them. The ocean water passing over the coral reefs in the Florida Keys contains a potpourri of point source pollutants from as far away as South and Central America that are carried to the reefs via the largest moving body of water in the world, the Gulf Stream. Closer to Florida's reefs, polluted storm water

from South Florida's massive urban development combine with agricultural runoff from Florida's farm lands and is channeled into Florida Bay via an elaborate system of canals originally designed to "drain the swamp." This water ultimately passes over the coral reefs of the Florida Keys. Adjacent to the reefs, over-development and inadequately treated sewage in the Florida Keys contributes to the elevated levels of nutrients found on the reef (Sutherland 1999). There is no single source of pollution or "silver bullet" that can be blamed for the decline of coral except for man's inability to deal with the pollution that we create. The excellent web paper by Reef Education Network, *Energy Cycles: What Goes Around Comes Around*, makes a very good point about lessons we can learn from the coral reef environment by summarizing that good management of limited resources has been the key to successful tropical coral reef development (REN 2002).

Coral Monitoring

In 1996, 168 coral reef monitoring stations were established throughout the Florida Keys as part of the Environmental Protection Agency's Coral Reef Monitoring Project. Dr. James Porter was one of the 24 scientists on the monitoring team. In the first assessment in 1997 (AMNH 2002), Dr. Porter was quoted as saying "Nothing within any of our experiences prepared us for the increase we've seen in coral illness. We saw a 300% increase in the number of stations afflicted by disease."

Corals are the barometers of the ocean, similar to canaries in coal mines. They are indicators of the health of our oceans. When corals become stressed, they frequently change their appearance, signaling to us that something is wrong (Nicolls 2002).

In 1993, I launched the Reef Relief Photo Monitoring Survey Program in the Florida Keys. The goal was to document with photographs and video specific coral formations over time. It was anticipated that it would take several years to observe any changes that might occur because of the slow pace at which coral reefs grow. However, within four years, by late 1997, coral diseases had escalated to epidemic proportions and were exacerbated by the worst coral bleaching event ever recorded in the Florida Keys. Reef Relief's archive of images taken between 1993 and 1999 depict a coral reef in the throws of extinction. During the survey, yellow band coral disease was discovered, white pox coral disease was discovered, and white plague type II was first observed in the Lower Keys.

Coral disease is a relatively new field of study for scientists and there is a tremendous amount of debate surrounding the issues related to the global decline of coral. It appears that before scientists discover the exact causes of coral disease, the world will lose a majority of its coral.

The corals are telling us something, and I think it is something like, "you're next."

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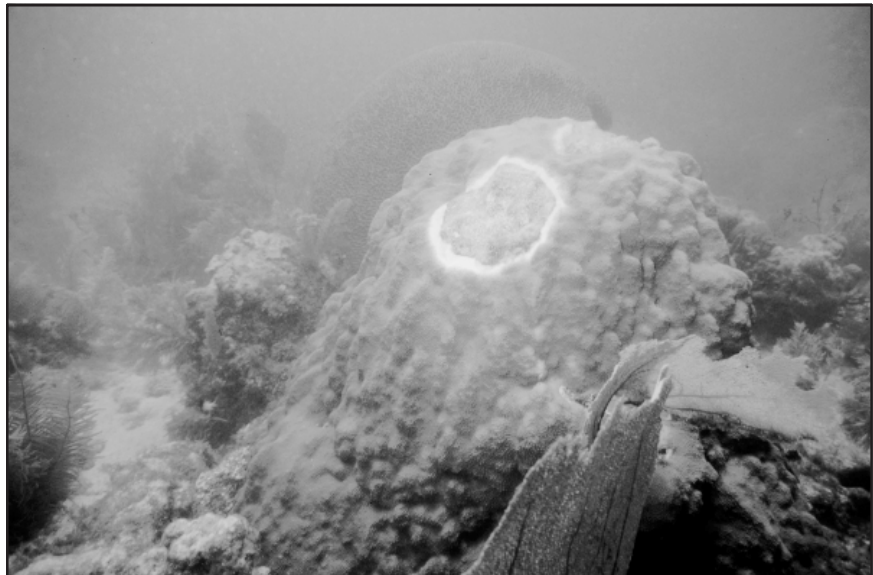


Figure 1. Sand Key Reef, 6 miles south of Key West, Florida, August 1993: The first documented outbreak of yellow band coral disease discovered by Craig Quirolo during a Photo Monitoring Survey dive. Photo credit: Reef Relief.

