APPENDIX A

Methodology

Selection of Plans

In selecting the plans for analysis in this report, we considered the spectrum and diversity of conservation plans and associated species and ecosystems. We chose plans to represent that diversity. We considered multiple factors in order to have a full picture of the array of conservation plans. First, we selected plants from all geographic regions where planning occurs. Some regions of the nation (California and Florida) have a substantially higher concentration of endangered species and plans, which is reflected in our list of plans (see Maps 1 and 2). Second, we wanted a diverse array of plan sizes. Most approved HCPs are for single landowners with small tracts of land. Although we have analyzed a few of those small plans here, we have emphasized large plans because of their greater impact on wildlife and biodiversity and the increasing number of larger, multiple-landowner plans. Third, we selected plans addressing endangered species from a variety of taxa (e.g., amphibian, fish, bird) and a variety of habitat types (e.g., grassland, forest, etc.). Finally, we have given special emphasis to plans that are important in conservation planning because they attracted considerable public attention or set precedents.

The plans we analyzed here were at least at the formal draft phase. We included some draft plans because nearly 200 HCPs are being developed but have not been approved, and usually plans do not change substantially after the formal draft phase (see Public Review and NEPA). In this context, the only exception we made was for the Georgia statewide HCP for the red-cockaded woodpecker, which had not been released as a formal draft. Similar conservation plans are being developed for the woodpecker in Alabama, Texas, South Carolina and Louisiana. We note, however, that the Georgia plan may be changed substantially before it is finalized. In the report, we make similar caveats about plans that are not finalized, recognizing that aspects can change before plan approval.

Analysis

After we selected the plans and identified the varous scientific, public participation, funding

and legal elements important in conservation planning, we analyzed each conservation plan. The first step was to read the plan and associated documents such as environmental impact statements, the U.S. Fish and Wildlife Service biological opinion and management/monitoring plans. We also read comment letters on the draft plans. We then typically talked to various people involved in each plan including federal officials, local biologists and conservationists. If there was an updated (i.e., within the last ten years) recovery plan for species associated with the conservation plan, we obtained the recovery plan and analyzed the relationship between the recovery and conservation plans. Through these techniques, we assessed each element of each plan and compared plans to each other. In this way, we were able to find general trends in conservation plans as well as to pull out good and bad examples of conservation plan elements.

APPENDIX B

A Statement on Proposed Private Lands Initiatives and Reauthorization of the Endangered Species Act from the Meeting of Scientists at Stanford University

When the Endangered Species Act was authorized in 1973, Congress charged the Departments of the Interior and Commerce to conserve the ecosystems upon which threatened and endangered species depend, and to do so "using the best available scientific and commercial data." Despite remarkable growth in our scientific understanding of the conservation needs of threatened and endangered species during the past two decades, controversy continues to surround the Act, especially as it affects the use of private land. The Act's provisions for the treatment of imperiled species on private land are of major conservation concern both because, according to some estimates, more than half of all listed species occur wholly on private land, and because listed species on private land are faring worse in general than those on federal lands.

Various bills recently introduced in Congress propose changes in the Act's provisions for treating listed species on private land. The private lands provisions proposed in draft legislation would modify the habitat conservation planning (HCP) language of Section 10 (a) of the Act. The HCP process was designed to mitigate substantially the impacts of otherwise legal activities on listed species. However, many recent HCPs have been developed without adequate scientific guidance and there is growing criticism from the scientific community that HCPs have the potential to become habitat giveaways that contribute to, rather than alleviate, threats to listed species and their habitats.

The proposed new provisions have the potential to either improve or worsen the conditions of listed species on private lands, depending on whether or not habitat conservation planning and management are based on objective scientific evidence and methods. To provide guidance on the scientific implications of proposed private lands provisions, a group of nationally respected conservation biologists met at Stanford University in February [1997]. Among the undersigned are ecologists and geneticists with extensive experience in conservation planning for imperiled species. Our group includes individuals with widely differing positions on how best to achieve the goals of the Endangered Species Act. The

diverse composition of our group should give weight to our conclusions.

In considering private land conservation planning initiatives, we restricted ourselves to five agenda items that recur in draft bills and ongoing discussions in congressional and conservation circles: 1) the "no surprises" policy, 2) multiple species conservation planning, 3) "safe harbor" initiatives, 4) pre-listing agreements, and 5) small-parcel landowner initiatives. We understand that this is not an exhaustive list of potential private lands policies and programs. We also recognize that there is overlap among many of the proposed provisions; for example, the no surprises policy is often viewed as an obligatory component of the other proposed provisions.

As the following discussion makes clear, we believe that the current proposed private lands amendments to the Endangered Species Act will not further the Act's goals unless those measures are implemented in a scientifically sound manner. However, our group believes that with essential stipulations, "landowner-friendly" initiatives can assist in meeting our nation's goal of protecting its unique and valuable natural heritage.

No Surprises

More aptly labeled "fair assurances" to landowners, no surprises policy promises that if private landowners protect targeted species under a Habitat Conservation Plan or the equivalent, they then will not have to underwrite future conservation requirements that may develop due to new information or changed circumstances. Should the species require further conservation efforts, the costs would be largely borne by the public rather than the landowners.

