



HEALING PROCESS: (top) The massive wounds left by logging on the body of Redwood NP are being treated with intensive care

(bottom) by the largest resource management/science staff of any park in the National System.

Redwood Restoration Efforts Succeeding

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NPS natural areas generally are thought to have been cut, in pristine condition, from the whole cloth of public lands. But many park areas, including Isle Royale, Shenandoah, Big Cypress, Redwood, Acadia and Everglades, were obtained in part or whole for the public following private ownership, and in some cases after being logged or otherwise altered from the natural state.

Portions of some parks have required time to allow natural processes to heal the damage from earlier consumptive land uses. In other cases, like restoring the "hole in the doughnut" in holdings at Everglades or the reintroduction of fire in forests of Yosemite and Sequoia Kings, active rehabilitation programs have been necessary to speed the healing process and begin to re-establish natural conditions. By far the largest NPS rehab program in a natural area is that now underway at Redwood.

When Redwood was established in 1968, Congress expressed concern about the potential impact of timber harvest outside the park on park resources, especially the Tall Trees Grove adjacent to Redwood Creek. This concern was due in part to the unusual physical setting of Redwood. High winter rainfall,

rapid continental uplift and deeply sheared rocks all contribute to the highest natural erosion rates anywhere. Streams in and near Redwood move sediment at rates 10 times higher than the Colorado.

The process of timber harvest on the steep slopes above the 1968 parklands exacerbated natural erosion. Tractor trails, road construction, the removal of forest vegetation, and a series of major winter storms temporarily increased erosion rates above the capacity of the stream to transport the eroded material to the sea.

This situation, documented by the Service and the U.S. Geological Survey as early as 1972, caused serious changes in the streams draining into and through the park. Aquatic resources were altered and streamside groves were damaged or endangered by elevated and widened stream channels, streamside landslides, log jams and gravel deposits.

As the magnitude of the problem became more apparent, Congress responded in 1978 by adding 48,000 acres to the park and by authorizing a watershed rehabilitation program. The goal is control of excessive erosion due to modern human land use, re-establishment of vegetation, and eventually the restoration of near-natural aquatic and terrestrial conditions in the park.

Some experimental rehabilitation work was under-

taken in 1977 prior to park expansion; however, the work only now is in full swing. In 1978 the permanent park staff included a research scientist, engineering geologist, forest hydrologist and forester. That small staff grew by the end of 1980 to a total of 22 permanent scientists and more than 50 temporary appointments including geologists, plant ecologists and archeologists, with added support in the administrative division. The combined program for FY 80 amounted roughly to \$2.25 million. The active rehab program now is largely conducted by the division of resource management headed by Don Reeser, formerly of Hawaii Volcanoes. Planning, rehabilitation technique development and rehab evaluation is carried out by the technical services division led by Assoc. Supt. Lee Purkerson, formerly of the WASD staff. Supt. Bob Barbee thus has at his disposal the largest resource management/science staff in any park area.

The program was authorized at \$33 million and is expected to last 10 to 15 years. The work proceeds in steps. Geologists and hydrologists identify the most serious erosional areas. These are mapped and a detailed treatment plan prepared during late winter and early spring. When dry weather arrives, bulldozers, backhoes, draglines, and other heavy equipment go to work. Contract equipment operators under the direction of physical scientists and technicians begin restoring natural drainage patterns. This involves removing stream crossing fills and old culverts, out-sloping roads, removing ditches, reshaping old landings and diverting gullies. As this work proceeds, hand crews begin building check dams, gully plugs and other erosion control devices. Straw, wood chips, and other mulches are spread over the exposed surfaces, which also may be seeded with grasses. As the autumn rains begin, vegetation specialists begin planting native shrubs and trees to control erosion and speed re-establishment of native vegetation. Through the winter, field crews monitor the rehab work, repair failures, and treat problem areas. In late winter the cycle begins anew.

In 1978 about 300 acres were treated experimentally; in 1979, 1,100 acres, and in 1980, 1,500 acres. As each season passes, new techniques are tried and less effective treatments are abandoned, yielding a solid body of rehabilitation techniques now operational.

At Redwood, the NPS has responded to a severe man-caused environmental problem. The problem is not licked, but the erosion control and restorative process has moved into a strong operational mode. The watershed upstream from the park still is yielding a high sediment load, but NPS scientists and resource managers are optimistic about their ability to deal with these problems.

Service employees are well into a significant program designed to rehabilitate, restore and perpetuate an exemplary natural resource — the redwood forests and their associated streams and wildlife.