

November 1994

NATIONAL WILDLIFE REFUGE SYSTEM

Contributions Being Made to Endangered Species Recovery





United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

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November 14, 1994

The Honorable Gerry E. Studds
Chairman
The Honorable Jack Fields
Ranking Minority Member
Committee on Merchant Marine and Fisheries
House of Representatives

The Honorable Jim Saxton
Ranking Minority Member, Subcommittee on
Environment and Natural Resources
Committee on Merchant Marine and Fisheries
House of Representatives

The National Wildlife Refuge System was established to help conserve the nation's wildlife resources. To assist in your consideration of potential legislation affecting the purposes of the system and its management by the Department of the Interior's Fish and Wildlife Service, you asked that we obtain information on how and the extent to which wildlife refuges contribute to the recovery of species listed as threatened or endangered under the Endangered Species Act. In response, this report discusses the extent to which listed¹ species and their habitat occur on refuges and how refuges and refuge staff contribute to the conservation and recovery of listed species. It also discusses how funding limitations constrain the contribution that wildlife refuges make to the recovery of listed species.

Results in Brief

Of the almost 900 species listed under the Endangered Species Act, 215 (24 percent) occur and/or have habitat on national wildlife refuges. These listed species represent a diversity of wildlife, including 58 plant, 54 bird, and 40 mammalian species. While a significant portion of the current habitat for 94 listed species is located on 66 wildlife refuges, many other listed species use refuge lands on a temporary basis for breeding or migratory rest-stops.

Refuges and refuge staff contribute to the protection and recovery of listed species in a number of ways. First, the refuges themselves represent about 91 million acres of secure habitat, including over 310,000 acres that have been acquired by the Service specifically for the protection of listed

¹The term "listed" is used to refer to species designated under the Endangered Species Act as endangered or threatened.

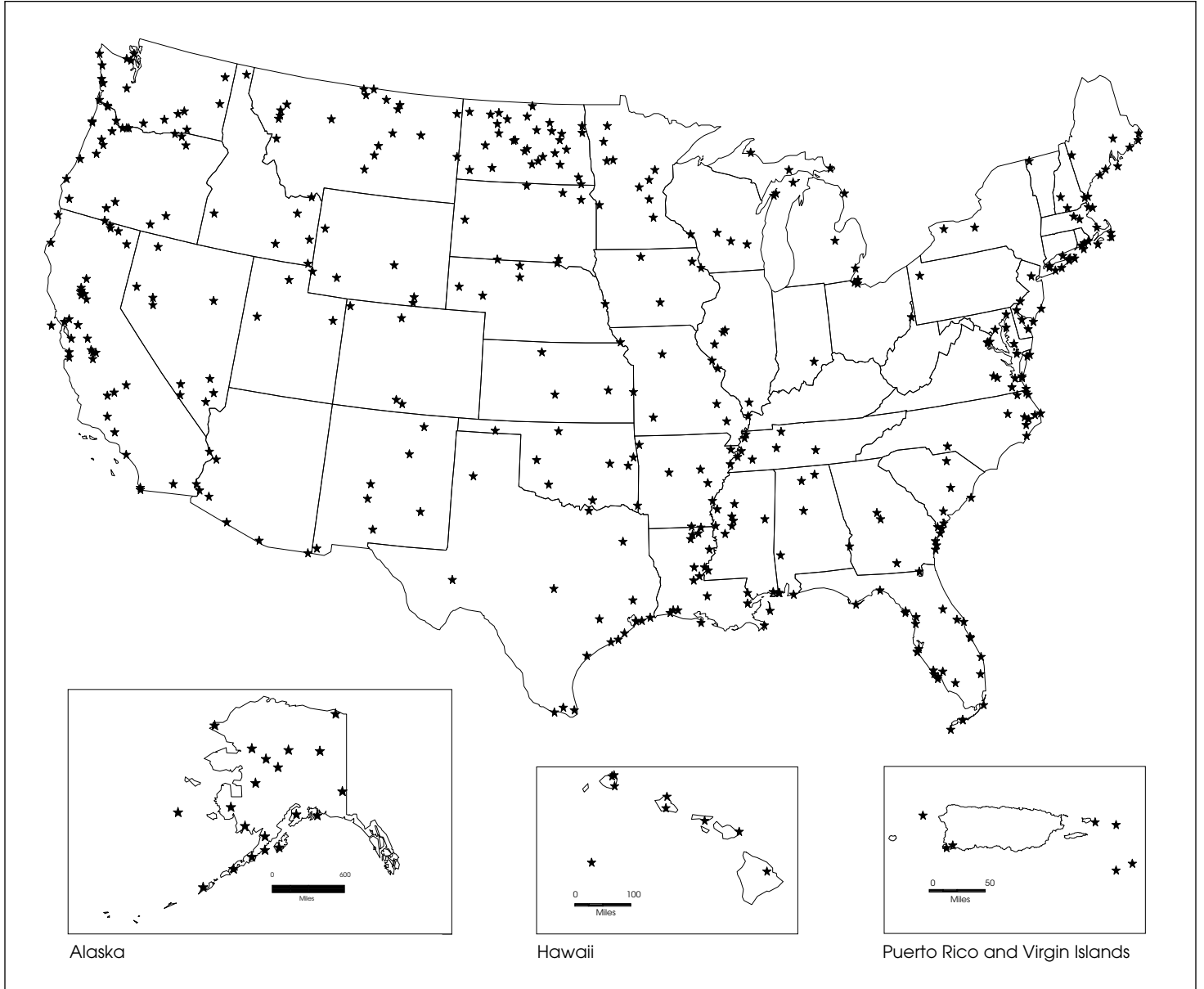
species. Second, refuge staff are taking actions to protect and recover listed species. For example, staff at the Harris Neck National Wildlife Refuge have created wood stork nesting areas, and staff at the Salinas River National Wildlife Refuge are protecting snowy plovers' nests from predators. And third, refuge staff participate in the development of recovery plans that the Service requires for listed species by identifying specific actions that can contribute to species recovery.

