ZOOLOGY

Bald eagle sanctuaries expanded

Several thousand acres of private California and Illinois land have been purchased by the National Wildlife Federation in order to protect roosts of the American Bald Eagle. The endangered species, severely victimized in the 1960s by DDT side-effects, has been making a slight comeback in recent years.

The Federation acquired 1,200 acres in Siskiyou County, Calif., between the Modoc and Shasta National Forests. The acreage, after it is eventually turned over to the U.S. Forest Service, will become part of the adjoining Three Sisters Bald Eagle Preserve. This preserve, currently 6,000 acres, is the major eagle roosting site in the Lower Klamath Basin.

A smaller acquisition in Rock Island—105 acres—is the beginning of what will be a new 225-acre sanctuary, according to the NWF. Adjacent to the Illiniwek Forest Preserve, the new Oak Valley Eagle Refuge is within a critical feeding and winter roosting area along the Mississippi River. Before the Federation's purchase, the California land had already been divided into 40-acre tracts, many of which had been sold. In Illinois, the land had already suffered some bulldozing in preparation for a housing development.

Alien predator devastates lake life

A zoologist has found that the population of native fish in Panama's Gatun Lake has been profoundly ravaged by a foreign predator, the peacock bass. Ten years ago, the alien fish was brought from the Amazon River to the Chagres River, adjoining the lake, and placed in a research compound. During rainy season, the river's waters, together with the bass, overflowed into Gatun Lake.

Thomas M. Zaret of the University of Washington reports that in 10 years the bass have devastated 12 of the 14 species of small fish that originally inhabited the lake. And because of the predator's gluttony, its own numbers are facing attrition for lack of remaining food.

Overall, Zaret says, the total fish population has decreased by 25 percent. Portions of the lake are almost devoid of any indigenous species. With the small native fish gone, there are also fewer kingfishers, herons and terns but more mosquitos.

Past similar disasters have been precipitated, unlike this one, by man's deliberate introduction into a lake of a foreign, often commercial, species. To assist in preventing future occurrences, Zaret is developing an ecological model that will predict potential hazards of this kind before they happen.

Puzzling piscine adoption behavior

A zoologist has observed in one of Africa's Great Lakes some puzzling behavior among species of a freshwater fish commonly found in America, Africa and Asia. A.J. Ribbink of Rhodes University in South Africa noticed, in Lake Malawi, that *Haplochromis chrysonotus* Boulenger fry are routinely adopted by mothers from other very distinct species.

H. chrysonotus and the foster parent *species—H. polystigma* Regan, *H. macrostoma* Regan and *Serranochromis robustus* Regan—are all maternal mouthbrooders. In the presence of danger, a mother will signal the young fry into her mouth for protection.

During his research (reported in NATURE, 267:243), Ribbink frequently saw foster parents looking after mixed broods. The adoption procedure remains enigmatic, but previous research has revealed the *H. chrysonotus* fry's impaired ability to recognize its real mother. This study, says Ribbink, "raises questions [about] the significance of the parent-brood relationship [and] the behavioral mechanisms(s) of brood hybridization."

SPACE SCIENCES

U-drive rocket sees quasar in UV

A sounding rocket, steered "real-time" from the ground by a person who sees what the rocket sees via a TV monitor, has yielded "the first observation ever made of a quasar in the ultraviolet region of the spectrum." The flight, conducted at White Sands Missile Range in New Mexico on April 15, also provided data said to indicate that the universe is continuously expanding, or "open," rather than cycling through alternate periods of expansion and contraction.

"There was no detectable neutral hydrogen gas in the intergalactic medium between earth and the quasar [3C-273]," says Arthur Davidsen of Johns Hopkins University, "suggesting that the amount of mass in the universe is insufficient to cause a reversal of the seemingly infinite expansion of the universe."

Davidsen, who was assisted in the project by William G. Fastie and George Hartig, both of Johns Hopkins, controlled the rocket's orientation in space by variously pushing four buttons—up, down, left and right—as he watched a monitor showing a TV image from a telescope-equipped camera in the rocket's nose. While a separate optical device maintained the rocket's point of reference by keeping a fix on a bright star, Davidsen kept the rocket and its telescope pointed at the quasar by using a separate star, near the quasar's coordinates, as a guide.

This version of the human-steered guidance system was developed at NASA's Goddard Space Flight Center in Maryland. A pioneering system, however, was "flown" by Gunter Brueckner of the Naval Research Laboratory on Aug. 13, 1970, to test the pointing accuracy of a UV solar spectrograph then being developed for Skylab. Instead of a TV monitor to look at, Brueckner had only an oscilloscope, showing a step-shaped line that represented the change in brightness as the rocket's camera system passed on and off of the edge of the sun. His two pushbuttons controlled only one axis of the vehicle's movement. In early 1974, a two-axis system with TV was used successfully, although it too was both studying and steering by the sun. A further refinement was flown in 1976, with a "joystick" control replacing the pushbuttons and providing continuous movement rather than the fixed steps of the button system. This version also used two cursors, or cross-hairs, one of which was centered in the TV screen while the "pilot" would line up the other with the target being observed; a computer would then automatically bring the two cursors together, aiming the rocket's camera in the process.

The "live" steering of sounding rockets was developed merely to help check out a scientific instrument. Now it is a powerful scientific tool in its own right.

French-Soviet Venus mission planned

The concept of an unmanned balloon floating in the atmosphere of Venus to collect scientific data has been proposed in the past by NASA as a possible mission for the 1980s. It has now been reported that France and the Soviet Union are planning just such a project as a cooperative venture, to be launched in 1983. The balloon would be released from a spacecraft that would then go into orbit around Venus, while the balloon inflates to a diameter of 8 to 9 meters. Pressurized with helium, the balloon would float about 55 kilometers above the surface, with a planned life of at least 40 hours. The report appears in AVIATION WEEK AND SPACE TECHNOLOGY (June 27).

The two spacecraft of the U.S. Pioneer Venus mission, meanwhile, will be launched in 1978. An orbiter will be sent to spend at least one Venus year (225 earth days) circling the planet, while the second craft will separate into one large and three small entry probes (plus the "carrier bus" itself) to study the atmosphere down to—but not on—the surface.