MONITORING MARSH MANAGEMENT ON THE SACRAMENTO NATIONAL WILDLIFE REFUGE COMPLEX

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Abstract: The Central Valley plays a key role in providing wintering habitat for 60% of the Pacific Flyway's waterfowl. Unfortunately, about 95% of the wetland habitat upon which these birds depend has been lost. It is imperative that remaining wetlands be managed in the most efficient and productive manner possible. In 1981, personnel of the Sacramento National Wildlife Refuge complex (SNWRC) began developing a habitat management system to guide the planning, field operation, and evaluation on all refuges of the Complex. Annually, a management team plans habitat objectives, water regime, vegetation manipulation, and a prioritized work list for each unit of each refuge. Subsequent monitoring is used to document accomplishments. Data management is computer aided and permits flexibility in tracking and comparing management actions. Use of the system has resulted in substantial progress in habitat management on the SNWRC in recent years. As more information is collected and analyzed, further refinements are anticipated.

Administered by the U.S. Fish and Wildlife Service (USFWS), the Sacramento National Wildlife Refuge Complex (SNWRC) is comprised of six refuges (24,031 acres) in the Sacramento Valley of California (Fig. 1). They are located 60-80 miles north of the city of Sacramento, in Sutter, Colusa, Tehama, and Glenn Counties. Topography is flat with most refuge lands located in historic wetland basins. The region is generally rural in nature with low human population density. Farming activity predominates, with the acreage that surrounds the SNWRC mostly in rice, interspersed with orchards, wheat, and alfalfa.

California's Central Valley is the winter destination for 60% of the waterfowl in the Pacific Flyway (U.S. Fish and Wildlife 1978). Historically, the Sacramento Valley has played the major role in providing wintering area for these migratory waterfowl (Gilmer et al. 1982). In recent years, SNWRC populations have peaked at 1.5-2 million ducks and 0.5 million geese (U.S. Fish and Wildlife Service, unpubl. data).

Unfortunately, over the years the habitat upon which these birds depend has been drastically reduced. An estimated 95% of the wetland acres which existed during the late 1800's have been lost (Frayer et al. 1989). Most have been converted to agriculture, making it imperative that remaining wetlands be managed in the most efficient and productive manner possible. As a result, the refuges of the Complex are some of the most intensively managed waterfowl areas in the nation. Management objectives include:

1. Provide habitat and manage for endangered or sensitive species.
2. Provide wetland habitat of suitable quantity and quality for both wintering and resident waterfowl.
3. Prevent, or minimize, migratory bird depredation of private croplands.
4. Provide an area for compatible, management oriented research.
5. Provide for public use activities such as wildlife observation, hunting, fishing, and photography.

Whereas refuge objectives have remained fairly consistent over the years, refuge personnel often change. When an employee transfers or retires, the knowledge and experience gained in marsh management may be lost, leaving new personnel to learn and develop their own techniques. Unfortunately, such a combination rarely builds upon the knowledge of the past, or makes for efficient management.

In 1981, to enhance continuity and improve management, SNWRC personnel developed a habitat management planning system. This system is designed to: 1) select yearly habitat management strategies, and 2) document the results in terms of water, work project completion, vegetation production, and wildlife utilization.