Funding limitations constrain efforts to manage wildlife refuges. Two 1993 Department of the Interior reports found that available funding was not sufficient to meet established objectives for refuges because the level of funding has not kept pace with the increasing costs of managing new or existing refuges. At 14 of the 15 locations we visited, refuge managers and staff said that funding constraints limited their ability to enhance habitat and to facilitate the recovery of listed species.

Background

The National Wildlife Refuge System comprises the only federal lands managed primarily for the benefit of wildlife. The refuge system consists primarily of National Wildlife Refuges (NWR) and Waterfowl Production Areas and Coordination Areas. The first national wildlife refuge, Florida's Pelican Island, was established by President Roosevelt in 1903 to protect the dwindling population of wading birds in Florida. As of July 1994, the system included 499 refuges in all 50 states and several U.S. territories and accounted for over 91 million acres. (See fig. 1.)

Figure 1: General Location of Units in the National Wildlife Refuge System



Source: Fish and Wildlife Service.

The Fish and Wildlife Services' (FWS) Division of Refuges provides overall direction for the management and operation of the National Wildlife

Refuge System. Day-to-day refuge activities are the responsibility of the managers of the individual refuges. Because the refuges have been created under many different authorities, such as the Endangered Species Act (ESA) and the Migratory Bird Conservation Act, and by administrative orders, not all refuges have the same specific purpose or can be managed in the same way.

The ESA was enacted in 1973 to protect plants and animals whose survival is in jeopardy. The ESA's goal is to restore listed species so that they can live in self-sustaining populations without the act's protection. As of April 1994, according to FWS, 888 domestic species have been listed as endangered (in danger of extinction) or threatened (likely to become endangered in the foreseeable future). The ESA directs FWS to emphasize the protection of listed species in its acquisition of refuge lands and in its operation of all refuges. Under the ESA, the protection, recovery, and enhancement of listed species are to receive priority consideration in the management of the refuges.

FWS' Division of Endangered Species provides overall guidance in the implementation of the ESA.² FWS' regions are generally responsible for implementing the act. Among other things, the act requires FWS to develop and implement recovery plans for all listed species, unless such a plan would not benefit the species. Recovery plans identify the problems threatening the species and the actions necessary to reverse the decline of a species and ensure its long-term survival. Recovery plans serve as blueprints for private, federal, and state interagency cooperation in taking recovery actions.

Listed Species Often Occur on Wildlife Refuges

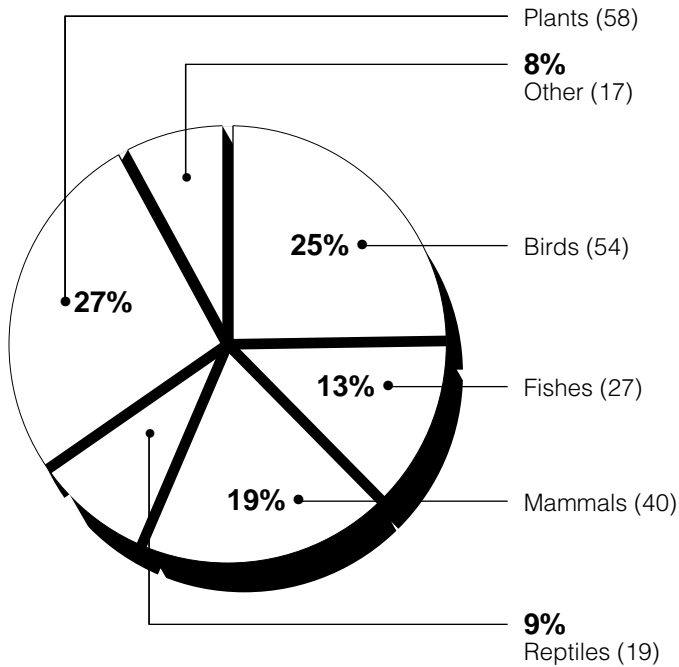
Of all the listed species, 215,³ or 24 percent, occur on wildlife refuges.⁴ (See app. I for the listed species that occur on refuges.) Figure 2 shows the types of listed species found on refuges. As the figure shows, more than two-thirds of the species are plants, birds, and mammals.

²FWS is generally responsible for protecting freshwater and land species. The Department of Commerce's National Marine Fisheries Service is responsible for protecting most marine species.

³Includes species that have been proposed for listing in the Federal Register.

⁴FWS estimates that an additional 360 candidate species—species that may warrant protection but are not currently listed under the act—also occur on refuges.

Figure 2: Types of Listed Species That Occur on Wildlife Refuges



Note 1: Percentages have been rounded.

Note 2: The total number of species is 215.

Note 3: "Other" includes amphibians (2), clams (6), crustaceans (1), insects (7), and snails (1).

Source: FWS.

Some refuges represent a significant portion of a listed species' habitat. According to FWS regional refuge officials, 66 refuges—encompassing a total of 26.7 million acres, including 22.6 million acres on two Alaska refuges—provide a significant portion of the habitat for 94 listed species. For example, Ash Meadows NWR in Nevada has 12 listed plants and animals that exist only at the refuge—the largest number of listed native species at one location in the United States. In addition, Antioch Dunes NWR in California contains virtually the entire remaining populations of three listed species—the Lange's metalmark butterfly, the Antioch Dunes evening-primrose, and the Contra Costa wallflower. (App. II lists the refuges that provide a significant portion of a listed species' habitat and the specific species that occur at these refuges.)

