

# Chapter 2: Alternatives, Objectives, and Strategies

## 2.1 Introduction

This chapter describes the alternatives developed in response to the issues and concerns discussed in Chapter 1. The preferred alternative, or proposed action, is also identified. Objectives and management strategies are used to describe what the Service would do over the next 15 years to implement each of these alternatives. A summary table of the alternatives is at the end of the chapter (Table 4 on page 75).

## 2.2 Formulation of Alternatives

The planning team and additional staff from the Refuge, Regional Office, and Illinois DNR met at a workshop from April 23 to 27, 2001, to develop alternative management concepts. Four concepts were developed and labeled: “Existing Management; Recreational Land Exchange; Open Land Management; and Forest Land Management.” The management concepts were described in a project update that was distributed at the Refuge and mailed to 1,400 people on the planning mailing list in September 2001. People were asked to comment on the concepts by November. We received approximately 39 messages through e-mail, 62 individual letters and 79 form letters, with approximately half of those letters including individual comments. We also received a petition with 485 names. Some people wrote in support of an alternative. Each alternative had some supporters. Some people commented on a particular aspect of an alternative. Some people suggested variations of the concept alternatives. A summary of the comments received is presented in Appendix H. Based on the comments received and



*Crab Orchard NWR*

land cover data analysis, the alternatives were amended and made more specific and an additional alternative was added by the planning team and Refuge staff. The alternatives were also given titles that better describe their content.

## 2.3 Selecting the Preferred Alternative

In selecting a preferred alternative, we considered environmental, economic, and social factors and our ability to implement the actions necessary to accomplish the alternatives. We based our decision on how well the goals of the Refuge were met by each alternative and the environmental consequences of each alternative (See Chapter 4). We selected Alternative E as our preferred alternative. Alternative E will fulfill our statutory mission and responsibilities, and we have adequate authority to implement it.



Ruddy Duck, U.S. Fish & Wildlife Service

During our initial analysis, we considered Alternative B as our “working” preferred alternative. However, Alternative B was abandoned as our preferred alternative when we confronted the difficulties of implementing the land exchange, which would be an important part of Alternative B. If we exchange land, Federal regulations require that the land involved in the exchange be of approximately the same value. Our preliminary appraisal estimates indicated that the Federal property in the proposed exchange exceeds the value of the Southern Illinois University property by as much as \$20 million. We evaluated the possibility of putting restrictive covenants on the exchanged property to reduce its value and reducing the amount of property that might be exchanged, but we were unable to reach equal values for the two properties. The exchange proposed in Alternative B could only be accomplished with Congressional action, which we did not want to pursue. We thought that the exchange would be politically sensitive and that its resolution in the legislative process would be lengthy and out of our control. Rather than pursue a course with an uncertain timetable and outcome, we chose an alternative that is within our current authority to implement.

## 2.4 Summary of Alternatives

### 2.4.1 Alternative A: Current Management/No Action

#### 2.4.1.1. Background

The Council of Environmental Quality's regulations (40 CFR §1502.14(d)) for implementing the National Environmental Policy Act require that all

environmental impact statements include the alternative of taking no action. In addition, some public comments favored the Refuge continuing on its present course. This alternative is being analyzed in response to the views of some of the public and to satisfy the Council's regulations.

#### 2.4.1.2. Summary

*Wildlife:* Under this alternative the current management activities at the Refuge would continue. The Refuge would continue to provide sufficient habitat for the needs of wintering geese. Current moist-soil management would continue. The Refuge would continue efforts to protect water quality by focusing within the Refuge boundaries. These efforts would include using best management practices on agricultural lands (including haying and grazing) and stabilizing lakeshores. The Refuge would continue to avoid impacts to nesting bald eagles and Indiana bat habitat, continue current wilderness management, grassland management, reforestation, and proceed with conversion of all non-native pine plantations to native hardwood forests.

*Recreation:* All current recreation uses and patterns on the Refuge would continue. There would be continued decline in support for swimming, power boating and water-skiing. There would be a gradual increase in the quality of other recreational facilities. However, at current levels of improvement, it would take many years to bring the quality of the campgrounds to standards comparable to others in the area. Camping would be limited to a 2-week stay. Hunting, fishing, wildlife observation and photography, environmental education and interpretation would continue at the current level with gradual improvement. Management of public use in the wilderness would continue at its current level.

*Industry:* Current industrial policies would remain in place and the Refuge would provide facilities for the existing tenants at fair market value rental rates.

*Agriculture:* The amount of agricultural land would remain fairly constant. However some loss may occur through installing buffer strips needed for soil and water protection. Current acreage of hay fields and pastures would remain about the same. All mowing of pastures, hay fields, and clover fields would take place after August 1.

## 2.4.2 Alternative B: Reduced Habitat Fragmentation, Wildlife-dependent Recreation Emphasis With Land Exchange

### 2.4.2.1. Background

Through the years the Refuge has been criticized for its lack of support of the recreational purpose of the Refuge. Recreation on the Refuge drew the greatest number of comments during the scoping of issues. When the Refuge was established, the Director of the Service assured Congress that the Service would be able to manage for the four purposes of the Refuge. In 50 years of management, the Service has not been able consistently to provide facilities and management for quality non-wildlife-dependent recreational experiences. Providing for swimming, picnicking, and power boating does not fit well with the capabilities and resources of the Service. Under this alternative the non-wildlife-dependent recreation that would remain the responsibility of the Refuge would be guided by the philosophy of “consolidate and improve.”

