Evaluating Contributions to North American Waterfowl

from U.S. Ricelands

Photo: © Michael Peters

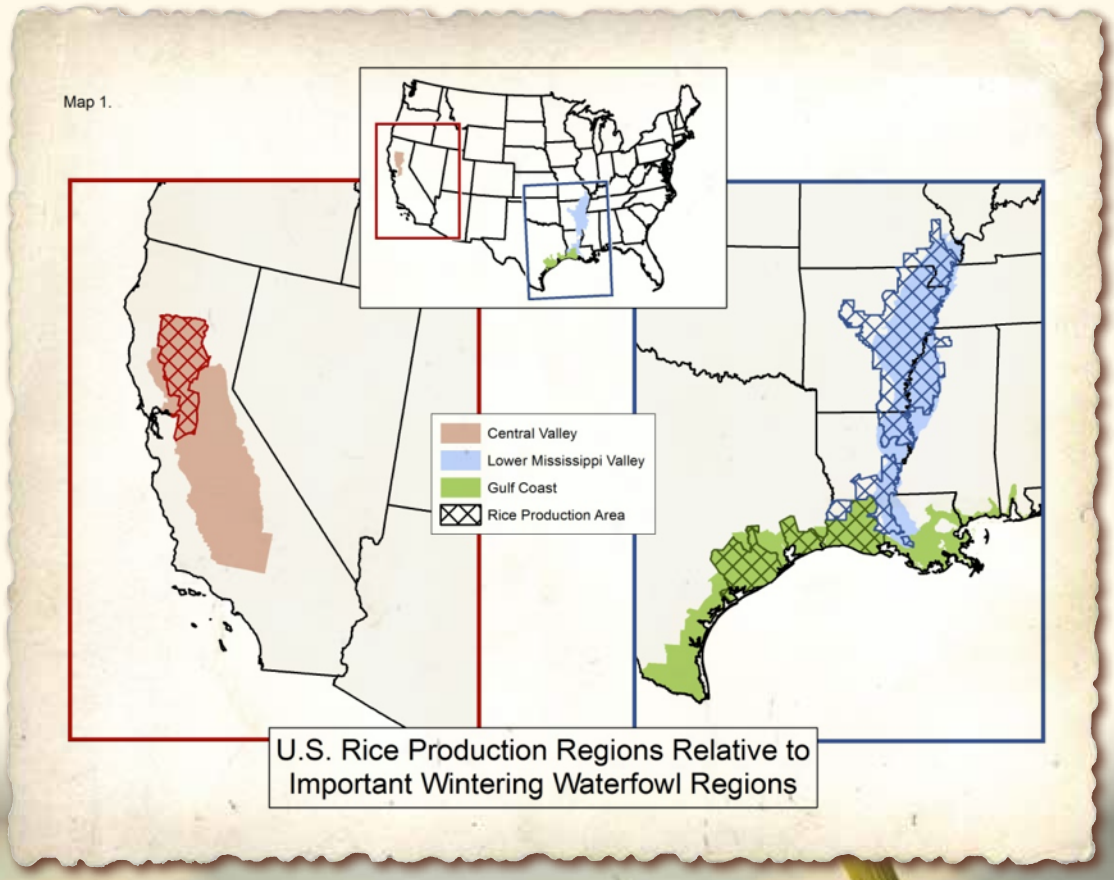
INTRODUCTION

Beginning in the 1980s, there was growing recognition from waterfowl biologists that conservation efforts on behalf of wintering and migrating waterfowl would have to be expanded to private lands if waterfowl needs were to be fully met. This awareness led to publicly funded initiatives, such as the Wetland Reserve Program, that were largely aimed at retiring marginal farmland and restoring wetland functions. However, public land efforts and set-aside programs on private lands need to be combined with actions that recognize and support the critical role that many working landscapes play in sustaining North American waterfowl populations. For wintering and migrating waterfowl rice production areas may be the most important of all working landscapes.

While the waterfowl benefits of rice have been well-documented at the field and regional level, the contribution that rice makes in support of North American waterfowl populations is less understood. Documenting the biological importance of these rice habitats in the context of the North American Waterfowl Management Plan (NAWMP) may provide the national recognition that these rice landscapes warrant.