A no surprises policy is troubling to scientists because it runs counter to the natural world, which is full of surprises. Nature frequently produces surprises such as new diseases, droughts, storms, floods, and fire. The inherent dynamic complexity of natural biological systems precludes accurate, specific prediction in most situations; and human activities greatly add to and compound this complexity. Surprises will occur in the future; it is only the nature of timing of surprises that are unpredictable. Furthermore, scientific research produces surprises in the form of new information regarding species, habitats, and natural processes. Habitat Conservation Plans, therefore, are inevitably developed and authorized under conditions of substantial uncertainty and may ultimately prove inadequate. Unless conservation plans scan be amended, habitats and species certainly will be lost.

We appreciate that no surprises policy is not a guarantee that conservation plans will not change, but a contractual commitment to shift some of the financial burden of future changes in agreements to the public. In that light, the following features should constitute minimum standards for HCPs with no surprises assurances. First, it must be possible to amend HCPs based on new information, and it should not require "extraordinary circumstances" to do so. Second, to underwrite program changes when parties other than the landowner request and justify them, there must be a source of adequate, assured funding that is not subject to the vagaries of the normal appropriation processes. We expect that the costs of fixing inadequate

HCPs may be substantial. Third, mechanisms to ensure that long-term conservation plans will be monitored adequately are essential. Monitoring habitat changes or ecosystem functions cannot substitute for the monitoring of target species. Moreover, new scientific information from monitoring should be incorporated into management as that information becomes available. Fourth, HCPs must clearly articulate measurable biological goals and demonstrate how those goals will be attained under the plans. Plans should not undermine the recovery of listed or vulnerable species. Fifth, assurances to landowners should only be extended for those targeted species for which the plan articulates species-specific goals that further conservation in a regional context, rather than in a local, piece meal fashion.

Multiple-Species HCPs

Although Habitat Conservation Plans originally focused on individual species in local areas, today many planners are finding it preferable (biologically and often economically) to plan for multiple species over entire regions. In the absence of scientifically credible recovery plans, multiple-species HCPs should clearly articulate conservation goals and must demonstrate their contribution to the conservation or recovery of targeted species. In addition, multiple-species HCPs should assume an extra burden of rigor, requiring independent scientific review of goals, design, management, and monitoring. There should be a standing body of independent scientists to establish minimum scientific and management standards for multiple-species HCPs. The comprehensiveness of independent scientific review should be appropriate to the size and duration of the plan.

Multiple-species Habitat Conservation Plans cannot be based solely on the distribution and extent of different habitat types because this information does not yield effective predictions of the distribution and abundance of individual species. Such HCPs, therefore, must focus on specific target species, such as endemic, listed, indicator, and keystone species. If one species is chosen as an indicator of the status of another species of conservation concern, the plan should validate the connection between them. Species that are critical for ecosystem integrity, whether or not they are listed as endangered or threatened, should be among the indicators chosen. In addition, the viability of all target species "covered" by a plan must be considered in a greater regional context, often well beyond the boundaries of the planning area itself. Adequate distributional and ecological information should be made available to assess the plan's impacts on all covered species.

Multiple-species Habitat Conservation Plans must include adequate research and monitoring programs. The target species covered by the plan, such as endemic, listed, indicator, and keystone species, must be monitored individually. Plans also must include an adaptive management program, so that management can be improved in the light of new information obtained by monitoring or other means. As is the case for "no surprises," besides being amendable, multiple-species HCPs must have an assured source of funds to support potential amendments.

Safe-Harbor Initiatives

Safe harbor initiatives encourage private landowners to increase the amount of habitat available to endangered species. In the past, many landowners have been reluctant to restore or enhance habitat for fear of incurring added regulatory burdens that will curtail future use of their property. Under safe harbor policy, the landowner is obligated to maintain only the baseline utilization of the property by the species prior to habitat improvements, which means that the landowner will be free to undo those improvements at a later date.

Most of our group believes that deleterious consequences to protected species from safe harbor initiatives will be infrequent and that safe harbors could prove to be an important inducement to overcoming landowner unwillingness to take actions beneficial to imperiled species. Nonetheless, two concerns should be addressed in safe harbor agreements. First, the concepts of "baseline population and utilization" require a clear definition. Sources of scientific uncertainty should be addressed in defining the baseline status of species, just as for the no surprises policy. The determination of the safe harbor baseline depends on reliable survey techniques and scientific interpretation. Second, some species may be better candidates for safe harbor agreements that others as a result of their distribution, resource needs, and habitat area requirements. Species are distributed across diverse landscapes with habitat areas of varying quality. In addition, species vary widely in their ability to move from one area of habitat to a neighboring one. Thus, we believe that the value of safe harbor agreements must be evaluated on a species-by-species basis. In the absence of scientifically credible recovery plans, safe harbor agreements should document their potential contributions to the conservation or recovery of target species within an entire region rather than on a single piece of private property.

Prelisting Agreements

Under a prelisting agreement, a landowner would take actions to benefit an unlisted rare or declining species before it is listed. This has the potential to benefit species conservation because a species is afforded no protection on private land under the Endangered Species Act until it is listed. Nevertheless, prelisting agreements must not become an easy substitute for necessary listings.

Prelisting agreements often will be negotiated in the face of significant levels of scientific uncertainty—we know little about many of our listed species, less yet about many unlisted species. Because prelisting agreements should benefit species, we recommend an enhanced level of attention and critical review of the biological circumstances under consideration in proposed prelisting agreements. The federal government will have to deal with an inevitable shortfall of information; that situation can be partially corrected by 1) developing the most complete database possible to inform the decision, 2) clearly articulating how the prelisting agreement will benefit the targeted species, and 3) applying the necessary concomitants of the "No Surprises" policy. The latter should include an ability to amend agreements, the availability of funding to support amendments, adaptive management

with effective program monitoring, sufficient consideration of the regional planning context, and independent scientific review.