Over the last decade habitat fragmentation has been identified as a significant result of changing land use. Habitat fragmentation is known to have negative effects on biological diversity. The number of species that can live within a fragment is related to the size of the fragment. This effect has been shown in both forest and grasslands (Turner et al. 1998). Habitat fragmentation has been identified as a primary threat to area-sensitive songbirds in the Midwest (Robinson 1996). Many of the species affected by habitat fragmentation are of concern to the conservation community.

Under this alternative, management emphasis would be on reducing habitat fragmentation and reconciling conflicts between the Refuge's recreation purpose and the Refuge System mission by focusing on wildlife-dependent recreation on the Refuge while still providing a full spectrum of recreational activities in the area.

### 2.4.2.2. Summary

*Wildlife:* Under this alternative some of the current management activities at the Refuge would be modified to provide greater benefits to wildlife. The Refuge would continue to provide sufficient habitat for the needs of wintering geese. Acreage of moist-soil management units would increase. The Refuge would continue efforts to protect water quality on the Refuge, as well as start cooperative efforts with

landowners within the watershed. The Refuge would continue to protect nesting bald eagles and Indiana bat habitat. The Refuge would proceed with conversion of all non-native pine plantations to native hardwood forests. The Refuge would manage two large forest blocks to benefit area-sensitive forest birds. The Refuge would maintain some early successional habitat. Pasture and hayfield management would change to provide more emphasis on habitat quality for grassland birds. Removal of linear forest habitat and hedgerows adjacent to agricultural fields would benefit Canada Geese and grassland birds.

*Recreation:* The main point of this alternative is to offer increased recreational opportunities by exchanging land in the developed northwestern portion of the Refuge for undeveloped land at another location. The Service would try to reconcile conflicts between the Refuge's recreation purpose and the Refuge System mission through a land exchange with Southern Illinois University or other interested parties. The recipient of the exchange would have ownership and management responsibility for the area and could offer non-wildlife-dependent recreational opportunities such as camping, boating, or swimming at their discretion. Under this alternative the Refuge would slightly increase use restrictions on Crab Orchard Lake. Group camps would be managed to include the Refuge's environmental education program. The Refuge would focus on improving hunting, fishing, wildlife observation and photography, environmental education and interpretation (the Refuge System's priority wildlife-dependent recreational opportunities). The Refuge and exchanged lands would offer a spectrum of recreational opportunities ranging from developed, non-wildlife-dependent, recreation in the northwestern corner of Crab Orchard Lake to wildlife-dependent opportunities at Little Grassy and Devils Kitchen lakes. Gas motors would be prohibited on the most southern portion of Devils Kitchen Lake. The campground at Little Grassy Lake would be upgraded. The campground at Devils Kitchen Lake would be closed. Camping would be limited to a 2-week stay. The Refuge would take a more active approach to wilderness management. Horseback use would be confined to designated trails.

*Industry:* Under this alternative, the Refuge would update the industrial use policy with the intent of not promoting expansion and consolidating the areas occupied by industrial tenants. The Service would maintain roads, water and sewer services and tenants would be expected to maintain and

upgrade leased facilities as needed. The Service would seek not to compete with neighboring industrial parks. If an industrial tenant were to leave the Refuge and their facilities were suitable for occupancy, the Refuge would make them available for new tenants.

*Agriculture:* The amount of row crops would decrease slightly. Current acreage of hay fields and pastures would remain about the same. All mowing of pastures, hay fields, and clover fields would take place after August 1 to protect nesting birds. The Refuge would convert fescue pastures to other cool-season and native warm-season grasses over a period of 15 years and modify grazing regimes to benefit grassland birds.

### **2.4.3 Alternative C: Open Land Management, Consolidate and Improve Recreation**

#### 2.4.3.1. Background

Both grassland and forest species are negatively affected by habitat fragmentation. Under this alternative the Refuge would take advantage of the lands that are already open and increase the size of existing large blocks of open land for grassland dependent species, especially birds. Under this alternative the Refuge would satisfy the Refuge's recreation purpose as much as possible within Service budget priorities with increased emphasis on wildlife-dependent recreation.

#### 2.4.3.2. Summary

*Wildlife:* Under this alternative cropland and grassland would increase slightly. Pasture and hay-field management would change to provide more emphasis on habitat quality for grassland birds. Acres devoted to moist soil management would increase. The Refuge would continue to provide sufficient habitat for the needs of wintering geese. The Refuge would continue efforts to protect water quality by focusing within the Refuge boundaries. The Refuge would continue to protect nesting Bald Eagles and Indiana bat habitat. The Refuge would manage one large forest block to benefit area-sensitive forest birds. The Refuge would convert non-native pine plantations located south of Grassy Road and outside the wilderness area to native hardwood forests.