Nearly all of the rice grown in the United States is produced in California's Central Valley, the lower Mississippi Alluvial Valley, and the Gulf Coast of Louisiana and Texas. These areas overlap with North America's three most important wintering habitats, recognized by the NAWMP as the Central Valley Joint Venture (CVJV), the Lower Mississippi Valley Joint Venture (LMVJV), and the Gulf Coast Joint Venture (GCJV). Joint Ventures are regional partnerships of public and private organizations formed to implement the NAWMP. Over 50% of all dabbling ducks that winter in the United States occur in these three Joint Ventures. Yet, many of these rice landscapes are under increasing pressure with drought and declining rice acreages impacting waterfowl populations, especially California's Central Valley and the Gulf Coast.

Thus an evaluation of the biological importance of riceland habitats relative to the waterfowl population goals of the NAWMP, how declines in riceland habitats may impact these populations, and the costs of replacing U.S. ricelands with managed wetlands that provide similar biological resources for wintering and migrating waterfowl is critical to inform the management of migration and wintering landscapes that support continental waterfowl populations.



Map 1. The distribution of U.S. rice production regions relative to the most important areas for wintering waterfowl in North America. Areas of rice production within a Joint Venture are indicated by cross-hatching.

CENTRAL VALLEY JOINT VENTURE

Rice production in the CVJV is concentrated in a six-county area within the Sacramento Valley. Rice production began in 1912 and increased through the early 1950s, with over 500,000 acres planted in 1954. Since then, rice acreage has ranged from a low of 228,000 acres to a high of 600,000 acres. From 2008-2012, Central Valley farmers have harvested an average of 557,200 acres of rice. Rice acreage in the Central Valley has been generally stable over the past decade. The Central Valley produces over 2 million tons of rice annually, making California the second largest rice-growing state in the nation and contributing over $1.8 billion to the state's economy.

The amount of rice straw remaining in harvested fields can be substantial and eliminating this straw before the growing season is necessary to improve seedling establishment and reduce the likelihood of disease. Winter flooding is one of the most common methods for decomposing straw with an average of 300,000 acres of harvested rice fields holding winter water in the CVJV region. The viability of winter flooding is dependent on reliable and affordable water supplies. California is now in a record drought as a result of three years of below-average precipitation, and surface water supplies that have traditionally been used to winter-flood rice have been drastically reduced. In fact, the amount of winter-flooded rice in 2014 is predicted to be less than 20% of normal years.

LOWER MISSISSIPPI VALLEY JOINT VENTURE

Rice cultivation in the LMVJV first occurred on a small scale around 1900. Today, nearly 2 million acres of rice is grown throughout Arkansas, Louisiana, Mississippi, and Missouri. Arkansas is currently the largest producer of rice in the United States, planting and harvesting nearly 48% of all rice acres. Rice production and processing accounts for over 40,000 jobs in LMVJV states and contributes nearly $10 billion to the region's annual economy.

Historically, rice fields in the LMVJV produced only a single crop each year with harvest occurring late enough in fall to provide an abundance of waste rice for waterfowl. However, changes in the timing of harvest appear to have significantly reduced rice food supplies for waterfowl. Most rice fields in the LMVJV are now harvested in late summer (August-September), several months prior to the arrival of most wintering waterfowl. Thus, waste rice has more time to decompose, germinate, and be consumed by other wildlife, making less rice available for wintering waterfowl.

Volunteer ratoon, or second crop rice, is becoming more common in the LMVJV due to development of rice varieties that mature more rapidly and are more tolerant to cold temperatures. The emergence of a ratoon crop is potentially a very important development for wintering waterfowl in the LMVJV region and could potentially increase food energy availability and carrying capacity for waterfowl beyond that provided by harvested single-crop rice fields.

Example of Sprouted Rice Seed

GULF COAST JOINT VENTURE

Rice production first appeared on the Gulf Coast during the mid-1800s in the parishes and counties of southwest Louisiana and southeast Texas. By the early 1900s, rice agriculture had become more profitable and was expanding westward into the mid-coast of Texas. The coastal tallgrass prairies of Louisiana and Texas once covered over 2.5 million acres from Lafayette to Corpus Christi and extending inland 20-100 miles from the adjacent coastal marshes. Most of the natural wetlands on the coastal prairies were converted to alternative land uses as the region was settled and agriculture, including rice, expanded. Average rice acreage in coastal Louisiana and Texas from 1970-1982 was approximately 982,000 acres. However, a Federal Acreage Reduction Program was implemented in 1983, resulting in Gulf Coast rice production immediately dropping to 582,000 acres. While rice production in Louisiana and other states generally recovered from these policy-driven declines, and many even increased, the same was not true for Texas. Several factors contributed to this decline including rising land prices, higher land opportunity costs, and increased competition and higher costs for limited water, all of which were driven largely by a burgeoning human population in the Houston metropolis that was expanding westward into several rice-growing regions. From 2007-2011, average rice acreage along the Texas coast was 168,600 acres, a 67% decline from the 1970s.

