

King Rail Conservation Action Plan Workshop Summary



Photos by: Noppadol Paothong, Missouri Dept. of Conservation

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Table of Contents

1. Executive summary.....	1
2. Workshop background and objectives.....	2
3. Current research and issues related to King Rails	3
4. Population decline, status, and distribution discussion.....	5
5. Developing measurable population objectives	7
6. Research and monitoring discussion.....	7
7. Conservation and management discussion	9
8. Recommended “next steps” and moving forward	11
9. Final Thoughts	13
10. Appendix A. – Workshop participants.....	14
11. Appendix B. – Suggested focal species plan outline	15
12. Appendix C. – working groups for <i>King Rail Conservation Action Plan</i>	16



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1. Executive Summary

The King Rail Conservation Action Plan Workshop was held November 14-15, 2006 at the Ducks Unlimited National Headquarters in Memphis, Tennessee. Twenty-five people, representing United States Geological Survey (USGS) Cooperative Fish and Wildlife Research Units, state conservation agencies, universities, and various regions/programs within the U.S. Fish and Wildlife Service (USFWS), attended the workshop (Appendix A).

The purpose of the workshop was to receive input from concerned stakeholders for developing a comprehensive *King Rail Conservation Action Plan* resulting from a new program called the “Focal Species Strategy for Migratory Birds”. This strategy was initiated as a way to better measure the U.S. Fish and Wildlife Service’s success in achieving its bird conservation priorities and mandates by linking conservation activities to measurable outcomes. As part of the strategy, the USFWS identified 139 species of management concern that are to receive increased attention over the short term. Included on this list was the King Rail (*Rallus elegans*), which has shown long-term population declines.

The first day of the workshop began with background information on why the workshop was organized and was followed by listing the workshop objectives. Researchers from the Arkansas and Louisiana Cooperative Fish and Wildlife Research Units then updated participants on current studies and issues related to King Rails. Following the updates, participants discussed whether King Rail populations have declined and what evidence existed to support these claims. The remainder of the first day was spent discussing what the measurable objectives should be for the plan, research and monitoring priorities, and conservation strategies. Participants listed their three most important “next steps” for King Rail conservation as the final activity on the first day of the workshop. Similar responses were grouped and prioritized based on the number of respondents who listed similar “next steps” on their cards.

Day two started with a summary of the three “next steps” from day one. A draft set of goals, objectives, and tasks based on the “next steps” were presented and modified based on comments from participants. The goals, objectives, and tasks were organized into three main categories: 1) Conservation and Management; 2) Research and Monitoring; and 3) Education and Outreach. At the conclusion of the workshop, working groups were formed for each category to assist in the refinement of goals, objectives, and tasks in each category. Once a draft plan is completed it will be shared with workshop participants and others to review and provide comments for inclusion in the completed plan.

Information contained in this summary is a record of the workshop proceedings and will be used as a resource for future development of the *King Rail Conservation Action Plan*. Special thanks go to Bill Vermillion, USFWS Gulf Coast Joint Venture, and Jennifer Wheeler, USFWS Migratory Birds, for sharing their notes from the workshop for use in preparing the summary. If you have any questions regarding this summary or any comments, please forward them to tom_cooper@fws.gov. Thank you for your participation in the workshop!



2. Workshop Background and Objectives

The workshop began by having participants introduce themselves and stating their interest for attending the workshop. Bob Russell, Region 3 USFWS Migratory Birds, then gave a brief background about the King Rails range including the location of the three subpopulations (Figure 1). He indicated that King Rail habitat use varies in different parts of their range. He also talked about the status assessment he completed in 2004 for King Rails in the Upper Midwest which generated interest into looking at populations throughout their range of the species.