*Recreation:* To enhance non-wildlife-dependent recreational activities, the Refuge would consolidate marinas and picnic areas, upgrade existing boat

ramps and designate times and places for the various types of boating activities. Camping capacity would be reduced, the quality of camping facilities would be upgraded and a 2-week maximum stay policy would be implemented. A spectrum of recreational opportunities ranging from more developed recreation at Crab Orchard Lake to less developed opportunities at Devils Kitchen Lake would be provided. Camping at Devils Kitchen would be discontinued. Crab Orchard and Little Grassy Campgrounds would be upgraded to standards comparable to others in the area. The Refuge would study the possibility of adding primitive campsites to Devils Kitchen Lake, where gas motors would be permitted. Opportunities for hunting, fishing, wildlife observation and photography, environmental education, and interpretation would increase. Horseback use would be confined to designated trails.

*Industry:* Under this alternative, the Refuge would update the industrial use policy with the intent of not promoting expansion and consolidating the areas occupied by industrial tenants. The Service would maintain roads, water and sewer services and tenants would be expected to maintain and upgrade leased facilities as needed. The Service would seek not to compete with neighboring industrial parks. If an industrial tenant left the Refuge, the Refuge would not seek a new tenant for the vacant facility.

*Agriculture:* The amount of row crops would increase slightly. Current acreage of hay fields and pastures would remain about the same. All mowing of pastures, hay fields, and clover fields would take place after August 1 to protect nesting birds. The Refuge would convert fescue pastures to other cool-season and native, warm-season grasses over a period of 15 years and modify grazing regimes to benefit grassland birds.

### **2.4.4 Alternative D: Forest Land Management, Consolidate and Improve Recreation**

#### 2.4.4.1. Background

Both grassland and forest species are negatively affected by habitat fragmentation. Under this alternative the Refuge would take advantage of the natural tendency and historical prevalence of forests in the area and increase the size of large blocks of forests for forest interior species, especially birds. Under this alternative the Refuge would satisfy the

Refuge's recreation purpose as much as possible within Service budget priorities with increased emphasis on wildlife-dependent recreation.

#### 2.4.4.2. Summary

*Wildlife:* Under this alternative some of the current management activities at the Refuge would be modified to provide greater benefits to wildlife. The Refuge would continue to provide sufficient habitat for the needs of wintering geese. Acreage of moist-soil management units would remain the same. The Refuge would continue efforts to protect water quality on the Refuge. The Refuge would continue to protect nesting bald eagles and Indiana bat habitat. The Refuge would proceed with conversion of all non-native pine plantations to native hardwood forests. The Refuge would manage two large forest blocks to benefit area-sensitive forest birds. The Refuge would maintain some early successional habitat. Pasture and hayfield management would change to provide more emphasis on habitat quality for grassland birds, along with an emphasis on cattle production on pastures.

*Recreation:* To enhance non-wildlife-dependent recreational activities, the Refuge would consolidate marinas and picnic areas, upgrade existing boat ramps and designate times and places for various types of boating activities. Camping capacity would be reduced, the quality of camping facilities would be upgraded and a 2-week maximum stay policy would be implemented. A spectrum of recreational opportunities ranging from more developed recreation at Crab Orchard Lake to less developed opportunities at Devils Kitchen Lake would be provided. The campground at Little Grassy Lake would be upgraded. Use of gas motors on Devils Kitchen Lake would be prohibited. The quality of hunting, fishing, wildlife observation and photography, environmental education, and interpretation opportunities would improve without significant increases in facilities. Group camps would be managed to include the Refuge's environmental education program. Horseback use would be prohibited.

*Industry:* Under this alternative, the Refuge would update the industrial use policy with the intent of not promoting expansion and consolidating the areas occupied by industrial tenants. The Service would seek not to compete with neighboring industrial parks. If an industrial tenant left the Refuge, the Refuge would not seek a new tenant for the vacant facility.

*Agriculture:* The amount of row crops and hay fields would decrease slightly. Current acreage of pastures would remain about the same. All mowing of pastures, hay fields, and clover fields would take place after August 1 to protect nesting birds. The Refuge would increase forage diversity and use rotational grazing in pastures to increase cattle production.

### 2.4.5 Alternative E: Reduced Habitat Fragmentation, Consolidate and Improve Recreation (Preferred Alternative)

#### 2.4.5.1. Background

Over the last decade habitat fragmentation has been identified as a result of changing land use. Habitat fragmentation is known to have significant negative effects on biological diversity. The number of species that can live within a fragment is related to the size of the fragment. This effect has been shown in both forest and grasslands (Turner et al. 1998). Habitat fragmentation has been identified as a primary threat to area sensitive songbirds in the Midwest (Robinson 1996). Many of the species affected by habitat fragmentation are of concern to the conservation community.

The Refuge recognizes that improvements in the recreation program are needed. Under this alternative the Refuge would satisfy the Refuge's recreation purpose as much as possible within Service budget priorities with increased emphasis on wildlife-dependent recreation.

