

Research Facility at Jackson Hole Fuses Joint Effort

Editor's Note: The following is excerpted from a series of news releases by Karl Harper of the University of Wyoming News Service. The series was sent to Park Science by Neil J. (Jim) Reid, chief scientist in the Rocky Mountain Region of NPS, as indicative of the best in cooperative research taking place in the National Park System today. As Reid puts it, "The NPS-University of Wyoming Research Center near Moran is doing yeoman service in finding solutions to management problems, while at the same time providing opportunities for the on-going "pure" research that is so vital to our long-range understanding of how parks function."

Unique.

That's the University of Wyoming-National Park Service Research Center on the shore of Jackson Lake in Grand Teton NP: the most complete research facility operating in any U.S. National Park, the only one supported jointly by State and Federal monies, and the only one administering activities in a four-state area.

From May to October each year, the Center is the hub of biological, social, and physical sciences research by investigators selected from 70 institutions and agencies nationwide. Their studies are directed mainly toward problems or subject areas that have direct bearing on National Park operations and management in Wyoming, Montana, North and South Dakota.

General research priorities are established by a Center steering committee of eight members — four NPS officials and four UW faculty members — with the Center director, Kenneth L. Diem, UW professor of zoology and physiology, serving in an ex officio capacity. The committee evaluates proposals addressing areas of priority concern and sets project support budgets for most of the studies, although a significant number are funded by outside sources.

The NPS and UW share equally in the Center's \$200,000 annual budget, of which 65 percent is earmarked for research. About 80 percent of the research program is of an applied, goal-oriented nature, with the balance for basic research. The practice, according to Diem, has been to limit the number of Center-based projects to about 25 in any one season, with others assigned to various locations in the four-state area. Most are granted support for no more than three years.

Fifteen investigations currently are in progress at the Center or have been scheduled for completion or start during the 1982-3 season. Seven others are based elsewhere, but are being conducted under the aegis of the Center. Although most are relevant to National Park applications, some have broader — even global —

Kenneth L. Diem, professor of zoology and physiology at the University of Wyoming and director of the UW-NPS Research Center, surveys his quiet domain from the boardwalk connecting the Beryl Lodge with the Johnson house. Residence and service buildings are spotted in the meadowed bowl shielded from view of the thousands of tourists who daily pass on the highway to Moran and the town of Jackson to the south.



implications.

Examples this season include studies to establish baseline data and fundamental inventories of park resources, to assess factors bearing on understanding the productivity of Yellowstone Lake, to improve the accuracy of visitor statistics obtained in Grand Teton NP, to further catalog the bewildering variety of mushrooms native to the area, to document the population dynamics of the mouse-like voles that are a staple in the faunal food chain, and several geological studies. Animal parasites, otter behavior, the history of rabies in the area, the characteristics of small mammals in high radiation background areas of Yellowstone Park, and a wide-ranging survey of water resources in the Big Horn Basin are among additional projects under study this year.

This by-no-means-complete listing reflects the characteristic variety of investigations sponsored under the Center banner and their general relevance to National Park management.

One more detailed example is the work on Yellowstone Lake — centerpiece of America's first and best-known National Park. Scientists operating through the Center are conducting research to determine if the lake is undergoing a decline in productivity and ability to support a complex natural food chain. If so, they hope to pinpoint the underlying causes and to offer suggestions for restoring the natural balance if human activity is the cause.

William Romme, a botanist on the faculty of Ft. Lewis College in Durango, Colo., is spearheading the effort in cooperation with NPS and U.S. Fish and Wildlife research biologists. Romme cites "some evidence that the lake's primary productivity has been declining over the past 100 years. Water analyses made periodically since 1884, measuring nutrients critical to algal growth, suggest that some vital elements have reached extremely low concentrations in recent years." He adds it is doubtful that the lake will become completely sterile.

Core samples of the lake bottom sediments comprise a record of diatom



Botanist William H. Romme demonstrates the use of a device which extracts a small diameter (3/16") core sample in which the annual rings can be counted to determine the tree's age.

production over the past 1,600 years. Their concentrations in the samples reflect a gradual decline, reaching a very low concentration in the past century.

