

California Condors of the Colorado Plateau

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The spring of 2001 brought a significant event to the skies over the Colorado Plateau and the hidden caves and ledges of Grand Canyon National Park. For the first time in over 100 years, California condors laid an egg in the wilds of Arizona. Although they promptly broke the egg, hopes for successful breeding of condors and restoration of this extirpated species were encouraged. Then, in the spring of 2002, two pairs of condors laid eggs in remote caves below the South Rim of the park. Although the eggs initially appeared viable, both nests failed.

The discovery of these eggs came at an opportune moment for the condor restoration program, which, at the time, was about to begin a five-year review of reintroduction efforts. The program has been under fire lately by some scientists who argue that too many of the released birds are dying due to various causes. Back in the wild, condors continue to succumb to old hazards. In spite of aversive training and conditioning to keep condors away from humans and their structures, condors continue to be killed by collisions with power lines, consumption of antifreeze, and lead poisoning. These dangers create a quandary for the biologists trying to restore the species in both Arizona and California. How can they save these creatures from near-extinction, only to release them back into a world where the same threat awaits them?

At Grand Canyon National Park, staff biologists took a proactive approach. Power lines and poles throughout the developed zone have been fitted with devices to deter collisions. Human structures in locations where condors are tempted to perch or roost have an aluminum wire deterrent called *Nixalite* temporarily affixed to the rooftops to prevent landing. Funded by the National Fish and Wildlife Foundation and the Grand Canyon National Park Foundation, a condor biologist constantly patrols the areas of high visitor use, tracking birds and managing visitors, in hopes of decreasing encounters between humans and condors.

The release program has provided strong support for the hypothesis that the decline of the original wild condor population, in progress since at least about 1950, was due

primarily to lead poisoning. Many biologists hypothesize that ingestion of lead bullets found in animal carcasses scavenged by condors may have been a primary factor in their decline. To address this concern, rangers in the park use copper slugs to dispatch animals wounded by vehicles. Moreover, a breakthrough that biologists are cheering is a so-called "green bullet" developed by the U.S. Army. Instead of lead, the bullet's core is made of tungsten and tin or tungsten and nylon, and the cost is just slightly higher than lead. Recently, the resource staffs of Lake Mead and Glen Canyon national recreation areas and Grand Canyon National Park met to discuss placing restrictive measures on the use of lead in hunting and fishing activities within the parks and recreation areas. Discussions are in early stages and are very complex. The resolution of this one issue may result in a sharp decline in scavenger, waterfowl, and raptor mortalities across the West in the near future. Further discussions will take place at the next California Condor Recovery Team meeting.

While the existing monitoring and release program is an important aspect of the recovery efforts, more scientific data collection will be incorporated in order to analyze habitat utilization by the birds. For Grand Canyon National Park, this is necessary in order to incorporate recent and pertinent information into park planning and NEPA (National Environmental Policy Act) documents and to help analyze potential recreational impacts. Continued monitoring through the use of radio transmitters in addition to new satellite tracking units will allow for critical data collection in canyon country, where logistics are difficult at best.

As reintroduction efforts in Arizona continue, so do similar efforts with the California population. Defenders of Wildlife and the Ventana Wilderness Society have developed an environmental assessment for both the National Park Service (NPS) and U.S. Fish and Wildlife Service (USFWS). Led by the USFWS condor recovery coordinator and the staff at Pinnacles National Monument, scoping meetings resulted in favorable public support for the reintroduction efforts. Staff at Pinnacles hope to have condors flying over another NPS unit very soon.

Following the five-year review process, Grand Canyon National Park, USFWS, and the Peregrine Fund are working closely with adjacent land management agencies, such as the Bureau of Land Management (BLM), U.S. Forest Service, and the Navajo, Hualapai, and Havasupai tribal nations, to prepare for the upcoming breeding season and the challenges it holds.

The park is also launching a long-term monitoring plan for this highly endangered bird. The plan will include the development and implementation of a park-wide plan that addresses the conflicts between human and condors. To date, grants from the Grand Canyon National Park Foundation and National Fish and Wildlife Foundation have funded the salary of a condor technician, travel to critical Recovery Team meetings, and telemetry equipment that includes receivers for BLM staff to monitor the birds as they move across the Arizona Strip area. The importance of these tasks cannot be overstated. This program operates on a mere \$20,000 per year, awarded from the Grand Canyon National Park Foundation. In order to expand the program and meet the goals and objectives of the Recovery Team, serious consideration must be given to base-funding the threatened and endangered species program at Grand Canyon National Park.

It is critical that the ecological aspects of the recovery efforts be given high priority. It is not merely enough to "preserve" the species; we must examine and collect the appropriate data on distribution, abundance, and ecological relationships of the California condor. We

must ensure that suitable habitat for survival, reproduction, and recruitment is stable, both inside and outside of park boundaries, in order to reach a long-term goal of a viable yet *unmanaged* population of condors in the wild.