Following the steep declines of 1983, rice acreage in coastal Louisiana recovered to an average of 402,000 acres annually during the 1990s. Beginning in 2000, however, coastal Louisiana rice production entered a gradual decline, driven by higher production costs, depressed rice prices, and impaired rice land productivity caused by saltwater storm surge resulting from several strong hurricanes that impacted southwest Louisiana and southeast Texas. From 2007-2011, average planted acreage in coastal Louisiana was approximately 290,000 acres, a 39% decline from the 1970s. Among U.S. rice-growing states, only Louisiana and Texas have experienced declining trends in rice acreage from the 1970s, and these declines may continue and possibly intensify.

Although no single factor is responsible for past declines in Gulf Coast rice acreage, the factor potentially having the greatest impact on future trends is the availability and affordability of reliable water supplies. In no place has this become more evident and immediate than the Texas mid-coast. The primary sources of water for rice production along the Texas coast are either from groundwater wells or surface water provided by various irrigation districts. Recently, several consecutive years of intense drought

have led to restrictions on water availability for rice production along the Texas coast, causing an approximate 25% decline in rice acreage in this region. The short-term economic and environmental impacts of these reductions have been substantial, yet the consequences of additional curtailments to the longer-term future of a rice-based agricultural economy in the Texas mid-coast are of much greater concern.

While declines in rice agriculture are concerning across all U.S. rice growing regions, several unique aspects of Gulf Coast rice agriculture enhance their ecological value and amplify worry about their decline. The greatest difference is the growth of a second crop of rice immediately following the first harvest (i.e., ratoon crop). Owing to the region's long growing season and early maturing varieties, ratoon rice production became possible on large scales in coastal Louisiana and Texas during the 1960s, and now 30-65% of acres are ratooned annually depending on location. Harvest of the first crop normally occurs during late July or early August, after which the field is fertilized and reflooded to encourage growth of the ratoon crop. The ratoon crop is harvested October through November, which is generally coincident with the arrival of migrating waterfowl into the Gulf Coast region. Consequently, ratoon fields provide an immediate and abundant source of waste rice and natural seeds when flooded after harvest.

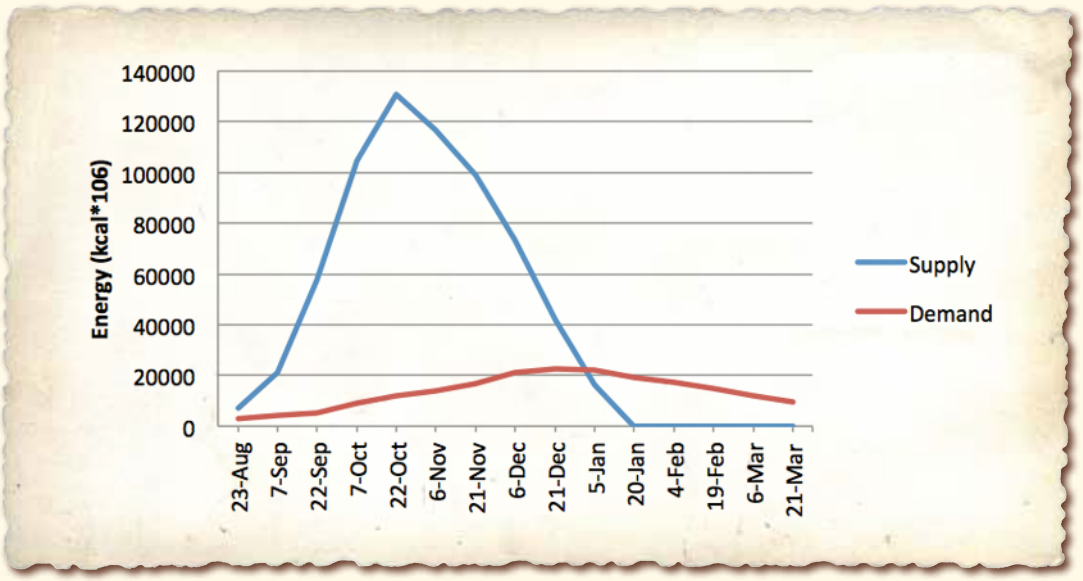
RICE CONTRIBUTIONS TO WATERFOWL POPULATIONS