Some listed species use the refuges on a temporary basis for migratory, breeding, and wintering habitat. As previously shown in figure 1, the refuges are often located along the primary north-south routes used by migratory birds. Migratory birds use the refuges as temporary rest-stops along their migration routes. The listed wood stork, for example, migrates in the spring from southern Florida to Harris Neck NWR in Georgia to nest in the refuge's freshwater impoundments. In addition, several refuges provide breeding habitat for listed species. The Blackbeard Island and Wassaw refuges in Georgia and the Merritt Island NWR in Florida, for example, provide beach habitat for the listed loggerhead sea turtle to lay its eggs.

Wildlife Refuges Contribute to the Recovery of Listed Species

Wildlife refuges and refuge staff contribute to the recovery of listed species in a variety of ways. Foremost, refuges provide secure habitat, which is often identified as a key component in the recovery of listed species. In addition, refuge staff carry out, as part of their refuge management activities, specific actions to facilitate the recovery of listed species. Refuge staff also participate in the development and review of recovery plans for listed species.

Refuges Provide Secure Habitat

One of the primary efforts for the recovery of listed species is to stabilize or reverse the deterioration of their habitat. Refuges contribute to the recovery of listed species by providing secure habitat. Our review of 120 recovery plans for listed species occurring on refuges disclosed that 80 percent of the plans identified securing habitat as an action needed to achieve species recovery.

As of March 1994, the refuge system included about 91 million acres of wildlife habitat. FWS has acquired over 310,000 acres to create 55 new refuges specifically for the protection of listed species. FWS' policy requires that a species recovery plan be prepared before lands are acquired for listed species. For example, the recovery plan for four Hawaiian waterbirds called for FWS to secure and manage a number of ponds and marshes that two or more of the waterbirds are known to use. One specific area described in the recovery plan, Kealia Pond, was subsequently acquired by FWS in 1992. However, overall we could not readily determine whether the acquisitions of lands for the 55 new refuges had been identified as needed acquisitions in species recovery plans. (App. III lists the refuges specifically established for listed species.)

According to FWS' data,⁵ listed species found on refuges, and specifically on refuges established to protect listed species, appear to have a more favorable recovery status than listed species that do not occur on refuges. Table 1 provides an overview of FWS' data on the recovery status of listed species. This information was compiled on the basis of the knowledge and judgments of FWS staff and others familiar with the species.

Table 1: Recovery Status of Listed Species, as of September 30, 1992

Listed species recovery status	Listed species that do not occur on refuges (percent)	Listed species that occur on all refuges (percent)	Listed species that occur on endangered species refuges ^a (percent)
Improving	6	19	25
Stable	26	36	43
Declining	34	30	18
Unknown ^b	33	13	12
Extinct ^c	2	3	2
Total ^d	100	100	100
Total number of species	523	188	65

^aThese species constitute a subset of those that occur on all refuges.

^bUnknown = those species for which additional survey work is required to determine their current status.

^cExtinct = those species that are believed to be extinct in the wild.

^dPercentages have been rounded.

Source: FWS.

As the table shows, a greater proportion of the listed species that occur on refuges have a recovery status determined by FWS to be improving or stable than the listed species not found on refuges. According to FWS' guidance, species whose recovery is improving are those species known to be increasing in number and/ or for which threats to their continued existence are lessening in the wild. Species whose recovery is stable are those known to have stable numbers over the recent past and for which threats have remained relatively constant or diminished in the wild. Declining species are those species known to be decreasing in number and/or for which threats to their continued existence are increasing in the wild.

⁵The latest data from FWS are contained in Report to Congress: Endangered and Threatened Species Recovery Program, draft, Department of the Interior, U.S. Fish and Wildlife Service (Dec. 1992).

Refuge Staff Implement Species Recovery Projects

Refuge staff carry out a variety of activities that contribute to the recovery of listed species. According to FWS' Refuges 2003: Draft Environmental Impact Statement,⁶ a total of 356 refuges had habitat management programs under way that directly benefited listed species. Refuge staff at the 15 refuges we visited were carrying out a number of specific actions in support of the protection and recovery of listed species. Such actions generally involved efforts to monitor the status of listed species' populations at the refuges and carry out projects designed to restore and manage the habitats and the breeding areas of listed species. Examples of specific actions being taken included the following:

- Carrying out prescribed burning of vegetation at the Okefenokee NWR (Georgia). Among other things, such burning helps restore and facilitate the growth of longleaf pine trees—the primary habitat for the listed red-cockaded woodpecker.
- Enclosing nesting areas at the Salinas River NWR (California). The enclosures protect the listed western snowy plover's nests and chicks from predation by red foxes.
- Undertaking protective actions at the Hakalau Forest NWR (Hawaii). Specifically, to protect and assist in the recovery of five listed forest birds, the refuge manager has restricted public use, fenced off the forest to keep out wild pigs and cattle, and created new nesting habitat for the listed birds by protecting indigenous plants and eliminating nonnative/exotic plants.
- Developing artificial nesting structures for wood storks at the Harris Neck NWR (Georgia). According to the refuge biologist, each structure at the refuge was occupied by up to three nests for these birds in both 1993 and 1994.
- Providing economic incentives to protect habitat and provide a food source for the listed bald eagle at Blackwater NWR (Maryland). Specifically, refuge management pays muskrat trappers to kill a rodent (the nutria) that is destroying the refuge wetlands. The carcasses are then left for bald eagles to eat.
- Managing vegetation growth to provide feeding pastures for the listed Columbian white-tailed deer at the Julia Butler Hansen Refuge for Columbian White-tailed Deer (Oregon and Washington). The vegetation in the deer's feeding pastures is kept short by allowing cattle to graze on portions of refuge lands under cooperative agreements with local farmers.