Small-Parcel Landowner Initiatives

Considering the cost, complexity, and time required to complete Habitat Conservation Plans and implement them, the idea of expediting the permitting process for small landowners is attractive. But we note that in many areas with imperiled species, private landholdings consist almost entirely of small parcels. In addition, when both large and small parcels are interspersed, the small parcels may contain most of the key habitat. Either way, the cumulative impacts of many small projects on imperiled species may be substantial. In addition, the relative impacts of small landowner activities vary greatly depending upon which endangered or threatened species live on their land. The loss of but five acres of remnant habitat could doom to extinction more than a few listed species. We are concerned that expediting the permitting process could come at a significant cost to species persistence.

Our group believes that any policy that allows for expedited HCPs should also require that such agreements not compromise the viability of targeted species within the planning region, and should explicitly consider and limit cumulative deleterious effects from incremental habitat losses. If a recovery plan exists, expedited HCPs must be consistent with the plan. Otherwise, to ensure coordination of existing and future HCPs, a regional analysis of species status should be required before any expedited HCPs or exemptions are considered.

Independent Scientific Review

While Habitat Conservation Plans and other conservation agreements that we have discussed above may offer promise for improved species protection on private and other non-federal lands, serious questions remain about their effectiveness for long-term species conservation and recovery. Because many recovery plans and HCPs lack scientific validity, because the private lands proposals discussed above remain largely untested, and because endangered species protection and recovery must be based on the best available science, we believe that independent scientific review must become an essential step in the implementation of the Endangered Species Act. Such review should be carried out by scientists with no economic or other vested interests in the agreement. It is critical to start the review process early in the project, including the design phase.

Conclusion

Finally, while not strictly a "science" issue, we strongly agree that implementation of the Endangered Species Act would be immensely improved if funding were increased and agency staff were better trained. We agree that better enforcement of the Act's prohibitions by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service would benefit listed species. We also agree that the Act's goals are compromised by conflicting laws and regulations that encourage actions that directly and indirectly contribute to species endangerment. And, we concur that a wide array of incentives and inducements for better Act compliance by private parties could serve to benefit species conser-

vation greatly if implemented in a scientifically responsible manner.

We hope that these observations and our scientific recommendations above will help Congress to enact legislation that will make the Endangered Species Act more acceptable to private landowners while strengthening the protection of species and habitats on private lands.

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APPENDIX C

Conservation Plans Analyzed

1. Washington Department of Natural Resources (DNR) HCP

The Washington Department of Natural Resources developed an HCP for 1.6 million acres of state-owned forested land within the range of the northern spotted owl *(Strix occidentalis caurina).* The plan is for 70 years but may be extended to 100 and purports to cover all species on the property.

In the plan, conservation planning focuses on northern spotted owls (threatened), marbled murrelets *(Brachyramphus marmoratus marmoratus*—threatened) and several salmon species (unlisted). In addition, there are incidental take permits and some protective measures for the grizzly bear *(Ursus arctos),* gray wolf *(Canis lupus),* bald eagle *(Haliaeetus leucocephalus),* peregrine falcon *(Falco peregrinus),* Columbian white-tailed deer *(Odocoileus virginianus leucurus),* Aleutian Canada goose *(Branta canadenis leucopareia)* and Oregon silverspot butterfly *(Speyeria zerene hippolyta).* For spotted owls, DNR is allowed to take some nesting and foraging habitat while protecting nesting and dispersal habitat that is proximate to national forest reserves under the Northwest Forest Plan. Because DNR has little information about marbled murrelets, it will conduct more research and develop a long-term management strategy for murrelets while harvesting some habitat that it determines is marginal. For salmon, DNR hopes to help prevent listing of several species by setting aside larger buffers along streams on the western side of the Cascade Mountains than before the plan, among other measures to curtail erosion into streams.

Within the HCP, DNR has a separate management regime for its Olympic Experimental State Forest on the Olympic Peninsula. The management on the peninsula will be much more flexible than prescriptions for the rest of the HCP lands, allowing experimenting with forestry techniques.

2. Plum Creek Timber Company HCP

Plum Creek developed this HCP for its commercial forestry management on 169,177 acres of its land in the central Cascades Range of

Washington. The company's land is intermixed with 249,513 acres of other ownership in a checkerboard configuration of alternating sections of national forest. The plan allows incidental take of the northern spotted owl, marbled murrelet, grizzly bear and gray wolf. The plan purports to cover all species on the property through a conservation strategy that revolves around the northern spotted owl and salmon species. The first phase of the plan is for 50 years, followed by a second phase for an additional 50 years, which allows incidental take of additional endangered species individuals beyond the populations that Plum Creek projected to support during the first phase.

For spotted owls, Plum Creek will reduce nesting, roosting and foraging (old growth) habitat, mitigated by Plum Creek's management for dispersal habitat (not old growth) and the U.S. Forest Service's protection of nesting habitat on federal lands under the Northwest Forest Plan. For salmon, Plum Creek takes an approach similar to the DNR's (above), by providing larger riparian buffers along fish-bearing streams than before the plan.