#### 2.4.5.2. Summary

*Wildlife:* Under this alternative some of the current management activities at the Refuge would be modified to provide greater benefits to wildlife. The Refuge would continue to provide sufficient habitat for the needs of wintering geese. Acreage of moist-soil management units would increase. The Refuge would continue efforts to protect water quality on the Refuge, as well as start cooperative efforts with landowners within the watershed. The Refuge would continue to protect nesting Bald Eagles and protect, restore and/or enhance potential Indiana bat habitat. The Refuge would proceed with conversion of all non-native pine plantations to native hardwood forests. The Refuge would manage two large forest blocks to benefit area-sensitive forest birds. The Refuge would maintain some early successional habitat. Pasture and hayfield management would

change to provide more emphasis on habitat quality for grassland birds. Removal of linear forest habitat and hedgerows adjacent to agricultural fields would benefit Canada Geese and grassland birds.

*Recreation:* To enhance non-wildlife-dependent recreational activities, the Refuge would consolidate marinas and picnic areas, upgrade existing boat ramps and designate times and places for the various types of boating activities. Under this alternative the Refuge would slightly increase use restrictions on Crab Orchard Lake. Group camps would be managed to include the Refuge's environmental education program. Camping capacity would be reduced, the quality of camping facilities would be upgraded and a 2-week maximum stay policy would be implemented. A spectrum of recreational opportunities ranging from more developed recreation at Crab Orchard Lake to less developed opportunities at Devils Kitchen Lake would be provided. The campgrounds at Crab Orchard Lake and Little Grassy Lake would be upgraded. Camping at Devils Kitchen Lake would be reduced to primitive sites only, and gas motors would be prohibited on the most southeastern portion of the lake. Opportunities for hunting, fishing, wildlife observation and photography, environmental education, and interpretation would increase. The Refuge would take a more active approach to wilderness management. Horseback use would be confined to designated trails.

*Industry:* Under this alternative, the Refuge would update the industrial use policy with the intent of not promoting expansion and consolidating the areas occupied by industrial tenants. The Service would maintain roads, water and sewer services and tenants would be expected to maintain and upgrade leased facilities as needed. The Service would seek not to compete with neighboring industrial parks. If an industrial tenant were to leave the Refuge and their facilities were suitable for occupancy, the Refuge would make them available for new tenants.

*Agriculture:* The amount of row crops would decrease slightly. Current acreage of hay fields and pastures would remain about the same. All mowing of pastures, hay fields, and clover fields would take place after August 1 to protect nesting birds. The Refuge would convert fescue pastures to other cool-season and native warm-season grasses over a period of 15 years and modify grazing regimes to benefit grassland birds.



Glenn Smart

## 2.5 Alternatives Considered but Not Analyzed in Detail

Reestablish pre-settlement habitat conditions: eliminate lakes, remove sediment, restore vegetation to pre-settlement conditions, eliminate non-native invasive species.

This alternative was not analyzed in detail because reestablishing pre-settlement conditions is not practical. The elimination of the lakes and removal of sediment contained in lake bottoms would not only be cost prohibitive but would be seen by most Refuge users as inappropriate. The lakes provide for a majority of Refuge visits, both wildlife-related and non-wildlife related. The elimination of non-native species is a worthy goal but not practical. The Refuge has been heavily infested by many non-native species, such as autumn-olive, Japanese honeysuckle, fescue and others. If they could be eliminated, it would take many years and require a cost-prohibitive investment in removal and treatment of these species. In addition, the Refuge purposes preclude complete reestablishment of pre-settlement conditions.

Eliminate all non-wildlife-dependent recreational activities

This alternative was not analyzed in detail because of the long history of non-wildlife-dependent recreation on the land prior to and after the establishment of the Refuge. To attempt to eliminate this type of recreation through this planning

process would not be practical. The political turmoil that would be created by such an alternative would stop the planning process.

#### Eliminate all picnicking

This alternative was not analyzed in detail because of the long established tradition of maintaining picnicking sites on the Refuge. Additionally, these sites are associated with other recreational activities such as bank fishing and/or wildlife observation.

#### Have the industrial purpose removed from the Refuge purposes

This alternative was not analyzed in detail because suitable industrial infrastructure still exists on the Refuge to support the munitions industry. The removal of industry as a purpose would be seen as a threat to the local economy and jobs.

#### Expand group camps

This alternative was not analyzed in detail because the Service is trying to reduce the number of sites and facilities on national wildlife refuges that are operated for limited use by individuals and organizations.

#### Immediately close Crab Orchard Boat & Yacht Club

The Crab Orchard Boat & Yacht Club has a long history on the Refuge. It has constructed and maintained the facilities that are on the site occupied by the Club. This alternative was not analyzed in detail because the immediate closure of the facility would not allow members to amortize their recent investments in a reasonable amount of time.

## 2.6 Detailed Description of Alternatives and Relationship to Goals, Objectives and Strategies

In addition to setting goals as part of the CCP process, objectives and strategies that will help specify and achieve the goals were developed. Goals are broad statements of the desired future condition. Objectives are specific statements of what will be accomplished to help achieve a goal. Strategies specify the activities that would be pursued to realize an objective.

Some of the alternatives emphasize one goal over another, thus objectives and strategies differ among some alternatives. This section describes the objectives and strategies for each of the alternatives (Alternatives A, B, C, D and E) under the goals of the Refuge. Note that Alternative A represents the anticipated conditions if the current management and trends continued.

Two land cover maps are included for each alternative. One map depicts the expected land cover in 2100, the other in 2015. The 2100 map depicts the long-range landscape plan for an alternative. Because succession and restoration are slow processes, we have included the map for 2015 to depict what we think is reasonable to expect in the next 15 years – the time horizon for the CCP – under each alternative.