⁶Refuges 2003: Draft Environmental Impact Statement, Department of the Interior, U.S. Fish and Wildlife Service (Jan. 15, 1993).

Refuge Staff Contribute to Species Recovery Plans

Refuge staff also participate on teams tasked with developing recovery plans for listed species. While the responsibility for developing and implementing the plans rests with FWS' regional offices, recovery teams often include species experts from federal and state agencies (including the refuges), conservation organizations, and universities. For example, a biologist at the San Francisco Bay NWR is helping develop a revised recovery plan⁷ for the salt marsh harvest mouse, the California clapper rail (a species of bird), and other coastal California wetlands species. On the basis of their knowledge of the listed species, refuge staff are also asked to comment on draft recovery plans developed by others. For example, refuge staff at the Moapa Valley NWR in Nevada were asked to review the draft recovery plan for the Moapa dace (a species of fish) developed by a recovery team made up of representatives from a variety of organizations, including the Department of the Interior's Bureau of Reclamation; the University of Nevada, Las Vegas; and the Nevada Division of Wildlife.

Refuge staff at the locations we visited told us they use the recovery plans to guide their activities to protect listed species. They also told us that recovery plans are good reference tools and help outline the management actions necessary for species recovery. They noted, however, that recovery plans have their limitations—plans can become outdated quickly and that refuges often lack the funding necessary to undertake all of the prescribed recovery tasks.

Funding Limitations Constrain the Contribution Wildlife Refuges Make to Species Recovery

While refuge staff have taken some actions to protect and aid the recovery of listed species on their refuges, we found that efforts were at times not undertaken. According to refuge managers and staff, their ability to contribute to species recovery efforts are constrained by the level of available funding. Two 1993 Interior reports discussed overall concerns about refuge funding and concluded that refuge funding was inadequate to meet the missions of refuges.

In its *Refuges 2003: Draft Environmental Impact Statement*, FWS reported that the refuge system's current annual funding is less than half the amount needed to fully meet established objectives. From October 1, 1988, through fiscal year 1993, appropriations for the Division of Refuges increased from \$117.4 million to \$157.5 million per year. If the current level of annual funding continues, according to FWS, funding will be inadequate to address the existing backlog of major refuge maintenance projects or the programs and construction projects necessary for any

⁷The original recovery plan was approved by FWS in 1984.

expanded wildlife or public use activities. In addition, FWS stated that recent increases in refuge funding have not been sufficient to address the rising costs of basic needs, such as utilities, fuel, travel, and training.

In August 1993, Interior's Inspector General reported that "refuges were not adequately maintained because Service funding requests for refuge maintenance have not been adequate to meet even the minimal needs of sustaining the refuges."⁸ According to the Inspector General, the maintenance backlog totaled \$323 million as of 1992. The Inspector General also reported that "new refuges have been acquired with increased Service responsibilities, but additional sufficient funding was not obtained to manage the new refuges." Between 1988 and 1992, according to the Inspector General, \$17.2 million was necessary to begin operations at the 43 new refuges acquired during this period. However, only \$4.7 million was appropriated for all new and expanded refuges. This appropriation level for refuge funding resulted in a \$12.5 million deficit, according to the Inspector General, some of which contributed directly to the maintenance backlog. In response to the Inspector General's findings, FWS has agreed to develop a plan to reduce refuges' maintenance backlogs and to report on efforts to ensure consideration of the operations and maintenance costs in all future acquisitions.

The budget resources are insufficient to undertake all of the efforts necessary to recover listed species, according to refuge managers. In general, refuge operations and maintenance budgets are earmarked for items such as salaries, utilities, and specific maintenance projects. As a consequence, many efforts to recover listed species are not being carried out. At 14 of the 15 locations we visited, refuge managers and staff said funding constraints limited their ability to fully implement recovery actions for listed species and other protection efforts. For example, refuge staff at the Savannah Coastal Refuge Complex in Georgia explained that they have enough resources to conduct only one survey of the bald eagle population per year, rather than the three they feel are necessary to adequately monitor the eagle's status. A biologist at the San Francisco Bay Refuge Complex reported that no money is available to conduct genetic studies on the listed salt marsh harvest mouse, even though such studies are called for in the species recovery plan.

⁸Survey Report: Maintenance of Wildlife Refuges, U.S. Fish and Wildlife Service, Department of the Interior, Office of Inspector General, Rept. No. 93-I-1477 (Aug. 1993).

Agency Comments

In commenting on a draft of this report, the Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior, generally concurred with the findings (app. IV contains Interior's comments). In particular, the Assistant Secretary stated that funding limitations constrain the National Wildlife Refuge System's ability to fully protect and recover endangered species; however, in light of other budgetary priorities, refuges have been funded at the highest affordable level. The Assistant Secretary also provided a number of comments that were technical in nature. In response, we revised the report, where appropriate, to refer to all components of the National Wildlife Refuge System rather than just the refuges and made other editorial changes.

Scope and Methodology

We conducted our work between May 1993 and July 1994 in accordance with generally accepted government auditing standards. To obtain information on FWS' policies and procedures for refuges and implementation of the ESA, we reviewed relevant FWS documents, including the May 1990 Policy and Guidelines for Planning and Coordinating Recovery of Endangered and Threatened Species; the Refuge Manual; Refuges 2003: Draft Environmental Impact Statement; the 1990 and draft 1992 Report to Congress: Endangered and Threatened Species Recovery Program; and 120 species recovery plans. We also interviewed officials at the Division of Refuges and Division of Endangered Species at FWS headquarters and at the FWS Portland regional office. In addition, we visited and met with officials from 15 refuges—including refuges created specifically for listed species and those that were created for other purposes—to determine how each refuge contributed to recovery efforts for listed species. The 15 refuges included, in California, Antioch Dunes, San Francisco Bay, and San Pablo Bay; in Georgia, Harris Neck and Okefenokee; in Hawaii, Hanalei, Huleia, James C. Campbell, Kilauea Point, and Pearl Harbor; in Maryland, Blackwater; in Maryland and Virginia, Chincoteague; in Nevada, Ash Meadows, Moapa Valley; and in Oregon and Washington, Julia B. Hansen Columbian White-tailed Deer.