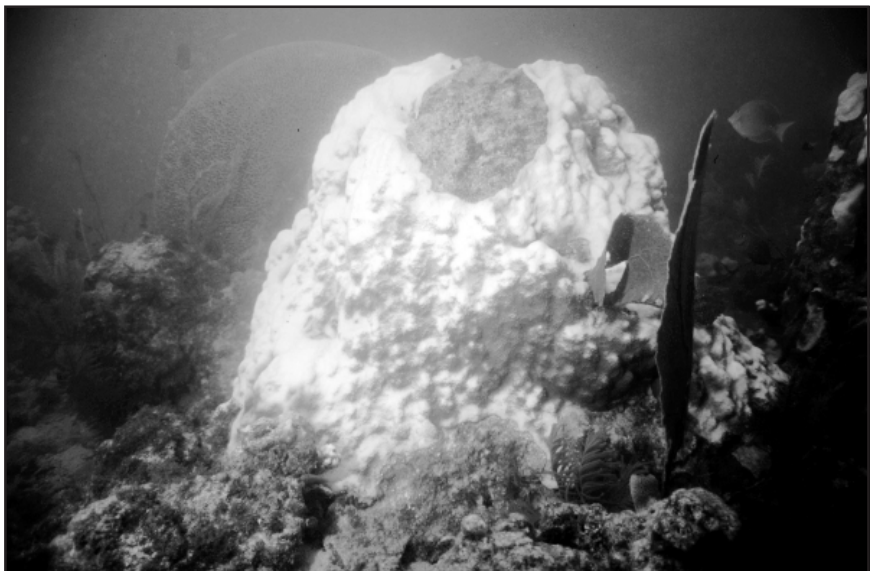


Figure 2. Sand Key Reef, 6 miles south of Key West, Florida, October 1997: The worst coral bleaching ever recorded in the Florida Keys was in full swing. Note that the spread of yellow band disease on this colony was not halted by this event. Photo credit: Reef Relief.

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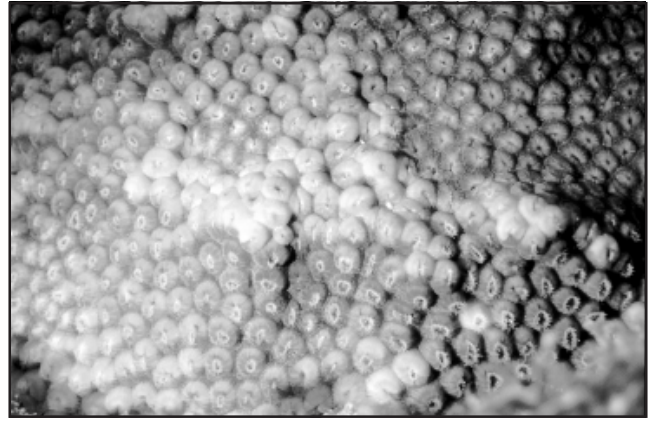
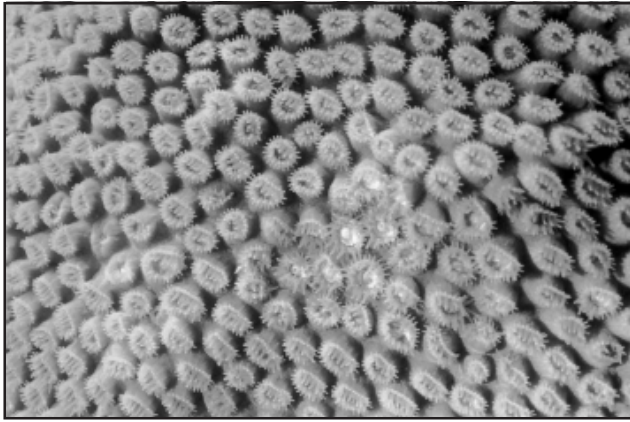


Figure 3. Left: With few exceptions, on a healthy coral colony the polyps are uniform in color, size, and shape. Right: Variations in the color, shape, and size of coral polyps is a sign