### 2.6.1 Features Common to All Alternatives

#### Canada Geese Goal

*Provide enough food for wintering Canada Geese to support 6.4 million goose-use-days annually, in support of the Mississippi Valley Population Canada Goose Management Plan.*

*Background:* When established, the Refuge was recognized as being important to providing habitat for wintering Canada Geese. The Refuge was also established with an agricultural purpose. The agricultural purpose and supporting wintering Canada Geese are interrelated.

#### Objective 1

Provide enough food for wintering Canada geese to support 6.4 million goose-use-days annually.

#### *Strategies:*

1. Maintain at least 4,000 acres in Refuge row crop program, actively manage moist-soil units, and continue fall mowing around selected ponds.
2. Continue managing the Refuge agriculture program with methods that benefit Canada Geese, such as: leave 25 percent of the corn crop unharvested, plant winter wheat in soybean fields each fall, use low tillage planting techniques, keep fields in clover 2 years out of the 5-year rotation.
3. Continue seasonal closure of east end of Crab Orchard Lake.

### Forest, Early Successional and Grassland Birds Goal

Maintain or enhance populations of forest, early successional and grassland birds, with emphasis on priority species, as identified in Partners in Flight Physiographic Area Bird Conservation Plans.

**Background:** The Refuge has about 25,000 acres of forest habitat. Most of this acreage is in old-field or second-growth hardwood forest cover on upland and bottomland sites. Oaks are keystone species that are essential to a healthy, diverse forest ecosystem in this region. Typically with a lack of disturbance shade-tolerant trees increase in dominance while oaks steadily decrease, and understory diversity is greatly diminished. On many sites timber harvesting, prescribed burning, and other methods of disturbance must occur for oaks to flourish. Past forest management activities have included prescribed burning and the thinning of hardwood stands to maintain tree health, promote mast production and control species composition. Our proposed management actions would apply these same treatments in order to provide habitat for the full spectrum of native plants and animals with an emphasis on the habitat needs of the resource conservation priority species listed in Table 34 on page



Natural Area, Crab Orchard NWR

131. No commercial timber harvesting would take place in the Crab Orchard Wilderness or any research natural area.

#### Objective

Manage forest land to favor oak-hickory forest types on suitable sites with all age classes from seedling stage to old-growth represented. Manage native, shade-tolerant tree species (such as sugar maple) to prevent wide-spread succession to climax forest cover types.

#### Strategies

1. Write and implement a *Habitat Management Plan* following policy in the Fish and Wildlife Service Manual (620 FW 1).
2. Apply appropriate silvicultural treatments to manage forest health, species composition, and age structure. Treatments may include non-commercial forest stand improvement treatments (girdling, cutting, and/or applying herbicide to individual stems), commercial timber cutting (thinnings, improvement cuttings, and regeneration cuttings) and prescribed burning. Forest stand improvement treatments may occur in any forest type (up to 25,000 acres). Commercial timber cutting may occur in any forest type outside the Crab Orchard Wilderness and research natural areas (up to 19,700 acres). Commercial harvest operations are not likely to take place on more than 400 acres annually on average, half of which would be considered regeneration cuttings. Our preferred regeneration technique is the shelterwood method. More specifically, the shelterwood method with reserves would be used in hardwood (and pine) stands where some hardwoods would be left standing following the final removal cutting. Prescribed fire may be applied in upland forest (up to 23,000 acres of hardwood and pine types), but not in bottomland forest.
3. Reforest available open sites located outside of the two large forest blocks (described in the Forest, Early Successional and Grassland Birds Goal section under Alternative B on page 41) by planting native hardwoods, with preference given to oaks and hickories, to reduce forest fragmentation. Examples of such sites would be small agricultural fields (or portions thereof) no longer being farmed, abandoned

industrial areas, abandoned rights-of-way (roads, powerlines, and pipelines), and remediated contaminant areas.

4. Control exotic, invasive plants through integrated pest management practices.

#### **Threatened and Endangered Species Goal**

*Maintain or enhance populations of federal and, where compatible, state threatened and endangered species that occur at or near Crab Orchard National Wildlife Refuge.*

*Background:* The Bald Eagle is the only federally designated threatened species known to occur on the Refuge. The Indiana bat, which is federally classified as endangered, is known to occur in proximity to the Refuge. Thirty-one state-listed threatened and endangered species inhabit, or have inhabited, the Refuge (see Appendix E). Chapter 3 describes the threatened and endangered species on the Refuge. Section 7 of the Endangered Species Act outlines a mechanism for ensuring that actions taken by federal agencies do not jeopardize the existence of any listed species. We conducted a “Section 7” review concurrent with preparation of the EIS.

##### **Objective 1**

Assure that federally listed species, state-listed species and federally proposed species and their habitats are protected.

##### *Strategies:*

1. No disturbance of bald eagles will take place during critical periods within protective zones as described in the Northern States Bald Eagle Recovery Plan (USFWS, 1983). Areas are designated closed through signing and brochures.
2. Forest management activities, such as thinning and prescribed burning, would require close coordination with U.S. Fish and Wildlife Service, Ecological Services personnel. These activities may require standard surveys to determine whether Indiana bats are present in a given forest unit or the activities may be scheduled outside of the season when Indiana bats are likely to use Refuge forests.