BIOLOGICAL

Over half of all dabbling ducks that winter in the U.S. occur in the CVJV, LMVJV, and GCJV. Winter-flooded ricefields provide over 40% of the food energy available to dabbling ducks in the CVJV and GCJV, and 11% in the LMVJV. Rice accounts for an even higher percentage of all goose foods in these Joint Ventures as dry fields are important foraging habitat. It is highly unlikely that the population goals established by the North American Waterfowl Management Plan could be met in the absence of riceland habitats.

It is highly unlikely that the population goals established by the North American Waterfowl Management Plan could be met in the absence of riceland habitats.

The elimination of rice production in the Central Valley would be catastrophic for waterfowl. Food supplies for both ducks and geese would be exhausted by early January, just as bird populations are peaking. Nearly half of all waterfowl in the U.S. portion of the Pacific Flyway occur in the Central Valley and the loss of rice would likely impact waterfowl on a continental scale. Pintails, which winter in great abundance in the Valley would be especially affected.



Food energy supply vs. food energy demand for ducks in the Central Valley in the absence of rice.

Although more rice is produced in the Mississippi Alluvial Valley (MAV) portion of the LMVJV than in any other region of the U.S., the amount of food provided by harvested rice fields in the LMVJV is below that of the CVJV and GCJV. Seed variety improvements that have allowed rice to be harvested earlier are largely responsible for this decline in winter waterfowl food value. Rice harvest in this region now occurs in August and September, well before fall migration. The loss of rice seed to germination, decomposition, and consumption by other wildlife appears to be extensive after harvest and before waterfowl arrive. The unintended consequence of this early rice harvest explains why flooded ricefields provide only 11% of the total food energy available to dabbling ducks in the LMVJV. Despite this lower amount of food currently provided by ricefields in the LMVJV, the potential of the MAV's 1.85 million rice acre base is easily imagined. Twenty percent (20%) or 388,000 acres of this 1.85 million acre rice base now is managed to hold water in winter. If these same winter-flooded fields were ratooned and harvested, the amount of food provided to dabbling ducks from flooded rice fields would increase nearly twelve-fold, assuming these fields provide the same amount of food as ratooned fields in the GCJV.

Ricelands provide approximately 42% of total food resources for dabbling ducks in the GCJV, but this percentage varies across the region. Current riceland-based habitat conditions indicate that food resources in the Texas mid-coast and Texas Chenier Plain are insufficient to satisfy foraging demands of dabbling duck population objectives, whereas habitat was abundant and exceeded demand in Louisiana's Chenier Plain. However, total potential foraging capacity of riceland-based habitats (i.e., food resources that would be available if all riceland acres were flooded) exceeded demand across all of the Gulf Coast, even at current, historically low riceland acreages. However in the absence of rice agriculture, it is a virtual certainty that the Gulf Coast region will be unable to support wintering waterfowl at either levels reflected by GCJV population objectives or waterfowl abundances observed in more recent periods. Multiple efforts will be required to ensure rice agriculture remains profitable and maintains a meaningful footprint within this region, thus continuing to provide abundant and valuable habitat for wintering waterfowl.

Harvester at work.

ECONOMIC

Winter-flooded ricefields and native/managed seasonal wetlands provide many of the same wetland functions for waterfowl and other wetland dependent birds. Managed seasonal wetlands in the CVJV, LMVJV, and GCJV total just over 285,000 acres, while winter-flooded ricelands exceed 1 million acres. Thus much of the shallow freshwater habitat preferred by dabbling ducks, especially pintails, is now provided by rice. Replacing these flooded rice habitats with managed seasonal wetlands would be cost prohibitive. The estimated capital cost of replacing existing flooded rice habitats with managed seasonal wetlands range from a high of $2.0 billion in the CVJV to a low of $200 million in the LMVJV. These values include the acres of managed seasonal wetlands that would have to be restored to replace the food energy currently provided by flooded rice habitats including land purchase and restoration costs.

