

WINTER-FLOODED RICE FIELDS PROVIDE WATERFOWL HABITAT AND AGRICULTURAL VALUES



RESEARCH ADVANCES Forest & Wildlife Research Center



Gary Kramer

INTRODUCTION

Over 3 million acres of rice are grown annually in the United States, primarily in the Lower Mississippi Alluvial Valley (the Delta). In fact, the Delta regions of Arkansas, Louisiana, Mississippi and Missouri produce more than 2 million acres of rice annually. Americans truly enjoy rice as a side-dish, as evidenced by consumption of almost 27 pounds per person in 1998. Not only are people partial to rice, but it is also an important food for waterfowl, especially mallard, northern pintail, teal, and several species of geese.

Indeed, rice fields provide critical habitat for large numbers of North America's wintering waterfowl, shorebirds, and other wetland birds. However, only about 10% of the rice acreage in the Delta is currently managed to provide winter wetlands for waterfowl. Thus, extraordinary potential exists on rice lands for increasing the availability of wetland habitat for waterfowl and other waterbirds.

Scientists in the Forest and Wildlife Research Center (FWRC) at Mississippi State University recently investigated the potential values of winter-flooding rice fields and found the benefits were

tremendous for both waterfowl and farmers. The team of FWRC researchers, composed of doctoral student Scott Manley, Dr. Rick Kaminski (Wildlife & Fisheries), Dr. Stephen Schoenholtz (Forestry), and research assistant Janet Dewey (Forestry), examined how different post-harvest treatments and winter-water management in ricefields affected soil erosion, water quality, rice-straw decomposition, weed control, and waterfowl food availability. The research was conducted during winters 1995-1997 and included 72 harvested rice fields, encompassing over 3,000 acres. Experiments were conducted in the major rice-producing areas in the Mississippi Delta, including Bolivar, Leflore, Sunflower, and Washington counties.

The scientists' primary objective was to test if winter-water management would benefit the environment, agriculture, and waterfowl. Another objective was to estimate potential cost savings in spring-field preparation to farmers who held water on rice fields during winter.





B E N E F I T S

While environmental and wildlife conservation are truly important, practices which also decrease farming costs are most readily adopted by producers. Winter-water management of rice lands is such a practice.

Soil conservation and water-quality management in winter-flooded ricefields

Conserving soil and improving water quality are important in protecting our nation's natural resources. Experiments by FWRC scientists showed that winter flooding conserved soil and increased quality of runoff waters, especially when rice fields were not disked after harvest. Fall-disked fields allowed to drain freely after winter rains lost about 1,000 pounds of soil per acre (Figure 1). Fields with drain pipes closed to impound water during winter and with stubble left undisturbed after harvest lost only 31 pounds of soil per acre. Flooding rice fields not only reduces the impact of rain on exposed soils but also allows fields to act as settling basins and retain sediment and nutrients.

Winter-water management as a tool for spring-field preparation

By early spring, rice farmers must contend with challenges in field preparation for planting, such as disposal of remaining rice straw and growth of cool-season grasses and weeds. Reduction of rice straw is particularly challenging as it is resistant to physical degradation and decay, but it must be disposed of to facilitate planting. FWRC researchers found that winter flooding was as effective as fall disking in reducing by 53%



the estimated 4.5 tons per acre of rice straw left after harvest (Figure 2). Elimination of fall-disking operations could save rice growers an average \$14.13 per acre. The combination of fall disking and winter flooding reduced straw most significantly (68%), although disking incurs an added expense. The researchers also found that winter flooding inhibited germination and growth of cool-season grasses and weeds (Figure 3). If rice growers could eliminate aerial applications of spring "burn down" herbicides as a result of winter flooding rice fields, they could save an average of \$13.19 per acre.

Winter-managed rice fields provide habitat for wetland wildlife

Researchers and rice growers know that rice left after harvest is an excellent source of food for waterfowl. However, the availability of 'waste rice' decreased 79-99% between harvest in August-September and early December when waterfowl typically arrive in the Delta in significant numbers. Researchers speculate that this decrease in waste rice during fall is due to a combination of factors, including germination of seed laying on the ground, decomposition, and consumption by rodents and birds. The decrease in waste grain has potentially serious implications for the foraging carrying capacity of rice fields and habitat needs for wintering waterfowl. Although availability of waste rice is much less than anticipated, the researchers found that flooded fields support winter populations of aquatic invertebrates, which are an important source of protein and minerals for waterfowl and shorebirds. Nevertheless, the researchers are concerned that winter food for ducks and geese may be

limited in Delta rice fields; thus, a new research initiative is underway to validate these findings and devise management strategies to counter possible food shortages for wintering waterfowl.