Grand Canyon National Park is a primary cooperater in the multi-agency project to re-establish the California condor to the southwestern United States. In addition to providing input on project issues and direction, the park also has protection and management responsibilities for condors within the park. Therefore, the primary goals of this project are to (1) contribute to the monitoring effort and daily management of condors within the park; (2) manage condor/visitor interactions and educate the public about condor natural history and the recovery effort; and (3) record a variety of biological information (e.g., habitat use, movement patterns, breeding activity, feeding and roosting patterns, intra- and inter-specific social interactions, etc.) regarding condor activity inside the park.

During the 2002 season, two condor pairs nested in caves near the South Rim of the Grand Canyon. This was truly a landmark event since the nests represented two of only eight total nests in the wild that have been established between Arizona and California since the beginning of the reintroduction program. Biologists spent a considerable amount of time monitoring the breeding activity and helped coordinate a volunteer nest-watching program consisting of over 25 volunteers. Although the nesting attempts were unsuccessful, the information learned will be critical for monitoring the upcoming breeding season. In addition to monitoring the breeding activity, we also documented 13 carcasses on which condors fed within the park, and 21 carcasses just outside the park. Furthermore, three main communal roosting areas for condors were documented near the South Rim.

The year 2003 has proven to be an exciting and eventful one for the program. At the time of this writing, biologists are eagerly awaiting the fledging of the Arizona's first wild condor chick in over 100 years! The chick appears healthy and active in a remote canyon

near the South Rim. Fledging is expected in late October or early November.

In upcoming seasons, we will again focus on monitoring the breeding activity of the condors inside the park, documenting movement corridors of condors moving to and from the park, and studying the condors habitat use and feeding/roosting activity. Currently, Grand Canyon National Park is involved in a formal consultation with USFWS regarding the effects of the air tour industry on condors. One priority will be to improve our understanding of condor flight patterns and movement corridors, and contribute scientific information to the consultation process. Finally, we will work with the Federal Aviation Administration (FAA) to organize safety classes to educate pilots in the Grand Canyon area about the condor project, condor behavior, and ways for avoiding conflicts with condors.

Future Goals and Objectives

Grand Canyon National Park biologists will work toward achieving the following goals and objectives in order to ensure the success of the recovery of the California condor in northern Arizona:

1. Develop a long-term monitoring plan and protocols coordinated with the agency members involved in the reintroduction efforts in the field. This plan will address, respond to, and prevent negative condor and human interactions.
2. Develop effective and innovative educational materials addressing condor issues that can be utilized throughout the home range of the condor.
3. Work closely with the western regional EPA coordinator to locate sources of lead within the park and clarify lead's effect on wildlife species.
4. Analyze tissue samples collected from the condor's prey base (deer, elk, and bighorn sheep), when carcasses are accessible, by working closely with the Arizona State Veterinary Laboratory in Tucson. Samples of road kill, relocated animals, and other scavenger species within the park (deer, elk, bighorn, squir-

rels, rabbits, coyote, gray fox) will be collected for lab analysis of lead, environmental contaminants, and other human-associated toxins. Tissues from carcasses along the river corridor will be collected during the annual wildlife monitoring trip and other park resource trips to sample the river corridor prey base and its environment.

5. Prepare and implement standard operating procedures and protective measures. These will be incorporated in NEPA documents, and communicated to park and project staff in conjunction with general management plan construction activities. A similar protocol will be established that addresses the Fire and Aviation Program as it directly relates to helicopter traffic in the park. This is critical when pairs are nesting in a typical administrative flight corridor.
6. Coordinate with Peregrine Fund field staff to test and implement appropriate hazing techniques and effective perching and roosting deterrents in order to decrease human/condor interactions and to ensure protection from hazardous sites, such as the Orphan Mine and areas of dense human concentration.
7. Implement more sophisticated monitoring of the condors. This will allow for better coordination between USFWS, Peregrine Fund, and NPS field crews and improve methods of recording, summarizing, and analysis. It will also assist in determining the location of contaminated carcasses in hopes of responding in a timely manner before more birds feed on them and then succumb to lead poisoning or other toxins. This will provide information regarding established flight corridors within and outside of the park in order to consult with USFWS on FAA overflight issues, as well as in-house administrative flights.
8. Coordinate a Condor Nestwatch Program, consisting of interested volunteers and staffed by a seasonal technician, in order to collect pertinent breeding, nesting, and brooding data.

Natural Resource Management

9. Work closely with the Grand Canyon National Park Foundation and the National Fish and Wildlife Foundation to raise funds for the continued implementation of the condor program within the park.
10. Work closely with the National Fish and Wildlife Foundation to fund a park technician, purchase telemetry equipment, and assess the issue of lead in the environment.
11. Continue to work closely with Recovery Team partners in achieving goals and objectives associated with the long-term recovery of the species.