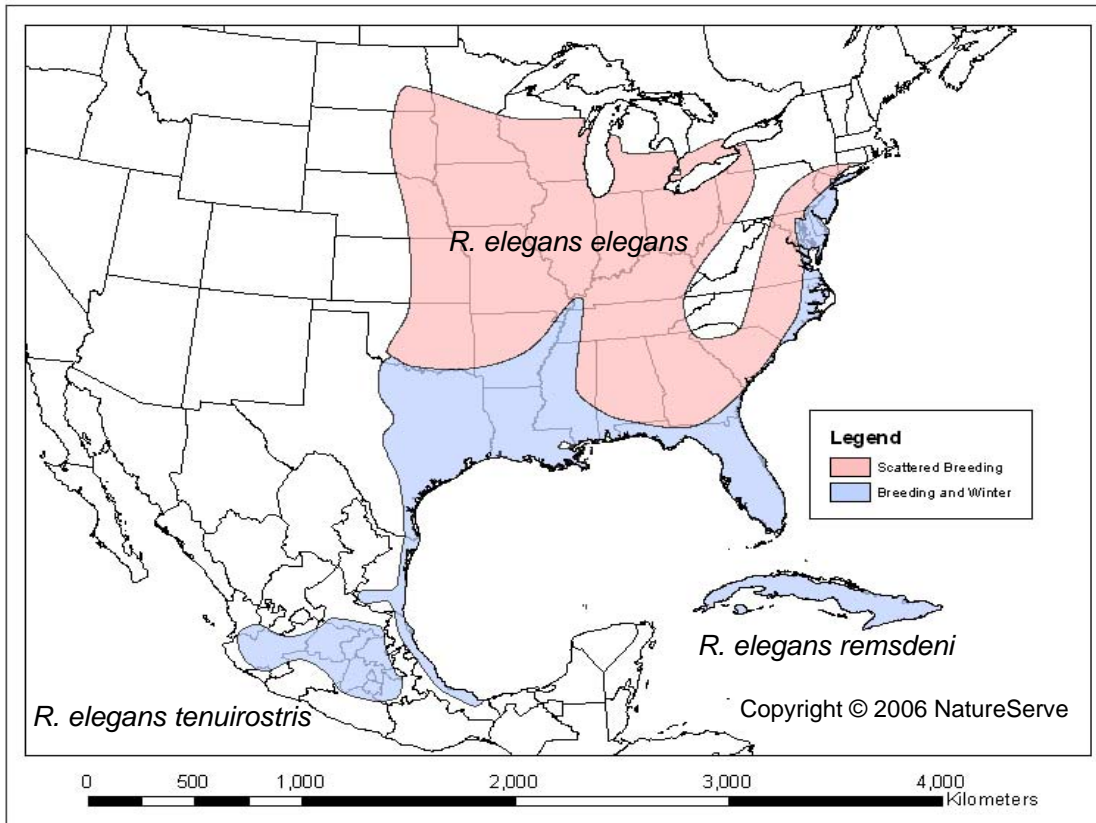


Figure 1. King Rail range and location of subspecies

An overview was presented next about the USFWS's *Focal Species Strategy for Migratory Birds*. More details on the strategy can be found by visiting the following website <<http://www.fws.gov/migratorybirds/FocalSpecies/Presentations.htm>>. The proposed format of what should be included in focal species conservation action plans was then presented (Appendix B). Objectives for work to be completed at the workshop were subsequently covered and were as follows.

King Rail Workshop Objectives:

- 1) Examine evidence for King Rail population declines. Identify data sources indicating declines, possible causes for the declines, and how well populations are being monitored
- 2) Identify gaps in knowledge and develop priorities for coordinated King Rail research (including habitat modeling opportunities for guiding King Rail conservation)

- 3) Identify and prioritize important areas for King Rail conservation throughout their range and list any threats to these areas
- 4) Identify and prioritize habitat management strategies that benefit King Rails
- 5) Develop measurable population objective(s) for evaluating the effectiveness of management actions for King Rails
- 6) Develop the framework for a King Rail Conservation Action Plan

3. Current Research and Issues Related to King Rails

Several presentations were given on recent studies and issues related to King Rails. The research was conducted by the Louisiana and Arkansas Cooperative Fish and Wildlife Research Unit. The presentations were valuable for bringing participants up to date on the latest studies and were helpful in giving background information on conservation issues facing King Rails. The presentation titles, presenters, and highlights from each presentation are found below.

King Rails in Louisiana Rice – Sergio Pierluissi, USFWS

- Conducted a study looking a marsh bird use of rice fields in southwest Louisiana.
- Found 37 King Rail nests in 2004 and 40 in 2005. Nest density was 4-5 nests/km². A previous study (Hohman et al. 1994) showed densities of up to 15 nests/km² in rice.
- Mayfield nest success was close to 50% each year of study
- Nests found in 40% of fields searched in 2004, 50% in 2005
- Nest densities were highest in open areas with abundant ditches and few trees. Location of nests negatively associated with amount of trees surrounding rice field and positively associated with the amount of ditches around the field. Perimeter scale variables did a better job of explaining nest location than landscape scale variables.
- Call back surveys were a good indicator of breeding activity. The most responses from the call back surveys occurred in June. Call back surveys were recommended for monitoring marsh birds in the region.
- Successful nesting is compatible with, and encouraged by rice production
- Juvenile survival is still unknown (post-hatching). Rice harvest is not thought to be a direct cause of chick mortality, but the harvest could concentrate birds into remaining habitat resulting in high predation rates.