The total cost of replacing all winter-flooded rice habitats in the U.S. with nearly 500,000 acres of managed seasonal wetlands would approach $3.5 billion. However if the energy provided by the riceland habitat in the LMVJV increased due to ratooning and subsequent harvest, the cost of replacing the currently estimated flooded rice habitat in the LMVJV would be nearly $2.4 billion alone.

JOINT VENTURE	RESTORED MSW (ACRES)	LAND PURCHASE COSTS PER ACRE	RESORATIONB COSTS PER ACRE	TOTAL COST
CVJV	186,188	$8,000	$3,000	$2,048,068,000
GCJV	266,019	$2,750	$1,800	$1,210,386,450
LMVJV	34,613	$4,000	$1,800	$200,755,400
TOTAL	436,820			$3,459,209,850

Table 1. Estimated capital costs of replacing flooded rice habitats with managed seasonal wetlands.

In addition, the annual operation and maintenance (O &M) costs of maintaining publicly managed seasonal wetlands in place of flooded rice habitats ranges from a high of nearly $40 million a year in the GCJV to a low of just over $5 million a year in the LMVJV. If flooded rice habitat in the LMVJV was ratooned and harvested, these costs would exceed $60 million as these ratooned habitats equate to significantly more managed wetlands.

JOINT VENTURE	RESTORED MSW (ACRES)	ANNUAL O & M COSTS PER ACRE	TOTAL ANNUAL O & M COSTS
CVJV	186,188	$150	$27,928,200
GCJV	266,019	$150	$39,902,850
LMVJV	34,613	$150	$5,191,950
TOTAL	436,820		$73,023,000

Table 2. Annual O & M costs of maintaining publicly managed seasonal wetlands in place of existing flooded rice habitat.

CONCLUSION

Winter-flooded rice habitats provide 44% of all the food energy available to dabbling ducks in the CVJV, 42% of the food energy in the GCJV, and 11% in the LMVJV. Winter-flooded rice habitats in these regions total just over 1 million acres. The capital costs of replacing these rice habitats with managed wetlands in order to provide a similar amount of food energy approaches $3.5 billion.

Significant challenges exist in each of the three major rice landscapes. Water supplies used for winter-flooding are under increasing pressure in the Central Valley, and many producers may be forced to adopt straw-decomposition practices that provide far fewer waterfowl benefits than winter-flooding. In the Mississippi Alluvial Valley, seed variety improvements now allow rice to be harvested in August and September, well in advance of waterfowl migration. The loss of rice seed to germination, decomposition, and consumption by other wildlife appears to be extensive after harvest and before waterfowl arrive. Research and extension programs that increase the feasibility of second crop or ratooned rice are needed to increase the amount of food provided by ricefields in the LMVJV. Long-term declines in rice acreage on the Gulf Coast, particularly on the Texas Coast, are especially worrisome. Halting this decline and winter-flooding a greater percentage of the acres that remain will be necessary to meet the needs of GCJV waterfowl in the future. All rice industry and waterfowl conservation stakeholders need to fully understand the importance of rice to meeting the population goals of the NAWMP and how difficult it may be to achieve these goals in the absence of rice.

CONTRIBUTORS:

MARK PETRIE, PH.D.
EDITOR
Director of Conservation Planning
Ducks Unlimited
Western Regional Office

DALE JAMES, PH.D.
Manager of Conservation Planning
Ducks Unlimited
Southern Regional Office

MIKE BRASHER, PH.D.
Biological Team Leader
Gulf Coast Joint Venture
Ducks Unlimited
Southern Regional Office

SCOTT MANLEY, PH.D.
Director of Conservation Innovation
Ducks Unlimited
Southern Regional Office

KAREN ALMAND
Graphic Designer
Ducks Unlimited
National Headquarters

For further information and full report titled "Estimating the Biological and Economic Contributions that Rice Habitats Make in Support of North American Waterfowl Populations", please visit http://www.ducks.org/ricelands

Photo: © Michael Peters

The Rice Foundation

The Rice Foundation
P.O. Box 786
Stuttgart, AR 72160
Email: cwilson@usarice.com

DUCKS UNLIMITED

Ducks Unlimited, Inc.
Western Regional Office
17800 SE Mill Plain Blvd., Suite 120
Vancouver, WA 98683
Email: mpetrie@ducks.org