"It's an enormous lake, very complex. None of these things is conclusive, but taken together they are bothersome," he says.

Romme is proceeding on several fronts and hopes to complete his current investigation by April 1983. His work includes gathering previously developed information from unpublished reports and other widely scattered sources. He also is in contact with Canadian authorities investigating cases in which some of their lakes, like Yellowstone, appear to be declining in productivity rather than becoming more productive with age, as is usually the case.

"We're also looking at several possible factors that may be exerting subtle but potentially profound influences on long-term productivity," he says. "Is it actually happening? If so, is it occurring naturally? These are the real questions, both from an academic and from park management standpoints."

Romme is directing his field work toward the forests of the watershed that drain into the lake. These inflows bring the lake much of its nutrients in amounts that largely determine productivity levels. Young, vigorously growing forest tends to spring up in the wake of fires, and such stands may take up more of the available nutrients than do the older, more stable stands. Following extensive fire, the denuded watershed might yield more of its

nutrients to the lake until such time as new forest growth creates a marked reduction in nutrient yield.

Romme hypothesizes that the 1880's survey may have been made shortly after such a fire and at a time when peak amounts of nutrients were reaching the lake from lightly vegetated watersheds, boosting lake productivity to an unusually high level. If there is a current decline, it may well be part of a natural cycle of nutrient flux, he says.

"In the Yellowstone area, there appears to be a natural fire cycle in which areas as large as 10 square miles are burned over in a short time every 300 to 400 years. Such occurrences could produce enormous pulses in the nutrient cycle," he says.

Romme is working with Dennis H. Knight, UW botany professor, on this aspect of the lake's history and on the larger picture of how old and new forest stands affect nutrient availability in the ecosystem in their varying patterns. He is developing a fire history of the lake watersheds, extracting core samples from living trees and gathering trunk slices throughout the area. These tell him a great deal about the extent of past fires, when they occurred, and how soon the young second growth may have placed nutrient drain on the system.

Romme also is looking at the possible impact of "the removal of more than 3,000 tons of trout from the lake" since it became accessible to human predators — fishermen — over the past 100 years. "That represents a lot of nutrient material lost to the lake ecology and it may have some bearing on the possible reduction of productivity," he notes.

Romme will investigate the vegetation ecology of the area in relation to other information coming to light and will either offer an explanation for the suspected change or suggest additional areas for investigation.

Press releases on most of the research projects — similar to the excerpts from the Yellowstone Lake study — are constantly being prepared by the UW information staff, creating interest and support among the public and informing people about the resources that they, as the public, hold title to.

Diem has been director of the research center since the cooperative agreement between UW and NPS was signed establishing the facility in 1977. UW holds a 15-year special use permit for the site, which is the early-day AMK Ranch, homesteaded in 1890 by John Dudley Sargent and purchased in 1975 by the NPS from its last private owners, the A.C. Berol family of the Eagle Pencil Co. It had served the family as a summer home since 1934, and all the original structures, except those erected by Sargent, still stand.

The buildings, most of them crafted of logs so finely fitted and carefully designed

that they are among examples marked for historic preservation, have proved adaptable to scientific research and support activity. The new location was occupied in the summer of 1978, when the activities of UW's forerunner, the Jackson Hole Biological Research Station, were moved to the 120-acre AMK Ranch.

Living quarters accommodate 50 or more well-equipped laboratories, shop buildings, storage areas, and a massive boathouse and dock complete the facilities. The Berol Lodge, a huge log structure on Jackson Lake, encloses labs, two large meeting rooms, the director's office, a three-room researcher's apartment, and a branch of the UW Science Library that has proved invaluable to the operation.

Dominating all are the Tetons, which vault from the far lakeshore 8,000 feet into the western sky. Thousands of tourists pass the approach road daily, unaware of the facility; even most park personnel don't know of its existence. Researchers prize the privacy and commonly spend 12 to 14 hours a day in the field or lab, working right through weekends and holidays.

The investigators pay nominal fees for their accommodations and either cook their own meals or use the Coulter Bay restaurants. They are enthusiastic in their praise of the Center and the situation that permits study in an untouched area beyond the reach of disturbing development (a condition vital to long-term research).