As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of the Interior; the Assistant Secretary, Fish and Wildlife and Parks; and the Director of the Fish and Wildlife Service. We will also make copies available to others on request.

Please call me at (202) 512-7756 if you or your staff have any questions. Major contributors to this report are listed in appendix V.

A handwritten signature in black ink that reads "James Duffus III". The signature is written in a cursive style with a large initial "J" and a stylized "III" at the end.

James Duffus III
Director, Natural Resources
Management Issues

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Abbreviations

ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
GAO	General Accounting Office
NWR	National Wildlife Refuge

Listed Species That Occur on Wildlife Refuges

As of April 1994, the number of listed animal and plant species occurring on wildlife refuges totaled 215. As of June 30, 1994, recovery plans had been approved for 157 of these species (as indicated by an asterisk).

Amphibians

*Salamander, Santa Cruz long-toed
*Toad, Wyoming

Birds

*Akepa, Hawaii
*Akiapolaau
*Blackbird, yellow-shouldered
*Bobwhite, masked (quail)
*Broadbill, Guam
*Caracara, Audubon's crested
*Condor, California
*Coot, Hawaiian
*Crane, Mississippi sandhill
*Crane, whooping
*Creeper, Hawaii
*Crow, Mariana
Curlew, Eskimo
*Duck, Hawaiian
*Duck, Laysan
*Eagle, bald
Eider, spectacled
*Falcon, American peregrine
*Falcon, Arctic peregrine
*Falcon, northern aplomado
*Finch, Laysan
*Finch, Nihoa
*Flycatcher, southwestern willow
*Goose, Aleutian Canada
*Goose, Hawaiian (nene)
*Hawk, Hawaiian
*Jay, Florida scrub
*Kingfisher, Guam
*Kingfisher, Micronesian
*Kite, Everglade snail
*Millerbird, Nihoa
*Moorhen (gallinule), Hawaiian common
*Moorhen, Mariana common
Murrelet, marbled
*O'u (honeycreeper)

Appendix I
Listed Species That Occur on Wildlife
Refuges

Owl, northern spotted
*Pelican, brown
*Plover, piping
Plover, western snowy (Pacific coastal)
*Prairie chicken, Attwater's greater
*Rail, California clapper
*Rail, light-footed clapper
*Rail, Yuma clapper
*Stilt, Hawaiian
*Stork, wood
*Swiftlet, Vanikoro
*Tern, California least
*Tern, least (interior)
*Tern, roseate
*Vireo, black-capped
Vireo, least Bell's
*Warbler, golden-cheeked
*Warbler, Kirtland's
*White-eyed, bridled
*Woodpecker, red-cockaded

Clams

*Fanshell
*Mussel, ring pink (golf stick pearly)
*Pearly mussel, Higgin's eye
*Pearly mussel (pimple back), orange-footed
*Pearly mussel, pink mucket
*Pigtoe, rough

Crustacean

Cambarus aculabrum (crayfish with no common name)

Fishes

Catfish, Yaqui
*Cavefish, Ozark
*Chub, bonytail
*Chub, humpback
Chub, Oregon
Chub, Yaqui
*Dace, Ash Meadows speckled
*Dace, Moapa
*Darter, watercress
*Gambusia, Pecos

Appendix I
Listed Species That Occur on Wildlife
Refuges

*Madtom, Neosho
Madtom, Pygmy
Minnow, Rio Grande Silvery
*Poolfish (killifish), Pahrump
*Pupfish, Ash Meadows amargosa
*Pupfish, Devils Hole
*Pupfish, Warm Springs
Shiner, beautiful
*Shiner, Pecos bluntnose
*Squawfish, Colorado
Sturgeon, Gulf
*Sturgeon, pallid
Sturgeon, shortnose
*Sucker, Lost River
Sucker, razorback
*Sucker, short-nose
*Topminnow, Gila (including Yaqui)

Insects

*Beetle, American burying
*Beetle, Valley elderberry longhorn
Butterfly, Karner blue
*Butterfly, Lange's metalmark
*Butterfly, Schaus swallowtail
*Butterfly, Smith's blue
*Naucorid, Ash Meadows

Mammals

*Bat, gray
Bat, Hawaiian hoary
*Bat, Indiana
Bat, lesser (Sanborn's) long-nosed
*Bat, Little Mariana fruit
*Bat, Mariana fruit
*Bat, Ozark big-eared
*Bear, grizzly
Bear, Louisiana black
*Cougar, eastern
*Deer, Columbian white-tailed
*Deer, key
*Fox, San Joaquin kit
Jaguar

Appendix I
Listed Species That Occur on Wildlife
Refuges

*Jaguarundi
*Manatee, West Indian (Florida)
*Mouse, Alabama beach
 Mouse, Key Largo cotton
*Mouse, salt marsh harvest
*Mouse, southeastern beach
*Ocelot
*Panther, Florida
*Pronghorn, Sonoran
*Rabbit, Lower Keys
 Rat, rice (silver rice)
 Rat, Tipton kangaroo
*Sea-lion, Steller (northern)
*Seal, Hawaiian monk
 Shrew, Dismal Swamp southeastern
*Squirrel, Delmarva Peninsula fox
 Whale, blue
 Whale, bowhead
 Whale, finback
 Whale, gray
*Whale, humpback
*Whale, right
 Whale, sei
*Wolf, gray
*Wolf, red
 Woodrat, Key Largo