The Future of Rice in SW Louisiana: Issues and Opportunities – Sammy King, LA Coop Unit

- Rice agriculture in southwest Louisiana provides wetland benefits that may compensate for the habitat loss of coastal prairie wetlands and some coastal marshes. LA coastal marsh loss rates peaked in the 1970's.
- Huner et al. (2002) reported that over 260 species of birds use rice/crawfish ponds in SW Louisiana
- King Rails begin nesting in rice when it reaches around 65-75 cm. This leaves 50-60 days for nesting; King Rails need 30-35 days.

- There are not any plans to develop rice varieties with shorter maturation times; farmers only need to plant a ratoon (second) crop to be profitable which can be done with current varieties.
- Rice acreage in LA is declining due to economics and saltwater intrusion from Hurricane Rita in 2005. Drought conditions following the hurricane heightened the saltwater intrusion problems by not having freshwater to flush salt from fields.
- Decline of rice acreage in Texas is due largely to high land prices in expanding urban areas surrounding Houston and high water costs.
- LA Rice Experiment Station is optimistic that rice will stabilize at around 600,000 acres in the state. However, rice acreage may continue to fluctuate wildly or stabilize at a lower level without improvement in prices.
- Landowner incentives are needed to insure waterbird habitat values associated with rice will remain in the future.
- As with most agriculturally-dominated systems, changes in the Farm Bill can have immediate and dramatic effects on landscape conditions

Use of Stable Isotopes to Determine the Ratio of Resident to Migrant King Rails in Southwestern Louisiana – Marie Perkins, LSU

- Study was conducted during 2004-2005 in southwestern Louisiana
- The best method for capturing rails (all species) was using airboats with night lighting techniques.
- A total of 189 King Rails were captured during study using a variety of methods.
- Stable isotope analysis indicated that few, if any, migrant King Rails were captured during the study. Major questions resulting from the lack of migrants in the sample were: 1) are migrant rails occupying different habitats and/or locations than resident populations; and 2) are there too few migratory rails left?
- More research is needed to determine where migrant rails are wintering.

King Rail Research in Arkansas and Missouri – David Krementz, AR Coop Unit

- Studies were conducted in the Delta region of Arkansas and in the northeastern part of Missouri. The study used site occupancy modeling procedures to look at King Rail presence on study sites.
- Results indicated that a minimum of 9 surveys at each site were required to determine absence. Low occupancy rates (0.172 in 2005 and 0.06 in 2006) were found in Arkansas. A comment was made that no estimation procedure can use such low numbers and calculate a reasonable population estimate.
- The presence of ditches appears not to be as important to King Rails in Arkansas when compared to Louisiana. This is probably due to the fact that ditches in AR have steeper sides and are less vegetated than those in Louisiana. In fact, some water management organizations in Arkansas require farmers to keep ditches clean.
- Some surveys were done in Arkansas rice fields, but it was not tall enough for nesting by the end of July so there was little use of rice compared to what was found in LA study.
- Most Arkansas study sites with King Rails were within 27 kilometers of the Mississippi River.
- Similar habitat characteristics were found at all sites where rails were present. The habitat was characterized by tall, robust emergent vegetation that was patchily distributed. The vegetation was horizontally and vertically stratified. Numerous patchy mudflats/shallow

water areas with adjacent tall, emergent vegetation were also present. These areas provided important brood habitat.

- Researchers in Arkansas and Missouri found that nests were often located next to ditches and borrow pits.
- Water availability during migration is an issue during dry years. Many study sites in Arkansas and Missouri were dry by the fall thus providing poor late brood rearing and migratory habitat.

4. Population Decline, Status, and Distribution Discussion

- King Rails have shown a long-term (1966-2005) population decline of -6.6% per year based on data from 31 Breeding Bird Survey (BBS) Routes. The most reliable BBS data comes from BCR 37 (Gulf Coastal Prairie) which has shown a decline of -10.5% per year from 1980-2005 based on 16 routes. BBS results should be interpreted with caution since the BBS is poorly designed for monitoring population trends of secretive marsh birds. There is an absence of long-term monitoring data for King Rails throughout much of their range.
- There have been recent efforts to better monitor secretive marsh birds using the Continental Marsh Bird (CMB) Monitoring Program in North America protocol developed by Dr. Courtney Conway of the Arizona Cooperative Fish and Wildlife Research Unit. However, it was pointed out that use of the program has been inconsistent due to refuge staffing and funding issues. 16 of 78 locations using King Rail vocalizations in their call back sequences have detected them.
- Throughout much of the King Rail range, population declines are based more often than not on anecdotal evidence from wildlife biologists with state and federal agencies, recreational birders, and farmers. For example, the Audubon Society has consistently placed King Rails on their “Blue List” which is based upon impressions from birders and Louisiana rice farmers have indicated declines since the 1970’s based on a decline seen while harvesting rice.
- King Rails are listed as threatened or endangered in 13 states. These states are primarily in the migratory portion of their range. Anecdotal information suggests that initial declines in the Midwest occurred in the 1930’s from agricultural drainage and development with another major decline occurring post 1960 (possibly from contaminants such as DDT?).
- Based on the preceding information, there was a general consensus of workshop participants that declines in King Rail populations were real and agreed that the development a long-term action plan would facilitate future conservation efforts of the species.
- Possible causes for population declines were discussed and included:
 - 1) Habitat loss and conversion: Specifics: direct wetland drainage, converting shallow water systems to deep water systems, change in vegetation structure due to invasive plants, loss of wet prairie/meadow habitat fringing wetlands, changes in ditch