#### **Resident Fish and Wildlife Goal**

*Maintain or enhance resident fish and wildlife populations consistent with management activities for federal trust resources in cooperation with the Illinois DNR.*

*Background:* There is a long history of public fishing, public hunting, and management of resident fish and wildlife species on the Refuge.

##### **Objective 1**

Manage Refuge fisheries with emphasis on mixed-species, warm-water sport fishing.

##### *Strategy*

1. Continue cooperative management of Refuge fisheries with Illinois DNR. Continue managing fish populations and habitat through activities such as: setting length and creel limits, seasonal closures of spawning bed areas, habitat enhancements, annual surveys, and fish stocking.

##### **Objective 2**

Manage Refuge resident wildlife populations at levels that allow opportunities for sport hunting of game species.

##### *Strategies*

1. Continue managing the Refuge agriculture program with methods that benefit resident game species, such as: leave 25 percent of the corn crop unharvested, plant winter wheat in soybean fields each fall, use low tillage planting techniques, keep fields in clover 2 years out of the 5-year rotation, delay mowing until after August 1, and use no insecticides.
2. Incorporate beneficial practices such as those suggested in the Northern Bobwhite Conservation Initiative: convert cool-season to warm-season grasses and burn and thin pine plantations.
3. Continue controlled hunting for turkey and deer in the restricted use portion of the Refuge.

#### **Outreach Goal**

*Visitors, cooperators, tenants, and local residents will understand Refuge goals, issues and activities. Service personnel will understand the expectations and concerns of the general public by being receptive to their feedback.*

*Background:* During the scoping process, residents of local communities reported they felt uninformed by the Refuge about activities occurring on

the Refuge and about the reasons for certain activities. To resolve this concern, the Refuge will communicate more effectively with local communities and listen more attentively to community concerns.

In keeping with the history of public use on the Refuge, many non-wildlife oriented special events have been permitted on the Refuge. These special events have included organized running, bicycling, and swimming events, use of Refuge for “National Hunting and Fishing Days” activities, and American Red Cross Blood Drives.

The Refuge will continue to support special events that foster good community relations and are sponsored by nonprofit organizations. To be permitted, these events cannot damage Refuge habitats or facilities, nor can they adversely impact fish and wildlife populations. In addition these events cannot interfere with Refuge visitors and wildlife-dependent activities such as hunting, fishing, and environmental education. Permitted activities will be limited to one-time and annual events.

#### **Objective 1**

The positive attitude toward Refuge management will increase among visitors, cooperators, tenants, and local residents throughout the life of the plan.

#### *Strategies*

1. Issue press releases, hold Refuge open houses and hold regularly scheduled forums.
2. Within 2 years of the Plan's approval, create and maintain a “listening log” of written and verbal public input submitted to the Refuge. Review this log quarterly and address voiced community concerns.
3. Provide annual reports on the “State of the Refuge.” Distribute these reports upon request at the Visitor Center and by mail and post the current year's report on the Refuge website.
4. Continue to permit selected annual and special events that are sponsored by nonprofit organizations, provided they are compatible and do not damage Refuge resources or interfere with wildlife-dependent recreation.

#### **Protection Goal**

*Protect the integrity of Refuge biological and cultural resources and the health and safety of visitors, industrial workers, farmers, and Service staff.*

*Background:* Past industrial practices at the Refuge contaminated some lands and waters. As a result, in 1987 the Refuge was added to the U.S. Environmental Protection Agency's National Priorities List of contaminated sites. Studies have located many sites of contamination within the former Illinois Ordnance Plant (IOP) resulting from military activities that occurred during World War II or subsequent activities of private industrial tenants. Lands no longer used by industry are converted to habitat for fish and wildlife. Some of these lands have been contaminated. These contaminants may need to be removed so that they do not adversely impact plants, fish, wildlife, or public health and welfare. Refuge visitors should be able to use these habitats for hunting, fishing, wildlife observation and other potential future uses without being exposed to unacceptable levels of contaminants. The Service is seeking remedy for past acts of contamination through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as “Superfund.” The Service believes past acts of contamination should be remedied with the best and most cost effective technologies available. The Service also believes that the Refuge should not be burdened with residual contamination that may impair the ability of the Service to manage the Refuge for appropriate uses in the future.

The Refuge's law enforcement officers serve to protect the natural and cultural resources, as well as the health and safety of visitors, staff, and tenants. The Refuge depends on cooperative relationships with the Illinois DNR and several local sheriff departments.

The Refuge faces a significant challenge of controlling exotic and invasive plants to protect biological diversity, provide high quality habitats for fish and wildlife, and facilitate agriculture, recreation, and industry.

The Refuge contains many documented cultural resources, and other undiscovered sites probably exist.

The Refuge manages 24 conservation easements within a 21-county area in southern Illinois. Inadequate staffing levels have impeded proper management of the widely dispersed easements. Some of

the easements have not been surveyed or marked on the ground. The easements should be inspected regularly, but some have not been inspected in over 10 years. Without appropriate monitoring the easements and their resources can not be protected from encroachment.