Reptiles

*Anole, Culebra Island giant
*Crocodile, American
*Lizard, blunt-nosed leopard
*Lizard, Coachella Valley fringe-toed
*Lizard, St. Croix ground
*Skink, blue-tailed mole
*Snake, Atlantic salt marsh
*Snake, eastern indigo
 Snake, giant garter
 Snake, northern copperbelly water
*Tortoise, desert
*Tortoise, gopher
*Turtle, green sea
*Turtle, hawksbill sea

Appendix I
Listed Species That Occur on Wildlife
Refuges

*Turtle, Kemp's (Atlantic) ridley sea
*Turtle, leatherback sea
*Turtle, loggerhead sea
*Turtle, Plymouth red-bellied
*Turtle, ringed sawback

Snail

*Snail, Iowa Pleistocene

Plants

Amaranthus brownii, Brown's pigweed
Amaranthus pumilus, Seabeach amaranth
*Asimina tetramera, Four-petal pawpaw
*Lomatium bradshawii, Bradshaw's desert-parsley
*Oxypolis canbyi, Canby's dropwort
Fritchardia renota, Loulo
Asclepias meadii, Mead's milkweed
*Phyllitis scolopendrium var. americana, American hart's-tongue fern
*Polystichum aleuticum, Aleutian shield-fern
*Boltonia decurrens, Decurrent false aster
*Enceliopsis nudicaulis var. corrugata, Ash Meadows sunray
*Grindelia fraxinopratis, Ash Meadows gumplant
*Hymenoxys aculis var. glabra, Lakeside daisy
*Thymophylla tephroleuca, Ashy dogweed
*Erysimum capitatum var. angustatum, Contra Costa wallflower
*Cereus eriophorus var. fragrans, Fragrant prickly-apple
*Cereus robinii, Key tree-cactus
Corphantha sneedii var. robustispina, Pima pineapple cactus
*Coryphantha sneedii var. sneedii, Sneed pincushion cactus
*Echinocereus fendleri var. kuenzleri, Kuenzler hedgehog cactus
*Sclerocactus glaucus, Uinta Basin hookless cactus
Harrisia portorricensis, Higo chumbo
Clermontia peleana peleana, 'oha wai
Clermontia pyrularia, 'oha wai
Howellia aquatilis, Water howellia
Schiedea verticillata, Whorled schiedea
*Nitrophila mohavensis, Amargosa niterwort
Tumamoca macdougalii, Tumamoc globe-berry
Mariscus pennatifolius ssp. bryanii, no common name
*Chamaesyce bargerii (=Euphorbia garberi), Garber's spurge
Aeschynomene virginica, Sensitive joint-vetch
*Apios priceana, Price's potato-bean

Appendix I
Listed Species That Occur on Wildlife
Refuges

**Astragalus phoenix*, Ash Meadow milk-vetch
**Lespedeza leptosyachya*, Prairie bush-clover
 Serianthes nelsonii, Hayun lagu
 Sesbania tomentosa (no common name)
 Stahlia monosperma, Cobana negra
**Trifolium stoloniferum*, Running buffalo clover
**Frankenia johnstonii*, Johnston's frankenia
**Centaureum namophilum*, Spring-loving centaury
 Iris lacutris, Dwarf Lake Iris
**Hedeoma todsenii*, Todsen's pennyroyal
**Helonias bullata*, Swamp pink
**Mentzelia leucophylla*, Ash Meadow's blazing star
 Sidalcea nelsoniana, Nelson's checker-mallow
 Eugenia woodburyana (no common name)
**Oenothera deltoides* ssp. *howellii*, Antioch Dunes evening-primrose
 Platanthera leucophaea, Eastern prairie fringed orchid
 Platanthera praeclara, Western prairie fringed orchid
**Peperomia wheeleri*, Wheeler's Peperomia
 Aristida chasae (no common name)
 Chorizante pungens var. *pungens*, Monterey spineflower
**Aconitum noveboracense*, Northern wild monkshood
**Ivesia kingii* var. *eremica*, Ash Meadows ivesia
**Agalinis acuta*, Sandplain gerardia
**Cordylanthus maritimus* ssp. *maritimus*, Salt marsh bird's-beak
**Penstemon haydenii*, Blowout penstemon
 Schwalbea americana, American chaffseed

Source: FWS.

Wildlife Refuges That Provide a Significant Portion of a Listed Species' Habitat, as of February 1994

State	Refuge	Species
Alaska	Alaska Maritime	Aleutian Canada goose, Aleutian shield-fern
	Yukon Delta	Spectacled eider
Alabama	Bon Secour	Alabama beach mouse
	Watercress Darter	Watercress darter
Arkansas	Logan Cave	Ozark cavefish, Gray bat, Indiana bat, <i>Cambarus aculabrum</i> (crayfish with no common name)
Arizona	Buenos Aires	Masked bob-white quail
	Cabeza Prieta	Sonoran pronghorn
	San Bernardino	Yaqui topminnow, Yaqui chub, Yaqui catfish, Beautiful shiner
California	Antioch Dunes	Lange's metalmark butterfly, Contra Costa wallflower, Antioch Dunes evening primrose
	Clear Lake	Lost River and short-nosed suckers
	Coachella Valley	Coachella Valley fringed-toed lizard
	Ellicott Slough	Santa Cruz long-toed salamander
	Hopper Mountain	California condor
	Salton Sea	Yuma clapper rail
	San Francisco Bay	California clapper rail
	Seal Beach	Light-footed clapper rail, California least tern
	Tijuana Slough	Light-footed clapper rail, California least tern
Florida	Archie Carr	Loggerhead, green, leatherback, and hawksbill sea turtles
	A.R.M. Loxahatchee	Everglade snail kite
	Crocodile Lake	American crocodile, Key Largo cotton mouse, Key Largo woodrat
	Crystal River	West Indian manatee
	Florida Panther	Florida panther
	Great White Heron	Rice (silver rice) rat
	Hobe Sound	Loggerhead and green sea turtles