PROCEDURES

Managing winter water in rice fields is relatively easy and inexpensive for rice growers because rice is grown in an aquatic setting. By following the procedures below, a winter flooding project should be successful.

1. Maintain water control systems and levees used for rice culture to impound winter rainfall. These sites are ideal for developing wintering habitat.
2. Consider refraining from fall disking to save money and prevent incorporation of 'red rice' seeds into soils.
3. Hold water on fields throughout winter.
4. As spring approaches, drain fields gradually to concentrate aquatic invertebrates and expose mud-flats for feeding waterfowl and shorebirds.

Overall, winter flooding of harvested rice fields was determined to be a valuable conservation practice that benefits the environment, farm operations, and waterfowl. Winter-water management is an excellent example of how agriculture can be compatible with wildlife management. This research also reaffirmed the importance of conserving other natural habitats, such as bottomland hardwood forests and moist-soil wetlands, to provide alternative foraging areas for wintering waterfowl when waste rice is in short supply.

Figure 1

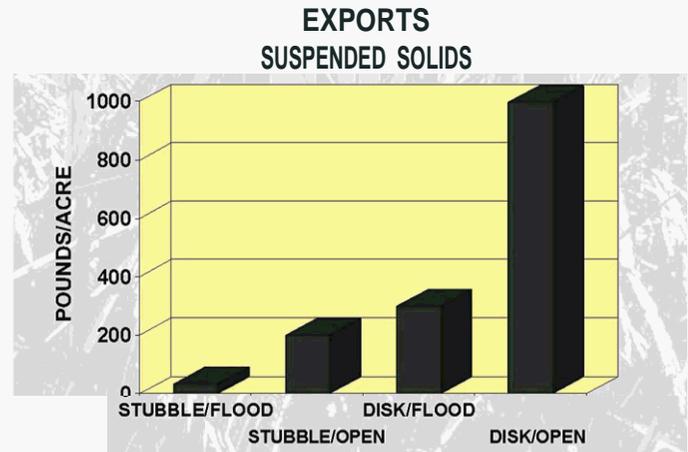


Figure 2

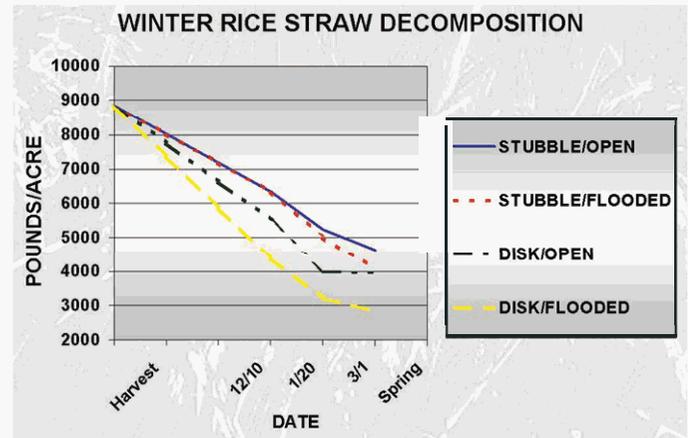
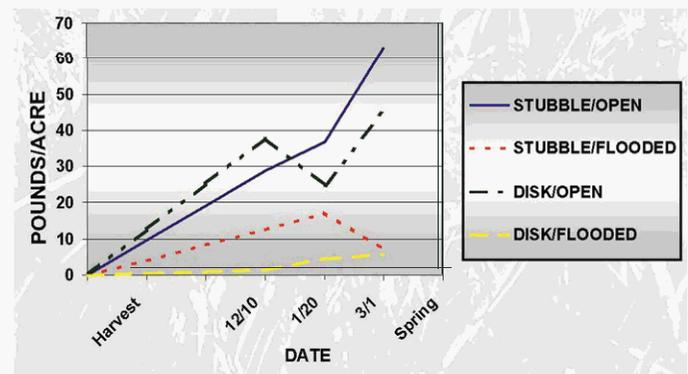


Figure 3

WINTER WEED GROWTH IN RICEFIELDS



Research conducted by
Richard Kaminski
Scott Manley
Stephen Schoenholtz
Janet Dewey



For more
information contact:

Bob L. Karr,
Interim Director
Forest & Wildlife
Research Center

Box 9680
Mississippi State, MS 39762

662-325-2952

Fax: 662-325-8726

bkarr@cfr.msstate.edu
<http://www.cfr.msstate.edu>

Karen Brasher, Editor

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