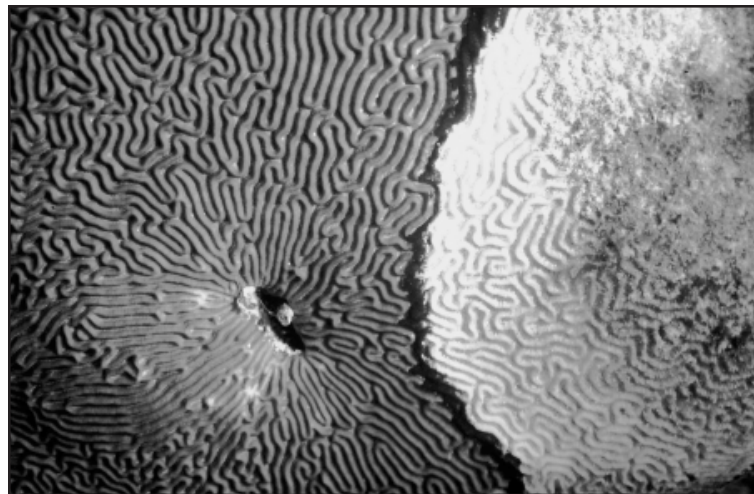
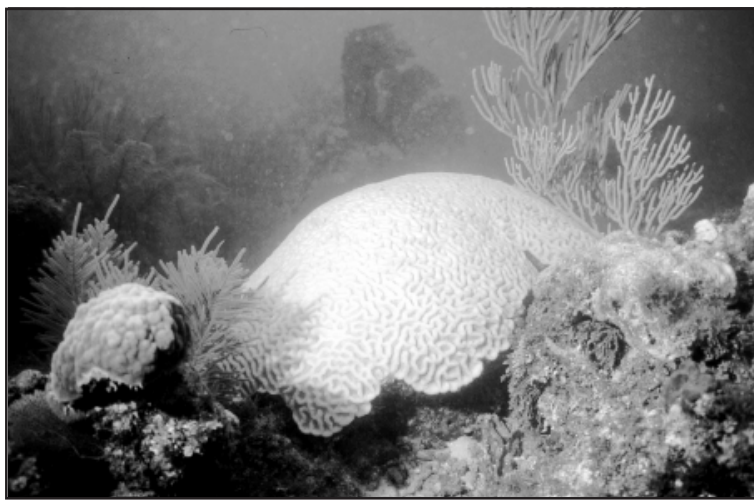


Figure 4. Coral diseases. Top left: coral bleaching. Bottom left: red band (on close inspection the band has a red tint). Right: white pox. Photo credit: Reef Relief.

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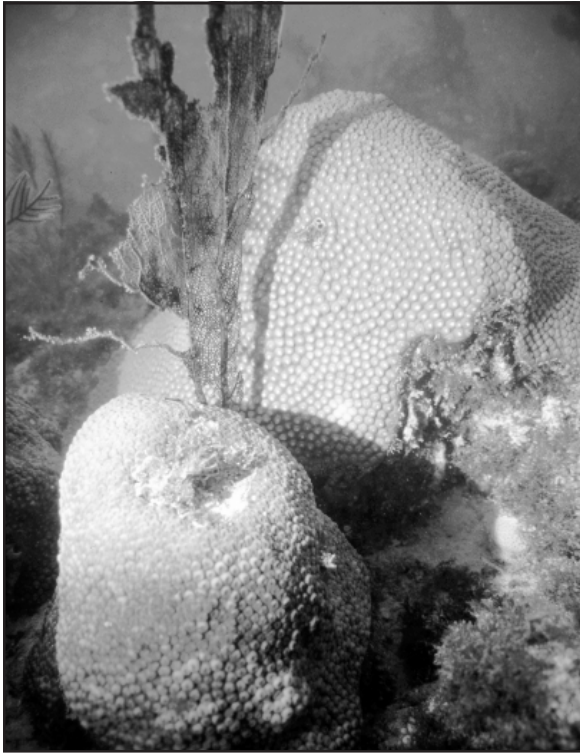


Figure 5. Left, October 1997: Coral diseases infect many different species of coral. In this picture, the sea fan looks shredded and exhibits dark purple spots that are associated with a fungus that attacks gorgonians called, *Aspergillus sydowii*. The *Montastrea cavernosa* in front of the sea fan (foreground) exhibits unusual color patterns. The *Montastrea cavernosa* colony behind the sea fan (background) appears to be unaffected by coral disease. Below, January 1999: Fifteen months later there is only a small area of living tissue remaining on the *Montastrea cavernosa* to the left of the sea fan. The sea fan has died as well. Photo credit: Reef Relief.



News from Zoos

Joint conservation project in Florida

The Florida Aquarium and the Tampa Port Authority, with the assistance of the Florida Department of Environmental Protection, are working to rehabilitate and enhance a small island in upper Hillsborough Bay. A man-made offshoot of two other islands, the exhibit island will be incorporated into the Aquarium's local eco-tour programs for the purpose of educating the public and school groups about the abundant wildlife that thrives in these habitats when properly managed as natural systems.