(continued)

**Appendix II
Wildlife Refuges That Provide a Significant
Portion of a Listed Species' Habitat, as of
February 1994**

State	Refuge	Species
	Key West	Schaus swallowtail butterfly
	Merritt Island	West Indian manatee, loggerhead, hawksbill, leatherback and green sea turtles, Florida scrub jay
	National Key Deer	Key deer, Lower Keys rabbit, rice (silver rice) rat, Key tree cactus
	St. Marks	Red-cockaded woodpecker
Georgia	Piedmont	Red-cockaded woodpecker
Guam	Guam	Little Mariana fruit bat, Mariana fruit bat, Guam broadbill, Mariana Crow, Guam Micronesian kingfisher, Bridled white-eye
Hawaii	Hanalei	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck
	Hawaiian Islands	Nihoa finch, Laysan duck, Laysan finch, Hawaiian monk seal
	Huleia	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck
	James C. Campbell	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck
	Kealia Pond	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck
	Pearl Harbor	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck
Insular Possession	Midway Atoll	Short-tailed albatross
Iowa	Driftless Area	Iowa pleistocene snail, Northern wild monkshood
Louisiana	Atchafalaya	Louisiana black bear
	Delta	Loggerhead, Kemp's ridley, and leatherback sea turtles
	Tensas	Louisiana black bear
Maryland	Blackwater	Delmarva Peninsula fox squirrel
	Chincoteague (also in Virginia)	Delmarva Peninsula fox squirrel
Michigan	Kirkland's Warbler	Kirkland's warbler
Mississippi	Mississippi Sandhill Crane	Mississippi sandhill crane

(continued)

**Appendix II
Wildlife Refuges That Provide a Significant
Portion of a Listed Species' Habitat, as of
February 1994**

State	Refuge	Species
	Noxubee	Red-cockaded woodpecker
Montana	Charles M. Russell	Black-footed ferret (to be reintroduced)
Nevada	Ash Meadows	Devil's Hole pupfish, Warm Springs pupfish, Ash Meadows amargosa pupfish, Ash Meadows speckled dace, Ash Meadows naucorid, Ash Meadows blazing-star, Amargosa niterwort, Ash Meadows milk-vetch, Ash Meadows sunray, spring-loving centaury, Ash Meadows gumplant, Ash Meadows invesia
	Moapa Valley	Moapa dace
North Carolina	Alligator River	Red wolf
	Pocosin Lakes	Red wolf
Oklahoma	Oklahoma Bat Caves	Gray bat, Ozark big-eared bat
	Wichita Mountains	Black-capped vireo
Oregon	Julia Butler Hansen Refuge for Columbian White-tailed Deer (also in Washington)	Columbian white-tailed deer
Puerto Rico	Culebra	Hawksbill and leatherback sea turtles, Wheeler's Peperonia, Roseate tern
South Carolina	Cape Romain	Loggerhead sea turtle
	Carolina Sandhills	Red-cockaded woodpecker
Texas	Aransas	Whooping crane
	Attwater Prairie Chicken	Attwater prairie chicken
	Balcones Canyonlands	Black-capped vireo, golden-cheeked warbler
	Laguna Atascosa	Ocelot, jaguarundi
	Lower Rio Grande	Jaguarundi
Virgin Islands	Green Cay	St. Croix ground lizard
	Sandy Point	Leatherback, hawksbill, and green sea turtles
Virginia	Chincoteague (also in Maryland)	Delmarva Peninsula fox squirrel

(continued)

**Appendix II
Wildlife Refuges That Provide a Significant
Portion of a Listed Species' Habitat, as of
February 1994**

State	Refuge	Species
Washington	Julia Butler Hansen Refuge for Columbian White-tailed Deer (also in Oregon)	Columbian white-tailed deer
Wisconsin	Necedah	Karner blue butterfly
Wyoming	Mortenson Lake	Wyoming toad

Source: FWS.

Wildlife Refuges Established for Listed Species as of May 24, 1994

State	Refuge	Primary species	Acreage
Alabama	Blowing Wind Cave	Indiana bat, gray bat	264
	Fern Cave	Indiana bat, gray bat	199
	Watercress Darter	Watercress darter	7
Arkansas	Logan Cave	Ozark cavefish	124
Arizona	Buenos Aires	Masked bobwhite quail	113,940
	Leslie Canyon	Gila (Yaqui) topminnow, Yaqui chub, Peregrine falcon	1,240
	San Bernardino	Gila (Yaqui) topminnow, Yaqui chub, Yaqui catfish, beautiful shiner	2,369
California	Antioch Dunes	Lange's metalmark butterfly, Antioch Dunes evening-primrose, Contra Costa wallflower	55
	Bitter Creek	California condor	14,054
	Blue Ridge	California condor	897
	Castle Rock	Aleutian Canada goose	14
	Coachella Valley	Coachella Valley fringe-toed lizard	3,276
	Ellicott Slough	Santa Cruz long-toed salamander	127
	Hopper Mountain	California condor	2,471
	Sacramento River	Valley elderberry longhorn beetle, bald eagle, least bell's vireo	6,458
	San Francisco Bay	California clapper rail, California least tern, salt marsh harvest mouse	21,200
	San Joaquin River	Aleutian Canada goose	1,638
	Seal Beach	Light-footed clapper rail, California least tern	911
	Sweetwater Marsh	Light-footed clapper rail	316
	Tijuana Slough	Light-footed clapper rail	1,023
Florida	Archie Carr	Loggerhead and green sea turtles	51
	Crocodile Lake	American crocodile	6,560
	Crystal River	West Indian manatee	66
	Florida Panther	Florida panther	23,379
	Hobe Sound	Loggerhead and green sea turtles	980
	National Key Deer	Key deer	8,196

