WILDLIFE HABITAT EVALUATION GUIDE (WHEG) FOR SHALLOW WATER MANAGEMENT ON LOUISIANA CROPLANDS (September 6, 2016 – Version 5)

Introduction

The accomplishment of broad-scale conservation goals for fish-wildlife (hereafter, wildlife) in agriculturally dominated landscapes requires the implementation of strategies for accommodating wildlife on agricultural working lands (Cruzio et al. 2013). The importance of rice agriculture for waterbirds is widely recognized (Taft and Elphick 2007). In North America, major rice-growing areas are found within three high priority waterfowl wintering areas identified in the North American Waterfowl Management Plan (DOI and EC 1986; DOI, EC, and Secretario de Desarrollo Social Mexico 2014): Lower Mississippi Alluvial Valley (LMAV), Central Valley of California and Texas-Louisiana Gulf Coastal Plain. Collectively, >50% of all dabbling ducks (Tribe Anatinae) that winter in the U.S. are found in these three regions (Petrie et al. 2014).

Waterfowl and other wetland-dependent birds are attracted to rice fields because of the abundant foods that occur there. Potential foods include waste grain, seeds of water tolerant (i.e., moist soil) plants, green forage, and invertebrates. Petrie et al. (2014) estimate that rice agriculture represents 42%, 12% and 42% of food energy available to wintering dabbling ducks in the Sacramento Valley of California, the LMAV, and Texas-Louisiana Gulf Coastal Plain, respectively. Reduced availability of food energy in the LMAV is attributed to regional agronomic practices and the timing of harvest relative to the arrival of migrating birds (Petrie et al. 2014). Birds also use rice fields as resting areas. The general openness of the rice agricultural landscape is attractive to many species that during migration and winter must remain vigilant for potential predators (Elphick 2000). Management of rice fields for waterfowl and other wetland birds in these three regions is essential for the achievement of habitat goals established in the North American Waterfowl Management Plan (Petrie et al. 2014).

Opportunities and challenges to managing agricultural working lands for waterbirds in the three rice-growing regions are uniquely different (Hohman et al. 2014). For example, cultivation practices vary within and among rice-growing regions as a consequence of differences in climate, geography, soils, topography, surrounding land-uses, water supply, disease-pest issues, rotational cropping opportunities, and farming traditions. The 3-4 million acres of farmland in coastal Louisiana and Texas operated in rice-crawfish-fallow, rice-fallow, rice-pasture or rice-dryland crop rotational schemes, simulate wet, early successional habitats that are highly attractive to wetland-associated wildlife in a region that historically provided habitat for untold millions of resident and migratory wetland birds. The close proximity of fields to coastal marshes, their location at the terminus of two major migratory bird flyways, bird-friendly cultivation practices, high annual rainfall, and abundant plant and animal foods further enhance their potential value for wetland-dependent birds. The loss of traditional wetland habitats also may be contributing to bird use of rice fields. Indeed, recent shifts in the distributions of wading birds from coastal wetlands to inland agricultural wetlands coincide with the expansion of crawfish aquaculture and ongoing loss and degradation of coastal wetlands (Fleury and Sherry 1995, Couvillion et al. 2011).

Avian use is of rice agriculture is best documented in California where over 118 species representing 38 families of wetland birds and some landbirds have been recorded during the winter or migration periods (Taft and Elphick 2007, Eadie et al. 2008). Waterfowl are the most conspicuous group of birds found in rice fields during the nonbreeding period with 9-15 species recorded using rice fields in the three regions (Eadie et al. 2008). Diurnal densities of waterfowl in flooded California rice fields averaged (mean + SE) about 730 (+123) birds/km^2 with average densities up to 3,600 birds/km^2 in some fields (Elphick and Oring 2003). Hobaugh et al. (1989) reported that up to 2 million waterfowl used Texas rice fields in winter. Diurnal densities of waterfowl in rice fields in the LMAV were estimated to be 10 birds/ha; 20-40% of the 1-1.5 million mallards wintering in the LMAV were observed in rice fields (Reinecke et al. 1992, Twedt and Nelms 1999).

Avian use of rice fields potentially is influenced by habitat features such as field size and cover type, management actions influencing the timing, duration and extent of flooding, crop rotation, cultivation and harvest practices, grazing, stature of vegetation, stubble treatments, frequency of disturbance and surrounding landscape features. Wetland bird richness and density are greater in flooded than unflooded rice fields in California (Eadie et al. 2008). Bird groups responded differently to water depth with peak species richness and conservation value (species indexed by their relative abundance in North America, Elphick and Oring 1998) observed at intermediate water depths (10-20 cm) (Elphick 1998; Eadie et al. 2008). Pickens and King (2012) found that the presence of King Rails in rice fields in southwestern Louisiana was negatively associated with forest canopy within 1 km of the field. Pierluissi and King (2008) reported that nest density of King Rails was reduced in fields with as little as 15% of the field edge bordered by trees.