**Objective 1**

Refuge lands and waters are safe for fish, wildlife, plants, and people.

*Strategy*

1. Work with USEPA, Illinois EPA, Departments of Interior and Justice, and responsible parties to remediate contaminated sites. Where contamination is left in place, or where there is potential for undiscovered contamination that may pose a risk from exposure, institutional controls may be formulated. An institutional control plan would be written by the CERCLA staff and made available to Refuge management for implementation.

**Objective 2**

Visitors will feel safe on the Refuge and illegal harvest of fish and wildlife will be reduced.

*Strategy*

1. Maintain full-time law enforcement staff.

**Objective 3**

Manage or eliminate invasive species on the Refuge.

*Strategy*

1. Write and implement an Integrated Pest Management (IPM) Plan following guidance developed by the Service's "Promises Invasive Species Team." The IPM plan will address target species control methods, mapping and monitoring.

**Objective 4**

Protect the cultural, historic, and pre-historic resources of federally-owned lands within the Refuge.

*Strategies*

1. Implement the Cultural Resource Management Plan for Cultural Resources within the Crab Orchard National Wildlife Refuge (Godfrey and Stubbs 2001).
2. Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing under-



takings. Notify the Regional Historic Preservation Officer early in project planning or upon receipt of a request for permitted activities.

3. Develop a step-down plan for surveying lands to identify archeological resources and for developing a preservation program.
4. Complete accessioning, cataloging, inventorying, and preserving the museum collection at the Refuge in accordance with "Survey of Collections at Crab Orchard NWR" by Mayda S. Jensen.

**Objective 5**

Meet Service policy guidelines ("Administration and Enforcement Procedures for Conservation Easement") for 12 conservation easements by 2007, for all easements by 2010.

1. Complete legal surveys on 50 percent (12 tracts) of all conservation easements by 2007 through contracted services. Complete contracted surveys on the remaining tracts by 2010.
2. Conduct annual inspections of all conservation easements.
3. Develop land use plans for 50 percent (12 tracts) of the conservation easements and restore grassland and wetland habitats on 25 percent of these tracts by 2009.

4. Hire a permanent 6-month law enforcement officer to conduct annual inspections, develop land use plans, and restore wetland and grassland habitat projects.

#### **Wilderness Goal**

*Protect the ecological integrity, preserve the wilderness character, restore natural conditions to the extent practicable, and provide opportunities for solitude and primitive recreation within the Crab Orchard Wilderness.*

*Background:* As long as they do not alter natural processes, the Wilderness Act of 1964 permits certain activities within designated wilderness areas. The Crab Orchard Wilderness is a popular area for hunting, hiking, nature study, horseback riding, and mushroom picking. Prohibited activities, such as camping and off-road vehicle use, occasionally occur. Horseback use and trails have developed inconsistent with the existing Wilderness Management Plan. The Wilderness Management Plan, which was approved in 1985, is dated and needs to be revised.

#### *Suitability*

In accordance with Refuge planning policy, this EIS includes a wilderness review to identify Service-owned lands and waters within the planning unit that may qualify for inclusion in the National Wilderness Preservation System. The Service has identified two tracts of land within the planning unit that meet the criteria for Wilderness Study Areas: an 80-acre tract completely surrounded by the existing Crab Orchard Wilderness and a 40-acre tract surrounded on three sides by the Crab Orchard Wilderness. Southern Illinois University owned both tracts when the Crab Orchard Wilderness was designated in 1976. The Refuge subsequently acquired the tracts through a land exchange in 1979. The two tracts are roadless, contiguous to designated wilderness, appear natural, and offer opportunities for solitude and primitive recreation. Both tracts are currently managed as a part of the Crab Orchard Wilderness.

An additional 558-acre tract contiguous with the southern boundary of Crab Orchard NWR was acquired in the same land exchange. Rocky Comfort Road runs north-south through this tract. The 424 acres west of the road are the site of a former Southern Illinois University environmental education camp. The 134 acres east of the road are old fields that are undergoing natural ecological succession. Neither portion of the 558-acre tract currently meets the criteria for naturalness.

There are no additional areas within the remainder of the Crab Orchard NWR planning unit that meet the minimum criteria for a Wilderness Study Area. The results of the wilderness inventory are documented in Figure 5.

The two parcels within the Crab Orchard Wilderness that were acquired after the Wilderness was designated have wilderness characteristics and should be recommended for wilderness designation. This will add consistency to the protection and management of the Wilderness. The Wilderness will be managed in accordance with Service policy for Wilderness management (6 Refuge Manual 8). All activities in designated Wilderness will be carried out in conformance with the mandates of the Wilderness Act and the establishing legislation for the Crab Orchard Wilderness, Public Law 95-557. The use of motorized vehicles and mechanical transport is prohibited, except in emergency situations.

#### **Objective 1**

Recommend the designation of two parcels (120 acres) as Wilderness within 2 years of approval of the CCP.

#### *Strategy*

1. Prepare and submit a Wilderness Study Report. Service wilderness policy is currently under revision. The direction of the new policy will be followed when it is adopted.

#### **Objective 2**

Revise and implement the Crab Orchard Wilderness Management Plan within 5 years of approval of the CCP.