management from ones with gradual, vegetated banks to ones with steep, unvegetated banks, and saltwater intrusion into fresh water coastal marshes

- 2) Changes in rice agriculture from both decreases in acreage and different farming methods being used. Acreage not being planted to rice is being planted to other crops which are not flooded.
 - 3) Contaminants directly affecting rails or indirectly affecting food supplies
 - 4) Harvest and accidental trapping. Based on harvest statistics, this is probably not a big factor. An estimated 300 King Rails were harvested in 2004 and 200 in 2005. However, many at the workshop felt that any harvest on remnant, migratory populations (i.e. Upper Midwest populations) could be detrimental.
 - 5) Miscellaneous factors such as tower, building, and vehicle strikes.
- Distribution data for King Rails from various data sources were displayed (Figure 2). Key areas based on the existing data were outlined in blue and these areas closely matched existing Bird Conservation Regions (BCR). It was felt several other important areas may not be represented in the data including the south Atlantic Coast and the southeast Gulf Coastal Plain. These areas need to be looked at more carefully to see if King Rails are using them. It was also noted that many of the upper Midwest records seemed to be associated with river systems or the Great Lakes.

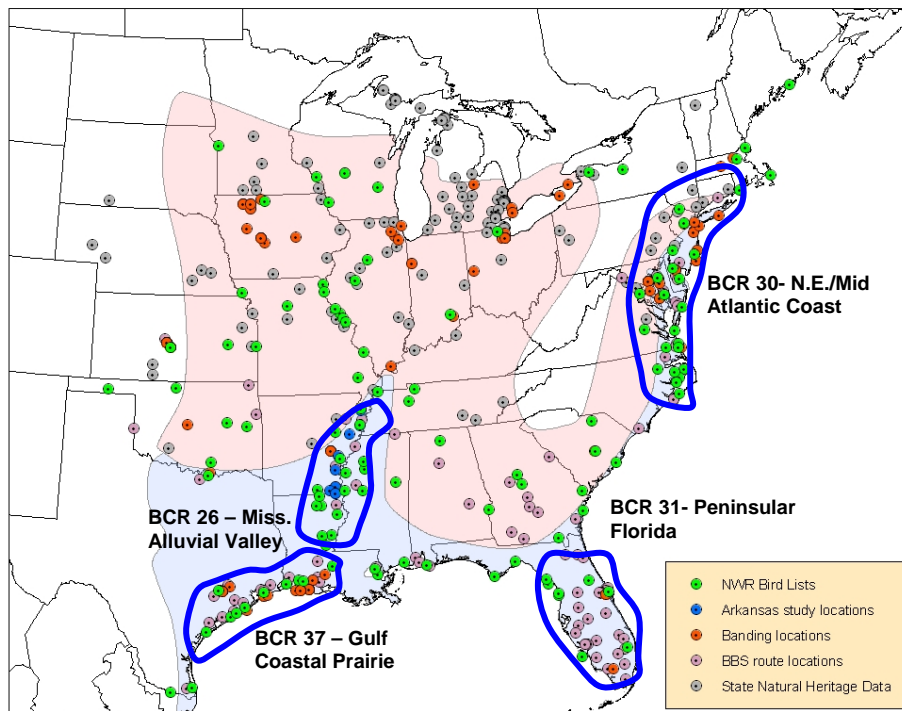


Figure 2. King Rail distribution based on various data sources with concentrations circled and the corresponding BCR each concentration is associated with identified.