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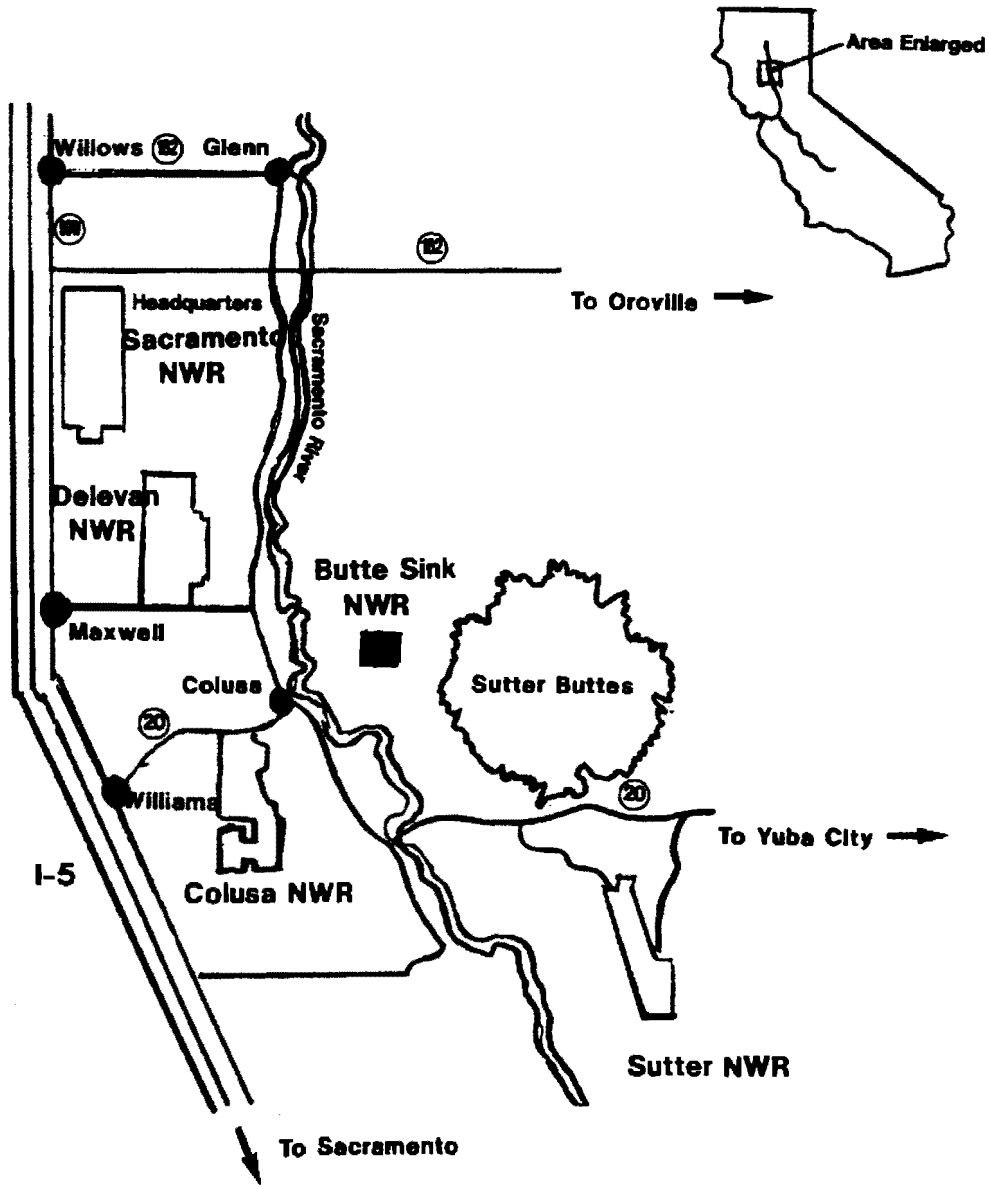

Figure 1. Refuges of the Sacramento National Wildlife Refuge Complex.

THE SYSTEM

The habitat management system is an organized structure that guides the planning, field operation, and evaluation of habitat management. The objectives of the system are to enhance the planning of the annual management program and permit present and future analysis of management effectiveness based upon habitat response and wildlife use. It provides:

1. The schedules, guidance, and documentation of the annual planning and implementation.
2. The forms and mechanisms for collection of data to assess management actions.
3. A data system to process information, evaluate results, and make them available for future planning.

A form (Fig. 2) lists the planned actions for all personnel to follow, accommodates the summarized monitoring data, and serves as a computer input document. Plan and form preparation are accomplished using computers and data base files.

Management is on the basis of habitat units, and some units are further divided into cells. Units