The project began in June 2000 with an examination of existing plant communities and physical characteristics of the island. After the island's natural composition was determined, staff began removal of the exotic, invasive plant species that covered approximately 80% of the island. Replacing exotic plants with native species such as mangroves, buttonwoods and various native grasses will allow for the creation and installation of microhabitats representative of the types that naturally make up the bay system (mangrove forest, salt marsh, etc.). The final construction phase includes adding boardwalks, trails, and interpretive signage to accompany eco-tours and education programs that highlight the island. The site will also provide an opportunity for collaborative efforts with local environmental groups, colleges and universities to develop monitoring projects on the island's restoration. [Source: Communique]

Turtle Survival Alliance rescues 7,500 turtles

On December 10, 2001, nearly 7,500 critically endangered turtles were confiscated in Hong Kong. Without the quick-paced conservation efforts of The Fort Worth Zoo and the Turtle Survival Alliance (TSA), the animals faced certain death.

Destined for the illegal food trade, the shipment of turtles, valued at \$3.2 million, was en route to China when intercepted by Hong Kong customs. The shipment, the largest seizure of live turtles in Hong Kong, was transported to Kadoorie Farms Botanic Gardens, Hong Kong, for identification and initial triage.

"Currently, seized turtles are simply destroyed because there is no place for them, and they are already sick or injured," said Rick Hudson, TSA co-chair and Conservation Biologist at the Fort Worth Zoo. "In need of intensive veterinary treatment, the turtles can't be released back into the wild."

"Before the creation of the TSA, confiscated turtles were disposed of in an effort to curb illegal harvesting. The TSA provides an ideal option, which channels these turtles into captive programs where they can be rehabilitated and managed long-term. It's a win-win situation for all involved, especially the turtles."

Shortly after being seized in Hong Kong, the 7,500 confiscated turtles were sent to Miami, Florida, where a multidisciplinary team, spearheaded by the TSA's co-chairs Rick Hudson (Fort Worth Zoo) and Kurt Buhlmann (Conservation International), developed "Assurance Colonies" for the endangered turtles. Located throughout the United States, these colonies will maintain these species for their eventual recovery.

Representatives from the Fort Worth Zoo arrived in Miami on Wednesday, December 19, 2001 to assist with rehabilitating the animals, maintaining a centralized database on all individuals and finding appropriate homes for the turtles. This is not an easy task once you consider everything that must be done for each turtle — stabilizing, assessing medical needs, weighing, measuring, drawing blood, sexing and marking all 7,500 specimens. In addition, TSA's partners had to convince other zoos, universities and private breeders to make room for new turtles and carefully ship each to its future home.

Six Asian Mountain Tortoises found among the shipment will be returning with Fort Worth Zoo representatives. The Fort Worth Zoo is one of the vital TSA partners providing a safe haven in which these turtles will eventually breed, thereby helping save a dozen species from the brink of extinction. [Source: Fort Worth Zoo / ENN]

News & Events

Book Release: CA Flora

The California Native Plant Society has published the 6th edition of the *Inventory of Rare and Endangered Plants of California*, which lists 2,073 plants as rare, endangered, or uncommon, representing about 33% of the state's native plants. To purchase, contact CNPS at (916) 447-2677 or ordering@cnps.org.

Petition to Uplist Loggerhead Turtles to Endangered

Two organizations, the Turtle Island Restoration Network and the Center for Biological Diversity, have submitted a formal petition to the National Marine Fisheries Service and the U.S. Fish & Wildlife Service to uplist two populations of the loggerhead sea turtle from Threatened to Endangered. Turtles face many threats from humans, including incidental bycatch of commercial fishing operations, ma-

rine pollution, and coastal development on critical nesting beaches. Turtles, like salmon, return to natal birth sites to nest. An electronic version of the petition is available by emailing Todd Steiner at tsteiner@igc.org. For more information: <http://www.seaturtles.org>.

Silent Spring 40th Anniversary

In celebration of the 40th Anniversary of Rachel Carson's influential and inspirational book, *Silent Spring*, The Andy Warhol Museum in Pittsburg will exhibit for the first time Warhol's 1983 print portfolio, "Endangered Species," and his "Vanishing Animals" from a 1986 book published in collaboration with the San Diego Zoo. For more information, contact: The Andy Warhol Museum, (412) 237-8300, <http://www.warhol.org>.

Canadian Endangered Species

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) met in November 2001 to review 37 species at risk. New species added to the list of endangered species include the southern resident population of killer whales and the southern population of tiger salamander. Eleven species, reevaluated using new IUCN criteria, were upgraded from Special Concern to Threatened (e.g. least bittern, Ross's gull, rosyface shiner). The number of species at risk now totals 387: 29 Extirpated; 118 Endangered; 94 Threatened; 146 Special Concern. For more information: Canadian Nature Federation, <http://www.cnf.ca>.

Announcements for the Bulletin Board are welcomed. Some items have been provided by the Smithsonian Institution's Biological Conservation Newsletter.