5. Developing Measurable Population Objectives

One of the most important components of the “Focal Species Strategy for Migratory Birds” is that conservation actions need to be linked to measurable objectives. Due to this requirement, there was considerable discussion on what the measurable objectives should be for the King Rail plan. For many species such as the Northern Bobwhite or American Woodcock, long-term surveys have been conducted with population size estimates reported annually. Plans for these species have set population objectives based on a historic population estimate from some point in time. For example, the goal of the Woodcock plan is to restore population levels to populations found in the early 1970’s. The population goal is then often linked to a habitat goal. For example, *X* acres of habitat *Y* are needed to get a breeding population of *Z* individuals. As mentioned earlier in the summary, there are no historical population estimates for King Rails so setting a population size objective is difficult.

The following ideas were presented by participants as possible population objectives for the plan.

- 1) Restore populations to their historic range and concentrate on areas where they were historically common.
- 2) Increase the frequency of King Rail detections on marsh bird surveys by some factor (five fold was discussed which may be consistent with some Midwestern evidence of declines)
- 3) Set regional population goals (by states, Bird Conservation Regions, Joint Ventures?) using the best available current population estimates and “backing into” historical population estimates using percent decline trends estimated from BBS data.
- 4) Set metapopulation objectives within key areas (based on BCR’s, States, or Joint Ventures). For example, first determine the number of metapopulations within each key area and set an attainable goal such as doubling the number of metapopulations within that area in a set amount of time. Bob Russell suggested another goal where a suitable habitat complex was restored or managed within 50 miles of an existing area currently being used by King Rails and distribute these sites across regions.

6. Research and Monitoring Discussion

Much of the discussion focused on what the limiting factors for population growth and range expansion are for King Rails. It was felt that any studies initiated should focus on identifying limiting factors especially for stages of the annual lifecycle where information is lacking (i.e. brood survival and non-breeding season survival). Range-wide studies for King Rails should be initiated examining these knowledge gaps. However, a coordinated approach should be developed so results from different study areas can be compared. Further research should also focus on delineating wintering areas of migratory populations, pairing chronology, settling patterns, and breeding site fidelity.

- Studies in Missouri (moist soil units) and Louisiana (rice fields) have shown that nesting success for King Rails is relatively good ($\approx 50\%$), however, little is known about brood survival from hatching until fledging. There was discussion about making assumptions about recruitment based only on nesting success. Good nesting success does not mean that

recruitment is good. A range-wide study looking at brood survival is needed to address if this may be a limiting factor for populations in different parts of their range. Additionally, information is needed comparing nest success and brood survival between natural wetlands and rice fields.

- Do we have enough information to make the assumption that habitat is the limiting factor in population growth and/or range expansion? What are the primary factors controlling populations? 1) habitat quality; 2) habitat quantity; 3) brood rearing habitat ; 4) migratory habitat; 5) winter habitat
- Based on discussion, King Rails tend to be good colonizers of newly restored habitat complexes. Some anecdotal evidence includes the use of newly created habitat at the Goose Pond Wetland Reserve Program (WRP) site in Indiana and the Red Slough WRP site in Oklahoma. King Rails have bred successfully at both sites shortly after restoration work was completed.
- There needs to be more genetic work comparing migratory and resident segments of the population with each other and with Clapper Rails. Previous work has shown there is not much difference between coastal, non-migratory King Rails and Clapper Rails. In fact, Marie reported that the variability between King and Clapper Rails is less than seen within Red-winged Blackbirds. We need to know how migratory birds compare with resident populations and Clapper Rails.
- Non-breeding season survival and movements are largely unknown for King Rails and need to be evaluated especially for inland nesting migratory populations. Telemetry studies could be used to assess movements along with survival. David Krementz felt that migrant rails may winter further north than areas used by resident populations which could explain the fact why no migratory rails were found in the LA isotope study. Bill Eddleman indicated that we really don't know if they are leaving an area or they have simply stopped vocalizing. Telemetry studies would help answer some of these questions.
- Sammy King and David Krementz indicated that there are plans to put some radio transmitters on birds from the migratory population and follow their movements. They also indicated that satellite transmitters are getting smaller and they should soon be available to use on King Rails. A telemetry study would provide valuable information for delineating important migratory and wintering areas. Conservation efforts would be enhanced by being able to target habitat protection and restoration programs for remnant migratory populations.
- A spatially explicit Landscape Suitability Index (LSI) model that was created by the Upper Mississippi River/Great Lakes Joint Venture was presented and discussed. Variables used in the expert opinion model included wetland size, wetland type, and distance to known King Rail locations. The model classified wetlands on a scale of 0 to 1 with 1 being the most suitable wetlands. Workshop participants liked the approach used to build the model and offered several suggestions on how it could be improved. Suggestions included: 1) Give a lower suitability score the further north you go since the model indicated that the best sites were in northern Michigan and Wisconsin which is probably not the case due to few records from these locations and being at the northern extent of their range; 2) decrease the suitability of woody wetlands which were ranked high in the model but in

reality probably are not important habitat for rails; and 3) give wetlands along (within \approx 25 km) major river systems or the Great Lakes a higher suitability since most records of King Rail occurrence in Midwest have come from these areas. The three recommendations were forwarded to the JV science team and they plan to update the LSI model based on the recommendations.

