

Wetlands Survey

Two hundred years ago, when the United States was an infant nation, there were more than 200 million acres of wetlands in what would later become the contiguous U.S. By 1980, less than 100 million acres remained—and losses are now estimated at 450,000 acres a year.

To Ducks Unlimited, Inc., Long Grove, Illinois, an organization dedicated to preservation of the world's waterfowl, current inventories of wetland resources are crucial to effective waterfowl management. To get continually updated information on the changing conditions of waterfowl habitats, Ducks Unlimited contracted with NASA to use data from the Landsat satellites' Thematic Mapper (TM), an advanced Earth-scanning instrument that collects data in seven bands of the spectrum.

Orbiting the Earth at 438 miles altitude aboard Landsat 5, the TM measures and records six values of light energy reflected from Earth and one value of heat energy as it scans the Earth below. On each orbital



sweep, its sensors produce a series of digital "scenes" representing the features of Earth segments measuring about 100 by 110 miles, each scene covering about eight million acres and each containing some 40 million bits of information. Called picture elements, or pixels, they are computer processed and the resulting mosaic is projected on a digital display device.

To interpret this great flow of information, Ducks Unlimited uses a computer



program designed especially for analysis of Landsat data. Called ELAS—for Earth Resources Laboratory Applications Software—it is supplied by NASA's Computer Software Management and Information Center (COSMIC)[®]. Located at the University of Georgia, COSMIC routinely makes available to industrial and other customers government-developed computer programs that have secondary applicability (see page 122).

The raw Landsat data con-



tains seven values for each pixel. Each of the seven bands of raw data can be displayed as shades of gray on a monitor or plotter (top right). Any three bands of raw data can be combined to produce color-coded informational images such as the one at left. From these images, dis-

played on monitors or film, analysts can extract volumes of information about the ability of an area to support waterfowl, and the information can be updated every 16 days.

In its Habitat Inventory and Evaluation Program, Ducks Unlimited is using this information to identify critical wetlands for waterfowl production; to select optimum sites for habitat enhancement projects; monitor habitat losses and habitat changes caused by

drought and other conditions; and generally improve waterfowl production estimates by including habitat availability factors. ▲

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