3. Weyerhaeuser Company — Willamette Timberlands HCP

Weyerhauser designed this HCP to allow incidental take of six listed species in connection with logging of a 400,000-acre area in the Willamette region of western Oregon. The six listed species are: northern spotted owl, marbled murrelet, bald eagle, peregrine falcon, Oregon chub *(Oregonichthys crameri)* and Umpqua River cutthroat trout *(Oncorhynchus clarki clarki)*. The HCP runs for 40 years, with the option for FWS to extend it for another 40. Only 400 acres of fragmented old-growth forest remain on the property, half of which will be harvested under the HCP.

The plan purports to cover a multitude of species by focusing on maintaining areas in certain timber classes. After year 29 of the HCP, Weyerhaeuser will maintain at least 40 percent of the property in sawtimber, poletimber and reserves (protection for buffers around riparian areas and other special features such as wetlands, lakes and meadows). Weyerhaeuser can harvest the rest of the land to very early forest stages. Management for spotted owls consists of maintaining (non-old growth) dispersal habitat in some areas and foraging habitat of up to 50 percent of certain areas proximate to federal forest reserves. Riparian protection for listed aquatic species and salmon that may be listed in the near future consists of a commitment to perform watershed analysis on watersheds where Weyerhauser owns at least 30 percent of the land, increasing the riparian buffers on fish-bearing streams, protecting buffers around wetlands and other measures.

4. A. Teichert and Son, Inc. HCP

Teichert developed an HCP for incidental take of the San Joaquin kit fox *(Vulpes macrotis mutica*—endangered) while mining aggregate in a 300-acre area (the Vernalis Project). Forty-eight of those acres were potential kit fox habitat, with an additional 27 acres of habitat disturbed by roadbuilding. To minimize impact on the kit fox, Teichert agreed to a variety of measures, includ-

ing a survey for kit foxes prior to construction, training for construction workers about the kit foxand reporting the siting or take of any kit foxes. For mitigation, Teichert acquired a conservation easement to 192 acres two miles away, high quality habitat with evidence of kit fox use for 20 years. Teichert also will annually pay the California Department of Fish and Game to manage the mitigation site.

5. Pacific Gas and Electric Company (PG&E) HCP

PG&E designed the Blackhawk HCP to address the potential impacts of the construction of a pipeline on five acres of potential California red-legged frog habitat *(Rana aurora draytonii* — threatened) in southern Contra Costa County, California. This was an extremely quick HCP — only 65 days elapsed between the first FWS contact and permit issuance. The duration of the incidental take permit is three years.

To minimize the take of California red-legged frogs and their habitat during the construction period, PG&E: (1) provided education and awareness training for those involved with construction; (2) restricted vehicle/equipment activities; (3) limited the use of access roads; (4) had a FWS-approved biologist on-site responsible for reporting and relocating any red-legged frogs and monitoring the construction area for compliance with construction requirements; and (5) installed a fence at the edge of the construction zone that prevented construction access to the creek bed. Following the installation of the pipeline, the impacted area was restored to its natural contour and vegetation. To mitigate for any take, PG&E posted a compensatory $100,000 bond to acquire and maintain ten acres of excellent red-legged frog breeding habitat adjacent to a protected area.

6. San Bruno Mountain HCP

This was the first HCP, approved in 1982, and provided the basis for the language of Section 10 of the ESA. This HCP was developed to resolve battles over land use on San Bruno Mountain near San Francisco and to address the conservation of two rare butterflies, the mission blue (*Icaricia icarioides missionensis*—endangered) and the callippe silverspot *(Speyeria callippe callippe*—endangered). Under this HCP, private landowners are permitted to develop habitat of 14 percent of the mission blue population and habitat of eight percent of the callippe silverspot population. Each development authorized in the HCP includes a process for phasing of development and design review, conveyance of some of the land to county ownership for conservation, assessment of annual fees to residents to fund habitat enhancement, reclamation of land disturbed during development and creation of buffer zones to protect residences from fire. The development authorized under this plan provides funding to carry out management activities such as removal of exotic vegetation and restoration of habitat.

7. Metropolitan Bakersfield HCP

This HCP was developed to allow incidental take of multiple listed species within a 408-square-mile planning area that includes the city of Bakersfield as well as some surrounding lands in Kern County, California. The most important

species covered in this plan are the San Joaquin kit fox *(Vulpes macrotis mutica)*, blunt-nosed leopard lizard *(Gambelia silus)* and Tipton kangaroo rat *(Dipodomys nitratoides nitratoides)*, all endangered. This HCP follows a land-use plan for the area which existed before the HCP. In the planning area, it is projected that one square mile of open lands will be developed each year (50 percent agricultural land, 50 percent natural land). The HCP stipulates that landowners must pay a one-time mitigation fee of approximately $1,250 per acre on all new construction. This money is then used to acquire state preserve lands primarily outside the planning area and to pay the state to manage those preserve lands.

8. Multiple Species Conservation Program (MSCP)

The MSCP is one of the first of nine subregional plans under the NCCP in California. The planning area is 900 square miles in southwestern San Diego County and purports to cover the needs of 85 rare species, including the coastal California gnatcatcher *(Polioptila californica californica*—threatened) and the coastal cactus wren *(Campylorhynchus brunneicapillus couesi*—unlisted). The MSCP planning area is divided into subareas, each responsible for developing a plan consistent enough with the overall planning document and preserve design to be included in the MSCP. The planning and take permits extend for 30 years.