- There was a general consensus that LSI models were a good starting point for looking at landscapes that are important to King Rails. The idea was presented that the modeling done by the Upper Mississippi River/Great Lakes Joint Venture should be repeated for different regions within the King Rail range (i.e. other Joint Ventures could assemble working groups to determine what variables they feel are important in their region). The groups could also identify missing GIS data layers that would be required to model King Rail habitat and form a strategy for acquiring the missing layers. Model outputs could potentially be used to target future conservation programs, locate new areas being used by King Rails, and design long-term monitoring programs. The models should be built around population objectives.
- It was generally felt that a range-wide monitoring program needs to be designed to better monitor trends in King Rail Populations and other secretive marsh birds. Low detection probabilities make designing a monitoring program extremely difficult because many observation points would be needed to detect statistical differences in abundance and trends. The Mississippi Flyway wants abundance and trend information for making decisions as does the FWS. The Continental Marsh Bird Monitoring Program methods should be used for conducting the surveys. Some funding to help design and implement a monitoring program in the northeast US may be available through the Northeast Coordinated Bird Monitoring Partnership.

7. Conservation and Management Discussion

Several participants suggested that conservation efforts should focus on remnant migratory populations at this point with the goal being to maintain these populations. The last strongholds for King Rails appear to be on public lands managed for wildlife. However, there are often management conflicts with other species such as waterfowl that do not benefit King Rails. The first priority should be targeting restoration work, fee-title acquisitions, wetland enhancements, and habitat management workshops in areas determined to be important to the future conservation of King Rails.

- We did a brainstorming session on what opportunities are available to better manage and/or restore habitat for King Rails. The ideas and where they can be applied are as follows:
 - 1) Work with the rice and crawfish industry to promote best management practices (BMP's) that benefit marsh birds – some ideas for rice industry included the use of informational brochures, workshops, and publications in rice industry journals. There is also an opportunity to work with the Rice and Waterbirds Working Group to promote BMP's beneficial to wetland birds. (Arkansas, Louisiana, Missouri, Texas)

- 2) Support farm policies that would provide incentive payments to rice farmers who employ BMP's benefiting marsh birds. (Arkansas, Louisiana, Missouri, Texas)
 - 3) Support the Louisiana Conservation Reserve Enhancement Program (CREP) Phase II which has the potential to restore 2,800 acres of shallow marsh habitat. The CREP also could be detrimental to marsh birds if the 22,400 acres of slated grassland habitat replaces fields that are currently managed for rice production. The juxtaposition of habitat types and the distribution of wetlands will ultimately determine overall positive and negative effects. (Louisiana)
 - 4) Work with public land managers to better manage existing habitat for King Rails and other wetland birds requiring similar habitat – some ideas included developing informational brochures on management/restoration guidelines and holding regional workshops focusing on shallow marsh management techniques in that region. Krementz and King indicated there was going to be a workshop next fall, on managing marsh bird habitat on public lands along the Mississippi. (Range-wide)
 - 5) Support implementing restoration and management practices that are beneficial to King Rails into farm bill conservation programs such as the Wetland Reserve Program (WRP) and the Conservation Reserve Program (CRP). This is already being done to some extent. Several high profile WRP restoration sites such as the Goose Ponds WRP site in Indiana and Red Slough WRP site in Oklahoma are being used extensively by King Rails according to reports. These sites can be used as a model for future wetland restorations. (Range-wide)
 - 6) Promote habitat restoration on private lands through national programs such as the USFWS's Partners for Fish and Wildlife Program and state programs such as the Texas Prairie Wetlands Project. (Range-wide)
 - 7) Work with "hypoxia task forces" in the Mississippi River basin by encouraging the creation of emergent wetland vegetation buffers along rivers as a way of combating the zone of hypoxia in the Gulf of Mexico. (Mississippi River Basin)
 - 8) Promote the creation of wetlands for tertiary water treatment at municipal waste water treatment facilities. There have been numerous reports of their use by King Rails. (Range-wide)
 - 9) Upgrade existing water control structures on managed wetlands to allow finer scale management of water levels. Many moist soil units are completely dewatered during the growing season. Maintaining some water on the units would be beneficial to King Rails. (Range-wide)
 - 10) Increase the use of disturbance management tools, such as fire and grazing, to maintain early successional habitat in wetlands used by King Rails where woody encroachment is a problem. (Range-wide)
- The group also brainstormed to list other species that would likely benefit from management practices aimed at King Rails. Listing these may help form future

partnerships with other groups interested in species with similar habitat requirements. Species that would benefit throughout their annual cycle include: Purple Gallinule, Sora, Black Tern, Yellow Rail, Fulvous Whistling Duck, Black-bellied Whistling Duck, Common Moorhen, Least Bittern, American Bittern, Sedge Wren, Marsh Wren, and various species of egrets and herons. Species that would benefit during migration and/or wintering include: Greater Yellowlegs, Lesser Yellowlegs, Black-necked Stilt, Long-billed Dowitcher, and Stilt Sandpiper.