Description of the Wildlife Habitat Evaluation Guide (WHEG)

The Wildlife Habitat Evaluation Guide (WHEG) for Shallow Water Management is a planning tool designed to assess current and future conditions of Louisiana croplands with the capacity to hold and manage water. This WHEG is based on the habitat requirements of priority shorebird, waterbird (wading and secretive marsh birds), and waterfowl guilds identified by the U.S. Fish and Wildlife Service Gulf Coast Joint Venture (http://www.gcjv.org/docs/GCJV%20Priority%20Species%20-%20Landbird%20Shorebird%20Waterbird.doc). Priority species are primarily migratory, but include some resident waterbirds (e.g., king rail, reddish egret and little blue heron) and the mottled duck. (Note - This model was designed specifically for rice agriculture along the Texas and Louisiana Gulf Coastal Plain but can be modified to apply to all rice growing regions.)

Both site-level (i.e., field size; extent, timing and duration of flooding; and agronomic practices such as crop rotation, second cropping, stubble treatments and other agronomic practices) and landscape-level characteristics (i.e., perimeter vegetation, surrounding land uses, and proximity of wetlands and ditches/canals) influence habitat quality and are described in below management scenarios, but to comply with current program requirements, only site-level factors are considered to assign fields to baseline, fair, good, very good, and excellent management categories. Section I of the WHEG assesses the opportunity for shallow water management at the site, e.g., if a field is lacking levees then no water management is possible and the overall WHEG score is zero. Section II evaluates sites with respect to water and vegetation management, and agronomic practices. The overall WHEG score is the average score for Sections I and II.

Management Scenarios

Status Quo Management Scenario (basal or unmanaged cropland situation, WHEG score = 0.1; range 0-0.2) is a leveed cropland with the capacity to hold water and normal agronomic practices.

Excellent Management Scenarios (WHEG score = 0.9; range, 0.8-1.0) for various bird groups are:

- <u>Shorebirds (fall-migrating)</u> – Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation; incremental, gradual (25% field/interval for 90-120 d), shallow (0-6”) flooding from July 15 to November 5; rolling or light disking as required to establish reduce vegetation stature to 0”; adjacent land uses consisting of open, idle land <25% forested, cropland, aquaculture or pasture; <15% woody vegetation along field perimeter.
- <u>Waterbirds (resident)</u>: Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation with continuous flooding (>180 d), water depth 8-18”, gradual drawdown in mid-July to early August; Permanent palustrine wetlands within 1 km; Ditches/canals conveying irrigation water permanently flooded; adjacent land uses consisting of open, idle land <25% forested, cropland, aquaculture or pasture; <15% woody vegetation along field perimeter.

- Waterfowl (migrating): Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation; incremental, gradual (25% field/interval for 90-120 d), shallow (0-12”) flooding early (Aug 16 – Oct 31) or late (Feb 1 - March 15); vegetation stature low (4-6”) or rolled if stature >6”; adjacent land uses consisting of open, idle land <25% forested, cropland, aquaculture or pasture.

Very Good Management Scenarios (WHEG score = 0.7; range, 0.6-0.8) for various bird groups are:

- Shorebirds (fall-migrating): Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation; incremental, gradual (25% field/interval for 90-120 d), shallow (0-6”) flooding from Sep 1 to November 5; rolling or light disking as required to establish low vegetation stature (0-6”); adjacent land uses consisting of open, idle land <25% forested, cropland, aqua agricultural or pasture; <15% woody vegetation along field perimeter.
- Shorebirds (spring-migrating): Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation; light disking of plant residue and shallow winter flooding to control weeds; water-leveling in March-April to prepare the seedbed for aerial seeding; retention of water for least 7 days after water-leveling to facilitate settling and gradual release of water following planting to minimize discharge of particulate matter.
- Waterbirds (resident): Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation with 180 d continuous flooding October 1 – April 1; water depth 8-18”.
- Waterfowl (migrating): Field size >10 acres; 3-year rice x crawfish x fallow or pasture x rice or rice x fallow or pasture x rice rotation; >90 d of shallow (0-12”) flooding between September 1 and March 15; light disking or rolling as needed to reduce stature of residual vegetation to 4-6”; adjacent land uses consisting of open, idle land <25% forested, cropland, aqua agricultural or pasture.

Good Management Scenario (WHEG score = 0.5; range, 0.4-0.6) for bird groups is:

- All Wetland-associated birds: leveed cropland with the capacity to hold water; active water management with control structures closed >60d between Sep 1 to Mar 1 and vegetation managed or unmanaged.