The overall plan delineates a multi-habitat planning area (MHPA), which is a preserve system of core and linkage habitat important for the conservation of multiple species. The MHPA design was based on a geographic information system (GIS) database of vegetation types, as well as land ownership and use, which allowed identification of areas most useful for conservation purposes based on their habitat value. The MHPA is 172,000 acres. Although this area is frequently referred to as a "preserve" system, some land uses will be permitted in parts of the MHPA, including low-density residential development, agriculture, infrastructure development (e.g., utility lines) and recreational use.

By participating in the program, landowners in the planning area are permitted to take incidentally 85 "covered" species as a result of development or other activities, presumably because protection and management within the MHPA will sufficiently conserve them.

9. Clark County, Nevada, HCP

Clark County is undergoing tremendous population increase and land development near Las Vegas. Some of the land planned for development is habitat occupied by the Mojave desert tortoise *(Gopherus agassizii*—threatened). To address development pressures on tortoise habitat, this 30-year HCP was approved in 1994. The total amount of land to be covered by the HCP is approximately 525,000 acres, 170,000 acres of which has already been developed and 114,000 of which will be developed under the HCP. For mitigation, $1.3 million will be used each year to finance acquisition of conservation easements and grazing privileges for up to 85,000 acres of Desert Wildlife Management Areas on nonfederal land, conduct tortoise inventories, inventory and create a multiple-species conservation strategy, construct

The Lower Colorado River

The Colorado River was the crown jewel of southwestern rivers: a hydrological and ecological marvel. It carved the Grand Canyon and supported a unique array of endemic species of fish adapted to its harsh environment of dramatically changing temperatures and flows. By carrying, and depositing at its mouth, extraordinary quantities of sediment — dwarfing the load carried by the "Big Muddy," the Mississippi River — it created a marsh complex in the Colorado River Delta which provided habitat for such species as the desert pupfish and Yuma clapper rail. Its nutrient-laden flows of freshwater also helped to sustain the health of the Sea of Cortez and associated marine species such as the vaquita porpoise, totoaba fish and green sea turtle.

Today the Colorado is dammed and diverted, its water depended upon by over 30 million people. The water is used to irrigate more than 37 million acres of farmland and to sustain multiple municipalities and industries. Management of this river, especially dam construction and water allocation, has altered the sediment balance, water temperature and flow, fish species composition, and adjacent riparian habitats. Water flowing from dams is much cooler and clearer than before, and many of the Colorado River's native species are in danger of extinction or likely to become endangered in the near future. Nevertheless, some of the natural Colorado River remains and more could be restored.

For the lower Colorado River (from Lees Ferry below the Glen Canyon Dam in northern Arizona to the southerly international boundary with Mexico), the states of California, Nevada and Arizona have begun to reevaluate the effect of river management practices on endangered species. Prodded by fear of the impact on water diversions from the designation of critical habitat in 1994 for two endangered fish species (razorback sucker—*Xyrauchen texanus* and bonytail chub—*Gila elegans*) in the Lower Colorado River, the three lower basin states began working with the Bureau of Reclamation and other federal agencies on the development of a multi-species conservation program. The formal draft of this program has not yet been developed, but stakeholders and data have been assembled, and preliminary plans have been distributed. The program is an attempt to design a comprehensive ecosystem-based conservation program on a large scale (the 100-year floodplain of the lower Colorado River). It is also designed to function as an HCP under Section 10 of the ESA for the non-federal entities using river water and as the conservation measures and incidental-take statement for the federal agencies under Section 7 of the ESA.

SOUTHWESTERN WILLOW FLYCATCHER. GEORGE ANDREJKO/AZ GAME & FISH

Program development was accelerated because the Bureau of Reclamation—the "watermaster" of the river—and FWS had entered into a memorandum of agreement (July 1994) waiving the requirements of the ESA during the time it took to complete this multi-species program. After Defenders of Wildlife and other groups threatened legal action against this temporary waiver, the agencies acknowledged that compliance with the ESA could not be put off to a later date.

As of the date of this report, it is questionable whether the state and federal agencies on the program's steering committee have demonstrated the requisite commitment to complete such an ambitious undertaking in a manner which will assure the long-term sustainability of the water resources,

Continued

prevent the extinction of native species, equitably provide for the needs of indigenous people and assure the overall ecological health of the region. A prime example of failure to adhere to sound biological principles of ecosystem management because of political considerations is that the planning scope as currently envisioned stops at the southerly international boundary—cutting off consideration of the biological relationships between the health of the river and that of the delta and the Sea of Cortez. Such species as the desert pupfish, Yuma clapper rail and southwestern willow flycatcher exist on both sides of the border, and the most efficient way to ensure their continued survival is an ecosystem-based, binational approach.

The conservation planning that is now under way is an example not only of Section 7 federal agency consultation with FWS but of incidental-take permits to nonfederal entities. The lessons, recommendations and warnings derived from the ESA-related conservation plans evaluated in this report apply with equal force to this planning process. That is, adequate scientific information should be applied in minimizing and mitigating incidental-take to the maximum extent practicable. In addition, public participation, funding and legal enforcement must be sufficient to ensure that the program is carried out. For the lower Colorado River, all of this occurs on a mammoth scale, involving hundreds of species, complex hydrology, water management and adjudication in three states, and cumulative effects on a severely debilitated ecosystem. Development of this conservation program is perhaps the most challenging endangered species planning so far undertaken.

tortoise barriers along roads and translocate tortoises from land to be developed, among other measures. The funds for mitigation come from a one-time development fee of $550 per acre.