- Conservation and management recommendations need to be linked with education and outreach for providing guidance to public and private land managers.

8. Recommended “Next Steps” and Moving Forward

At the conclusion of the first day, workshop participants were asked to write down what they felt were their top three priorities or “next steps” for advancing King Rail conservation. They were asked to base their recommendations on their existing knowledge of the species, the day’s presentations, and the discussion at the workshop. Tom Will summarized this exercise by combining similar responses into classes and ranking them based on the number of cards containing similar “next steps” (Table 1).

Table 1. Rank and classes for “next steps” based on participant responses.

#Cards	Class	Next Steps
11	stabilize	Prevent current population levels of (northern) birds from declining further by concentrating on areas where King Rails are present and restoring, enhancing, and by creating preferred nesting and foraging habitat. Ensure that migrant KIRA breeding areas have management plans conducive to continued use by KIRA
9	identify habitat	Describe critical habitat characteristics for all aspects of the KIRA life cycle by regions, including micro- and landscape requirements for nesting and foraging, patch size necessary for source populations -- especially for northern breeding/migrating populations. Investigate areas where rails are expected but don't occur -- these could tell us a lot.
7	current location	Determine more accurate distribution and current site occupancy of breeding (migratory) King Rails, covering a larger area of range and filling in gaps. Assess distribution, habitat relationships, and population size by KIRA range partitions or BCRs.
6	outreach	Inform and educate public/private lands managers. Get them thinking about KIRA. Distribute info on easy things that can be done to provide habitat (e.g., shallowly flood moist soil areas in early and late fall to provide migrant habitat, etc.) Contact Cuban and Mexican ornithologists to assess those populations.
5	model	Build/develop -- within each BCR (JV) -- a model to identify "potentially" suitable King Rail habitats using current knowledge of wetland location, size, characteristics at known sites, and expert opinion. Begin to design a population model for King Rails and identify data needs for the model to be addressed and prioritized through research.

4	identify tasks	Identify priority research needs. Develop and implement strategies for placing key habitats on the landscape. Identify limiting factors for both resident and migratory populations. Refine model and develop (a) population, (b) restoration, and (c) conservation goals and identify these areas in GIS.
4	implement	Use habitat needs information to implement management and restoration guidelines to improve existing habitat and acquire additional habitat. Develop mechanisms to maintain and improve existing rice acreage with practices suitable for producing optimal KIRA habitat on Texas and Louisiana coast. In the Southeast, look holistically at recovering marshes, leveraging current interest in flood control/ hurricane mitigation. Identify key policy (e.g., Farm Bill, farming policy / incentives & WRP regulations), management (e.g., how refuges manage ditches), and restoration (e.g., restore wetlands with appropriate habitats at appropriate scale) activities to conserve or improve King Rail areas.
4	monitor	Develop and implement a long-term monitoring program (National Marshbird Monitoring Program?) that would allow for estimation of (a) current spatial distribution, (b) correlative information on habitat use and requirements, and (c) temporal trends in populations among subunits. Monitor populations to determine if management actions are benefiting species.
3	GIS data	Develop national wetland database that is current and capable of demarcating tall, robust emergent wetland. Develop habitat data layers/GIS for critical habitats -- existing and historic -- throughout range.
2	basic info	Fill gaps in our knowledge of King Rail basic biology and natural history/habitat needs, migration patterns, population dynamics, etc.
2	set objectives	Use information from distribution and habitat inventory to develop bird/habitat -- population/habitat objectives that speak to population sustainability at multiple spatial scales with measurable parameter estimates.
1	focus areas	Develop focus areas for conserving the northern migrant populations using existing programs (state & federal) to deliver conservation practices.
1	research/ manage	Collate existing information and conduct research to determine the best habitat management methods in each King Rail management region (i.e. BCR, Joint Venture, State)
1	validate	Perform surveys (Marsh Bird, nest searches, etc.) to validate models, using an appropriately developed sampling scheme, survey for +/- of KIRA in wetlands identified at potentially suitable sites by the model. If present, develop density (i.e., birds, nests) to rate "quality" to evaluate model effectiveness.