Fair Management Scenario (WHEG score = 0.3; range, 0.2-0.4) for bird groups is:

- All Wetland-associated birds: leveed cropland with the capacity to hold water; normal agronomic practices + control structures open or closed <60d between Sep 1 to Mar 1.

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Wildlife Habitat Evaluation Guide (WHEG) for Shallow Water Management on Louisiana Croplands

I. Field Characteristics		
A. Flooding Potential	**Pre project**	**Post project**
Field[a] with levees and water control capability	1.0	1.0
Field without levees	0	0
Score	0.0	1.0
B. Crop Rotation	**Pre project**	**Post project**
Rice x Crawfish x Fallow x Rice	1.0	1.0
Rice x Pasture or Fallow x Rice	1.0	1.0
Rice x Dryland Crop(s) x Rice	0.5	0.5
Other	0	0
Score	0.5	1.0
C. Field management	**Pre project**	**Post project**
Passive[b, c]	0	0
Active[d]	1.0	1.0
Score	0.0	0.0
Score Tally (B+C)	1.5	1.0
Field Characteristics Score = A(B+C)/2	0.00	0.50

II. Water and Vegetation Management		
A. 60-90 Days of Continuous, Shallow Flood [e]	**Pre project**	**Post project**
Fall/Winter (Sep 1 to Feb 1)		
Field vegetation unmanaged	0.4	0.4
Height of field vegetation reduced to <6”		
Vegetation rolled, crimped, mowed or bush-hogged	0.55	0.55
Vegetation disked	0.45	0.45
Summer/Fall (Jul 15 to Oct 15)		
Field vegetation unmanaged		
Ratoon	0.75	0.75
No ratoon	0.6	0.6
Height of field vegetation reduced to <6” by rolling, crimping, mowing, bush-hogging or disking		
Ratoon	1.0	1.0
No ratoon	0.75	0.75
Winter/Spring (Feb 1 to Mar 15)		
Field vegetation unmanaged	0.6	0.6
Height of field vegetation reduced to <6”		
Vegetation rolled, crimped, mowed or bush-hogged	0.75	0.75
Vegetation disked	0.6	0.6
Score	0.45	1.00

B. 90-120 Days of Continuous, Shallow Flood [e]	Pre project	Post project
Fall/Winter (Sep 1 to Feb 1)		
Field vegetation unmanaged		
Ratoon	0.75	0.75
No ratoon	0.45	0.45
Height of field vegetation reduced to <6”		
Vegetation rolled, crimped, mowed or bush-hogged	0.75	0.75
Vegetation disked	0.55	0.55
Summer/Fall (Jul 15 to Oct 15)		
Field vegetation unmanaged		
Ratoon	0.75	0.75
No ratoon	0.6	0.6
Height of field vegetation reduced to <6” by rolling, crimping, mowing, bush-hogging or disking		
Ratoon	1.0	1.0
No ratoon	0.75	0.75
Winter/Spring (Feb 1 to Mar 15)		
Field vegetation unmanaged	0.6	0.6
Height of field vegetation reduced to <6”		
Vegetation rolled, crimped, mowed or bush-hogged	0.75	0.75
Vegetation disked	0.6	0.6
Score	0.55	1.00
C. >120 Days of Continuous, Shallow Flood [e]	**Pre project**	**Post project**
Fall/Winter (Sep 1 to Mar 1)		
Ratoon	1.0	1.0
No ratoon	0.75	0.75
Spring/Summer (Mar 1 to Aug 15)	1.0	1.0
Score	1.00	1.00
Water/Vegetation Management Score = A, B or C option	0.45	1.00

[a] A “field” here is defined as a whole land unit bounded by exterior levees, canals, roads, a change in habitat type, or hydrology. A field likely will be comprised of multiple “cells” or hydrologic units. Maximum water depth within cells is assumed to be 18”.

[b] Passive management = conventional agronomic practices conducted for crop production

[c] If management is passive (i.e., structures open and no atypical agronomic practices then Overall WHEG Score = A(B+C/2)

[d] Active management = management activities undertaken for purposes other than crop production. Complete below Sections II.

[e] Continuous, shallow flooding is accomplished by slowly adding water to the maximum depth (<18”) in individual cells and moving water incrementally between cells. Twenty-five percent of individual cells should be flooded at the start of period increasing incrementally to 100% of individual cells at the end of period. Goal is to make new feeding areas continuously available to birds throughout the season.

Calculation of Overall WHEG Score	Pre project	Post project
I. Field Characteristics Score	0.00	0.50
II. Water/Vegetation Management Score	0.45	1.00
OVERALL Score = (I+II)/2	0.23	0.50