10. Coleman Company HCP

In order to expand their existing warehouse in Cedar City, Utah, into 1.4 acres occupied by Utah prairie dogs *(Cynomys parvidens*—threatened), Coleman developed an HCP to take incidentally prairie dogs for two years. The expansion affects 116 prairie dogs, and the take permit allows for up to two prairie dogs to be incidentally killed. In order to avoid and minimize potential impacts on the prairie dogs, Coleman agreed to trap all of the prairie dogs, transfer them to a BLM research area (at a cost of $50 per relocated prairie dog), fence the area to deter prairie dog reestablishment, conduct a pre-construction education program and notify FWS and the Utah Division of Wildlife Resources about any prairie dogs killed or injured during construction. For habitat mitigation, Coleman paid $200 per acre (a total of $560) to BLM for enhancement of 2.8 acres of prairie dog habitat on public lands.

11. Swan Valley Conservation Agreement

This agreement was signed in 1995 by Plum Creek Timber Company, FWS, Flathead National Forest and the Montana Department of Natural Resource Conservation for an area of mixed land ownership. The purpose of the agreement is to integrate timber harvest, recreation

and management practices for the grizzly bear *(Ursus arctos horriblis*—threatened). The agreement's conservation area is important for grizzly bear habitat connectivity between the Swan and Mission Mountains in the Northern Continental Divide Ecoregion (one of five ecoregions with grizzly bears in the lower 48 states). To attempt to maintain that connectivity, the agreement's provisions include limits on the amount of land with road density greater than one mile per square mile; harvest rotations such that seven of 11 subunits will be inactive at any given time; restriction of some harvesting activities during critical seasons for the bear; reclamation or restriction of roads where practicable; and other provisions. This agreement does not authorize incidental take for Plum Creek or the Montana Department of Natural Resource Conservation. For those parties, it is not an HCP but a voluntary agreement, and it is a Section 7 consultation for incidental take by the U.S. Forest Service.

12. Balcones Canyonlands Conservation Plan (BCCP) HCP

This plan was developed from 1988 to 1996 in response to the listing of eight endangered species in Travis County, Texas, and to allow land development to proceed in the county, including the city of Austin. The golden-cheeked warbler *(Dendroica chrysoparia*—endangered) is the primary focus of the preserve system established under the plan, but the plan permits incidental take of all eight endangered species, including the black-capped vireo *(Vireo atricapillus)* and six cave invertebrates. The HCP was approved in 1996 and will last for 30 years.

This HCP covers all of Travis County (647,680 acres) and permits incidental take on all of the nonfederal land outside a preserve area designated in the HCP. It is estimated that 30,000 to 60,000 acres will be developed over the 30-year period, some of it endangered species habitat. To mitigate this take, the HCP includes establishment of a 30,428-acre habitat preserve system, management of the preserve system for listed species, acquisition and/or management of caves containing the six listed invertebrates and other species of concern, and protection as needed for additional species of concern.

For land outside of the preserve boundaries, there is no on-site or project-by-project mitigation. Instead, landowners will be required to mitigate for impacts by purchasing a participation certificate based on the total acreage of different habitat types within the tract. Preserve acquisition and maintenance will be funded by a combination of public financing (federal, state and local) and these participation certificate purchases. As of September, 1997, 23,059 acres of the preserve had been acquired.

13. Louisiana Black Bear 4(d) Rule

The Louisiana black bear *(Ursus americanus luteolus)* was listed as threatened in 1992, and approximately 400-500 individuals now exist almost solely in the bottomland forests of the Atchafalaya and Tensas river basins of Louisiana (although some are believed to be in Mississippi). The conservation plan for the black bear was developed by the Black Bear Conservation Committee, which is made up of diverse interests including the timber industry, farmers, con-

servationists (including Defenders of Wildlife), academics, bee keepers and concerned citizens. This conservation plan differs from almost all other plans in this report in that no incidental-take permits are issued.

The two separate regions in Louisiana where bears live now have been designated as two (of potentially five) bear management units. In addition, a coastal unit has been designated. Each bear management unit will possess its own coordinator and specific conservation strategies. The overall conservation plan lays out a restoration strategy that: (1) manages the two extant populations; (2) creates corridors between these two populations; and (3) adds at least three other subpopulations of bears, with the goal of all five populations eventually increasing to 200 adult bears each.

14. Fel-Kran Plumbing and Heating Company HCP

Fel-Kran developed this HCP for incidental take of the Perdido Key beach mouse *(Peromyscus polionotus trissyllepsis*—endangered) during residential development activities on its 27-acre tract in Alabama. This tract is adjacent to critical habitat for the mouse on state-owned land. To minimize the effect on the mouse, Fel-Kran agreed to certain measures, such as situating development inland (the beach mouse inhabits beach dunes), prohibiting home owners to have cats, installing rodent-proof trash cans (to discourage competing rats and mice) and providing information and education to local residents. For mitigation, Fel-Kran provided funds for the remediation and development of sand dunes on adjacent critical habitat and for conservation research on this species.