The summarized “next steps” were used to formulate goals for three sections of the *King Rail Conservation Action Plan*. The sections are Conservation and Management, Research and Monitoring, and Education and Outreach. Under each goal, objectives and tasks for achieving each goal were listed. The draft set of goals, objectives, and tasks were then presented and discussed for each section of the plan. The goals, objectives, and tasks were modified based on workshop participant input.

The final action taken at the workshop was to organize working groups to help flesh out the goals, objectives, and tasks. Three working groups were formed with one for Research and Monitoring, one for Conservation and Management, and one for Education and Outreach. The chair and members of each working group are listed Appendix C. Each working group will develop goals, objectives, and tasks for each section of the action plan based on their expertise and the proceedings of the workshop. The goal is to have the draft *King Rail Conservation Action Plan* completed by June 2007. Upon completion, the draft will be circulated to all workshop participants to review. Comments received back from the reviewers will be incorporated into the plan with the target completion date for the plan being October 2007.

9. Final Thoughts

The workshop was a valuable tool for getting stakeholder input for developing the *King Rail Conservation Action Plan*. As we move forward, the following points need to be considered:

- 1) We need to use the best science for setting plan goals and objectives. There was some concern that we might be outrunning our knowledge with some of the draft objectives that were discussed.
- 2) The *King Rail Conservation Action Plan* needs to be linked to the existing North American Water Bird Conservation Plan and the regional step-down plans that are currently being developed.
- 3) More input is needed from the East Coast and Florida since these areas had limited representation at the workshop. In addition, location information will continue to be collected to get a better picture of important areas for King Rails.
- 4) The *Strategic Habitat Conservation Final Report* developed by the National Ecological Assessment Team (NEAT) should be used as a tool for designing the plan. Strategic Habitat Conservation (SHC) is an adaptive process that ties together the planning, implementation, and evaluation phases of habitat conservation. Population and habitat objectives should be linked together with a plan in place for evaluating them. At the workshop, we seemed to be using this approach by discussing how monitoring, research, modeling, and habitat conservation should be linked together.
- 5) During much of the discussion, a common theme emerged that activities (i.e. modeling, research, conservation priorities, and monitoring) should be planned on a regional basis which at the workshop we referred to as “King Rail BCR’s”. One suggestion would be to use existing Joint Venture boundaries for these regions. The benefits of using the Joint Ventures include: 1) they are an established organizational framework for delivering conservation on a regional scale; 2) some JV’s are already planning for all bird conservation; and 3) the JV boundaries closely mirror King Rail distribution patterns with similar habitat types being used by rails within each JV.
- 6) Tasks under each objective need to have timelines for implementation or completion tied to them (i.e. short term, medium term, and long term).

10. Appendix A. Participants attending the King Rail Conservation Workshop

First Name	Last Name	Affiliation	E-Mail
Michael	Budd	Arkansas Coop Research Unit	mbudd@uark.edu
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11. Appendix B. Suggested Focal Species Plan Outline

- I. Executive Summary**
- II. Introduction**
 - A. Rationale for selection
 - B. Other species for which FS can serve as an indicator
- III. Description of Target Population**
 - A. Range and distribution
 - B. Spatial extent of conservation plan
- III. Population Status**
 - A. Status and trend
 - B. Legal or priority status
 - C. Known or suspected limiting factors
- V. Natural History Overview**
- VI. Focal Species Population Objectives**
 - A. How to measure
 - B. Time frame for achieving
- VI. Conservation Strategy**
 - A. Priority regions
 - B. Management treatments
 - C. Resources available
- VIII. Information Needs**
 - A. Adequacy of existing monitoring programs
 - B. Research Priorities
- IX. Priority Action Items**
 - A. Determine relative priority of action toward attainment of objectives
 - B. Estimated operational and staff costs to implement priority actions
 - C. Assign tasks to key Service or partner leads to implement priority actions
 - D. Determine timeline to accomplish priority actions
 - E. Evaluating Migratory Bird Program accomplishments (format, how often, who?)
- IX. Literature Cited or References**

12. Appendix C. Working Groups for King Rail Conservation Action Plan

Research and Monitoring Group Members: Dave Krementz (Chair), Sammy King, Bill Eddleman, Warren Conway, Mark Seamans, and Tom Cooper

Conservation and Management Group Members: Dave Ellis (Chair), Brian Loges, Bob Strader, Bob Russell, and Tom Cooper

Education and Outreach Group Members: Mike Budd (Chair), Karen Rowe, Jennifer Wheeler, and Tom Cooper