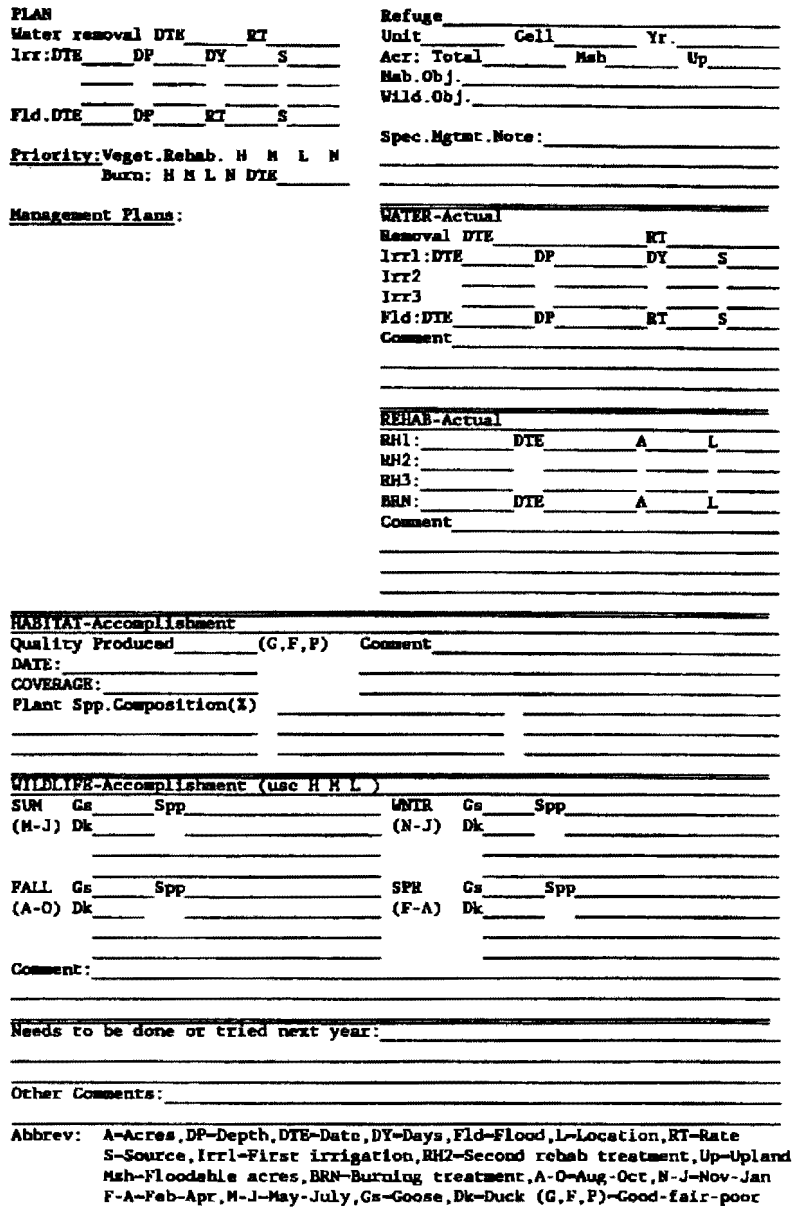

Figure 2. Form used to monitor marsh management.

vary from 50-300 acres in size. There are 164 units on the SNWRC which can be managed independently. In late winter of each year, a management team consisting of the manager or assistant manager, work leader, irrigator, and biologist make a unit-by-unit inspection. Each unit and/or cell is assigned to one of the five following major habitat types, based upon waterfowl needs:

Permanent Ponds

Water ponded year-round provides for the needs of both wintering and breeding populations of waterfowl and resident wildlife. Characteristic plants include cattail (*Typha* sp.), roundstem bulrush (*Scirpus acutus*), and sago pondweed (*Potamogeton pectinatus*). The objective is to have several small (10-40 acre) impoundments equally distributed throughout the refuge, that comprise about 10% of the total wetland area.

Summer Water

These units remain flooded during part of the summer growing period (June, July, August). Two strategies are employed: 1) water is maintained throughout the spring and into the summer, then

entry, transfer of data between files, and providing routine summaries.

Five data base files (basic, water, vegetation rehabilitation, habitat, and wildlife) are maintained for each refuge. The basic file contains permanent (unchanging) data on each unit and serves to generate information for each year's plan. The other files contain the actual results with one entry for each unit (and/or cell) for each year.

The system is capable of summarizing and comparing both planned and historic (actual) information using any combination of the data base files. Selected results are produced in a series of printed output reports.

RESULTS AND DISCUSSION

This system of habitat management is now in its ninth year. We have found that successful and efficient management by unit is often a formidable task. Conditions continually change, requiring adjustments in our plans. Problems of both nature's and man's making occur such as: 1) lack of a firm year-long water source complicates the flood-up schedule and reduces our ability to maintain water levels; 2) the dynamics of a wetland environment often require vegetation control or enhancement; 3) damages resulting from winter storms and flooding can be severe. Repair or replacement of dikes, roads, water control structures, etc. are essential to proper marsh management; 4) limitations on funds and manpower prevent the completion of all desired work in any one year.

Despite such limiting factors, the monitoring system has significantly improved management's overall direction and efficiency. In addition to providing objective assessments of habitat enhancements, the system produces several other intangible benefits: 1) providing the mechanism for the three elements of refuge management (management, biology, and field operations) to work together toward one mutual goal; 2) requiring annual planning for each unit, with the benefit of documented results from previous year's actions; 3) minimizing "seat of the pants" management and discouraging changes without analysis; 4) promoting decision making; 5) promoting continuity; 6) furnishing specific data (water source, habitat type, etc.) which, when compared with other refuge data sets such as disease losses, can prove useful in detecting any trends or patterns; 7) producing a "cookbook" of habitat management "recipes" based on years of field application, which can be used for habitat enhancement through technical assistance on private wetlands in the Sacramento Valley.

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