15. Sarah N. Bradley HCP

Sarah Bradley developed an HCP for all 80 acres of her land in Alabama for the incidental take of the Red Hills salamander *(Phaeognathus hubrichti*—threatened). This HCP consists entirely of minimizing the impact of logging activities on the salamander. In "optimal" salamander habitat (15 acres) there will be no logging or other disturbance, and in "streamside management zones" (16 acres), only large pine trees may be logged. In both the optimal and streamside management zones, incidental take of the salamander is prohibited. For the remaining 49 acres, 60 percent of the canopy coverage must be maintained after logging and incidental take may occur. The HCP extends for 30 years.

16. Fort Morgan Paradise Joint Venture HCP

This HCP was developed by the permittee to allow residential development of 753 condominiums ("The Beach Club") on a tract of 86 acres, including permanent destruction of approximately 37 acres of habitat occupied by the Alabama beach mouse (*Peromyscus polionotus ammobates*—endangered). To minimize and mitigate that take, the permittee is establishing a 16-acre protected area encompassing designated critical habitat which will not be disturbed. The permittee is also contributing $150,000 for acquiring and protecting habitat to mitigate for the take, but those funds can also be used for other conservation purposes (e.g., research). In addition, all subsequent individual residential

landowners will be required to adhere to management practices to minimize harm to the mouse (e.g., not owning cats and complying with the project's lighting plan). In addition, the permittee will restore dunes damaged by the project's three boardwalks through a dune restoration program that is approved by FWS.

17. Georgia Statewide HCP

A formal draft for this statewide HCP for red-cockaded woodpeckers (*Picoides borealis*—endangered) has not been issued, but in this report we review a draft as of July 1996 which, according to FWS, will not be significantly revised. This is one of six statewide plans being developed in the Southeast for this species.

The HCP consists of two parts: incidental take of demographically isolated groups of woodpeckers and safe harbors. Landowners that have woodpeckers "isolated" from other woodpecker populations will have complete land management flexibility, provided they notify FWS when they plan to take habitat and afford an opportunity for FWS to translocate those woodpeckers. Determination of whether groups are isolated will be based on an ecological computer model that takes into account habitat requirements and woodpecker behavior. For mitigation, there are three options: (1) to pay for purchase or protection of comparable occupied habitat elsewhere; (2) to pay for enhancement of unoccupied habitat elsewhere; or (3) for each woodpecker group, to delay habitat-altering activities until the wildlife agency has the opportunity to translocate enough juvenile woodpeckers from the site to form a bonded pair at another site. Landowners are expected to forgo options (1) and (2) in favor of the translocation option, because translocation is least expensive for the landowner.

Landowners with woodpeckers that are not isolated will be encouraged to participate in a safe-harbor agreement that is virtually identical to the Sandhills safe-harbor program described above.

18. Brandon Capitol Corporation HCP

This HCP is to allow Brandon Capitol to develop 3.78 acres of habitat used by the Florida scrub jay *(Aphelocoma coerulescens coerulescens*—threatened) into 20 residential homes (the "Villages at Tramore"). This tract does not contain a scrub jay nest but is part of a much larger scrub jay territory. To minimize harm, the company agreed to avoid clearing vegetation during the nesting period. To mitigate, the company purchased 7.5 acres of excellent scrub jay habitat and conveyed it to the county. This tract fills a gap between protected tracts adjacent to a Brevard County preserve for the Florida scrub jay. Brandon Capitol also provided $7,500 for habitat management on that conveyed land. The HCP and permit extend for two years.

19. Nick Gross/Snow Construction HCP

This HCP was developed to permit the incidental take of a pair of bald eagles (threatened) that established a nest on the property after Nick Gross had already purchased the land with the intent to develop the property. The plan permits residential development on all 11.4 acres of the property and grants a 99-year permit for incidental take of the eagles. Under the plan, construc-

tion is prohibited within 250 feet of the nest during the nesting season but is permitted during other times of year, and up to 14 homes can be built within that 250-foot radius. There must be a canopy that partially obstructs the eagles' vision of human activity below them, and there are provisions to minimize noise that would disturb the eagles. If the eagles do abandon the nest (which is likely according to the Biological Opinion of FWS), the permittee is required to pay $25,000 to a contingent mitigation account for acquisition of habitat elsewhere.

20. Volusia County, Florida HCP

During a six-month period in 1994, 1.2 million vehicles entered the beaches of Volusia County, which includes Daytona Beach. Volusia County also has important beaches for sea turtle nests, and vehicular traffic can destroy eggs and hatchlings, as well as impede returning females attempting to nest. Spurred by a court order issued in 1995 that restricted driving and parking on county beaches because of the impacts on endangered sea turtles, this HCP contains a management plan for all 50 miles of beach in Volusia County. The plan is a strategy to minimize impacts and avert take of one threatened sea turtle species (loggerhead—*Caretta caretta*) and four endangered sea turtle species, including the green sea turtle *(Cheionia mydas),* leatherback sea turtle *(Dermochelys coriacea),* hawksbill sea turtle *(Eretmochelys imbricata)* and Kemp's ridley sea turtle *(Lepidochelys kempii).*

Under the plan, there are different restrictions for three types of beach. For Natural Beach Areas, vehicular traffic is prohibited year-round. For Transitional Areas, vehicular traffic is prohibited in a Conservation Zone that is a strip running the length of the area and is 30 feet wide. For Urban Areas, vehicular traffic is prohibited in a Conservation Zone that is 15 feet wide. For the entire county, vehicular traffic is forbidden after dark. According to 1995 data, some 93 percent of turtle nests were located in the areas with no vehicular traffic under the HCP.