(continued)

**Appendix III
Wildlife Refuges Established for Listed
Species as of May 24, 1994**

State	Refuge	Primary species	Acreage
	St. Johns	Dusky seaside sparrow (extinct)	6,255
Hawaii	Hakalau Forest	Akepa, akiapolaau, 'o'u, Hawaiian hawk, Hawaiian creeper	16,515
	Hanalei	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck	917
	Huleia	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck	241
	James C. Campbell	Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, Hawaiian duck	166
	Kakahaia	Hawaiian stilt, Hawaiian coot	45
	Kealia Pond	Hawaiian stilt, Hawaiian coot	691
	Pearl Harbor	Hawaiian stilt	61
Iowa	Driftless Area	Iowa pleistocene snail	507
Massachusetts	Massasoit	Plymouth red-bellied turtle	184
Michigan	Kirtland's Warbler	Kirtland's warbler	6,530
Mississippi	Mississippi Sandhill Crane	Mississippi sandhill crane	19,308
Missouri	Ozark Cavefish	Ozark cavefish	40
	Pilot Knob	Indiana bat	90
Nebraska	Karl E. Mundt	Bald eagle	19
Nevada	Ash Meadows	Devil's hole pupfish, Warm Springs pupfish, Ash Meadows amargosa pupfish, Ash Meadows speckled dace, Ash Meadows naucorid, Ash Meadows blazing star, Amargosa niterwort, Ash Meadows milk-vetch, Ash Meadows sunray, spring-loving centaury, Ash Meadows gumplant, Ash Meadows ivesia	13,231
	Moapa Valley	Moapa dace	32
Oklahoma	Oklahoma Bat Caves	Ozark big-eared bat, gray bat	658
Oregon	Bear Valley	Bald eagle	4,178
	Julia Butler Hansen Refuge for Columbian White-tailed Deer (also in Washington)	Columbian white-tailed deer	1,978

(continued)

**Appendix III
Wildlife Refuges Established for Listed
Species as of May 24, 1994**

State	Refuge	Primary species	Acreage
	Nestucca Bay	Aleutian Canada goose	399
South Dakota	Karl E. Mundt	Bald eagle	1,044
Texas	Attwater Prairie Chicken	Attwater prairie chicken	7,984
	Balcones Canyonlands	Black-capped vireo, golden-cheeked warbler	7,905
Virginia	James River	Bald eagle	4,147
	Mason Neck	Bald eagle	2,276
Virgin Islands	Green Cay	St. Croix ground lizard	14
	Sandy Point	Leatherback sea turtle	327
Washington	Julia B. Hansen Refuge for Columbian White-tailed Deer (also in Oregon)	Columbian white-tailed deer	2,777
Wyoming	Mortenson Lake	Wyoming toad	1,776
Total acreage			310,110

Note: This list does not include refuges which were originally established for other purposes and later added specific lands for listed species.

Source: FWS.

Comments From the Department of the Interior



United States Department of the Interior

OFFICE OF THE SECRETARY

Washington, D.C. 20240

September 22, 1994

Mr. James Duffus, III
Director, Natural Resources
Management Issues
General Accounting Office
Washington, D.C. 20548

Dear Mr. Duffus:

The GAO Draft Audit Report, "NATIONAL WILDLIFE REFUGES: Contributions Being Made to Endangered Species" (GAO/RCED-94-203), was reviewed by the U.S. Fish and Wildlife Service's Division of Refuges and Division of Endangered Species.

We generally concur with the findings and have provided specific comments which should enhance the document (see enclosed).

If you have any questions concerning this information I will be glad to discuss them with you.

Sincerely,

George T. Frampton, Jr.
Assistant Secretary for Fish
and Wildlife and Parks

Enclosure

Appendix IV
Comments From the Department of the
Interior

COMMENTS ON GAO DRAFT AUDIT REPORT - "NATIONAL WILDLIFE REFUGES:
Contributions Being Made to Endangered Species"

General Remarks:

The National Wildlife Refuge System (NWRS) plays an important role in the implementation of the Endangered Species Act of 1973, as amended. It should be underscored that the NWRS plays a particularly critical role in the areas of Candidate Species Conservation (Prelisting) and Listed Species Recovery.

The Fish and Wildlife Service (Service) concurs with the finding that funding limitations constrain the National Wildlife Refuge System's ability to realize its full potential in the management of candidate, threatened, and endangered species. However, given resource constraints and other Departmental, Administration and Congressional priorities, refuges have been funded at the highest affordable level. In addition, the Service recognizes the need to expand training opportunities for land managers regarding Endangered Species Act Compliance requirements; ensure that Recovery Plans and Habitat Conservation Plans specifically address the role of public lands in species recovery; and promote enhanced communication and coordination within the Service at all levels (national, regional, field), by developing and implementing a process to communicate candidate, threatened, and endangered species needs.

Specific Corrections:

There is confusion in the document related to composition of the National Wildlife Refuge System (NWRS). The NWRS consists of 499 National Wildlife Refuges, 51 Coordination areas, and 166 counties with Waterfowl Production Areas (WPAs). The data supplied for this audit was based on the entire NWRS, not just for the refuges. Clarification of this is necessary to demonstrate the structure and magnitude of the NWRS.

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