The plan requires additional management procedures with regard to other activities, as well as a monitoring program that includes daily surveys for nests so that they can be marked for protection and monitored for success or cause of failure. The plan also requires that a Beach Lighting Management Plan be developed to mitigate for any take that may occur under the HCP.

21. Ben Cone HCP

In order to retain flexibility in managing 7,200 acres of his North Carolina land, Ben Cone developed an HCP for the 12 red-cockaded woodpecker groups that occupy 1,200 acres of that land. The HCP permits incidental take of all 12 groups of woodpeckers. To mitigate, Cone will provide $45,000 for the construction and installation of four artificial cavities and two cavity starts for each of 12 woodpecker clusters to be established on other sites. (This is enough to establish 21 groups, according to FWS.) Although Cone does not pay for the land, conservation easement or regular habitat maintenance of these 12 mitigation sites, he pays for their initial habitat enhancement (e.g., understory clearing). These recipient sites are on public

and private land. If Cone decides to exercise his right to destroy the habitat, Cone will advise FWS biologists of his intent and allow them to translocate the birds.

In addition, Cone has entered into a safe-harbor agreement for any additional woodpeckers that settle on his land (although it is not termed "safe harbors" in the agreement). The requirements of Cone are the same as for landowners under the Sandhills safe-harbor agreements (see below), except in this case Cone has received an incidental take permit for what would have been his "baseline" groups of woodpeckers (12 groups), bringing his baseline to 0. The incidental take permit, for existing and additional woodpeckers on his land, extends for 99 years.

22. Sandhills Safe-Harbor HCP

In the Sandhills region of North Carolina, a significant population of red-cockaded woodpeckers lives on a mosaic of private and public lands. Under a safe-harbor agreement, private landowners agree to maintain habitat for each group of woodpeckers already living there (baseline responsibilities, which may involve prescribed burning) and undertake habitat improvements on additional land. In return, landowners receive an incidental take permit for any additional woodpeckers that may settle on their land. If, for example, a landowner wants to harvest timber in the future in an area where additional birds have settled, he/she must notify FWS so that FWS can translocate the birds to suitable habitat, and timber harvest cannot occur during the woodpecker's reproductive season. The safe-harbor agreement extends for 99 years. Twenty-four landowners had signed agreements by January, 1997.

23. Massachusetts Division of Fisheries and Wildlife (MDFW) HCP

Along the eastern seaboard, the piping plover *(Charadrius melodus*—endangered) has been adversely affected by development, pedestrian use, introduced predators (cats and dogs) and off-road vehicle use. In response, federal and state guidelines for beach management (some of which are relaxed under this HCP) have protected piping plovers by restricting off-road vehicle use, monitoring nests and protecting nests through symbolic fencing and/or wire enclosures to keep out predators, among other measures. This HCP was developed in response to a need for "options for greater flexibility when managing recreational access by pedestrians and off-road vehicles and access by some types of essential vehicles" (pp. 4-5, HCP). This is a two-year plan that allows the MDFW to have relaxed restrictions on certain beaches along the entire coastline of Massachusetts, which may result in the incidental taking of piping plovers that breed on those beaches. Under this HCP, "incidental take of piping plovers will be permitted if it occurs as the result of management actions that may not follow state or federal guidelines but that are listed as management options in this Conservation Plan" (p. 9, HCP).

This HCP can be implemented only during summers after years in which the entire Massachusetts breeding population averaged over 1.5 chicks fledged per pair. Consequently, the HCP was not implemented during the second year of the HCP (1997). Landowners are eligible

for a permit only if the site meets all eligibility requirements, which include monitoring of nests in previous years, demonstrated plover population increase at the site, an average annual productivity of at least 1.5 chicks fledged per pair, prohibition of dogs throughout the summer and other requirements. The plan is scheduled to be reevaluated.

24. Atlantic Salmon Prelisting Agreement

The Maine Atlantic Salmon Conservation Plan was designed by the Maine Atlantic Salmon Task Force to protect and restore salmon runs in seven rivers in Maine. Considerable controversy exists over whether any wild Atlantic salmon *(Salmo salar)* still exist (that are genetically distinct from hatchery stocks) and over whether this fish should be listed as threatened or endangered. This plan was developed largely to prevent such a listing, which some industries fear will adversely affect them. Under this plan, the populations of salmon in each of the seven rivers would be treated as a single population segment (versus management of seven disconnected efforts) to be managed on a watershed/regional basis. The current management goal for the salmon would be to produce a minimum annual total run of 2,000 adult Atlantic salmon for the overall population segment, along with a provision for a minimum recreational harvest of 445 adult salmon (based on historical sport catches) above and beyond spawning requirements.

The plan outlines a "grocery list" of protective measures that a variety of state agencies, municipalities, industry and local volunteers will undertake. These include but are not limited to water use inventory and management plans, agricultural land-use inventories (control of non-point pollution sources, protection of habitat through landowner agreements, maintenance of stream temperature and shade, monitoring pesticide use) and pen rearing of adult salmon by Maine's aquaculture industry. The plan also calls for increased research and monitoring of Atlantic salmon in both freshwater and marine environments. These protective measures, however, are not required or enforceable under the plan, and funding to carry out the plan has not been identified.