#### *Strategy*

1. Prepare and implement a Wilderness Management Plan. Service wilderness policy is currently under revision. The direction of the new policy will be followed when it is adopted.

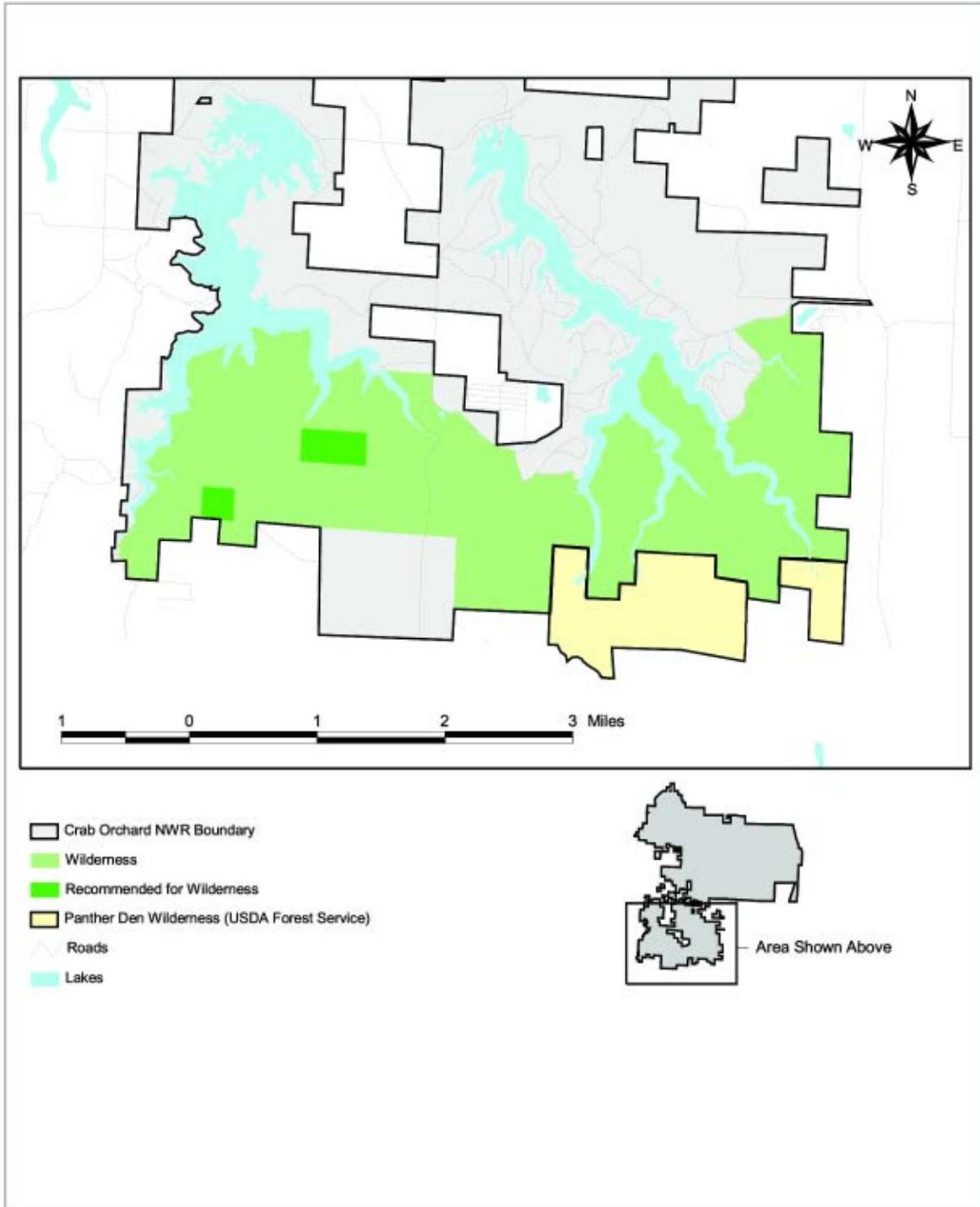
#### **Objective 3**

Restore native hardwood forest on 325 acres of pine and pine-hardwood forest in the Crab Orchard Wilderness within 15 years of approval of the CCP.

#### *Strategies*

1. Thin the pine plantations (229 acres) and pine-hardwood stands (96 acres) in the Wilderness to promote establishment and growth of native hardwoods. Thinning

**Figure 5: Results of Crab Orchard NWR Wilderness Inventory**



would be conducted in several phases over a 10- to 15-year period to mimic the natural process of succession where pines are gradually replaced by hardwoods. Individual pines would be killed by cutting, girdling or injecting herbicide. No trees would be removed from the site. Treatments would be conducted so that the results would appear natural as much as possible. However, trees along heavily used trails may need to be felled to avoid personal injury to visitors, in which case this zone may appear unnatural for several years. Eventual removal of all the non-native pines would restore the natural vegetative cover of the area and enhance wilderness characteristics.

2. Prescribed burn the pine and pine-hardwood stands during the dormant season (November through March) on a 3- to 5-year cycle to enhance habitat conditions and promote desirable hardwood regeneration. Control lines would be established by hand tools where necessary, using natural firebreaks as much as possible.

#### **Objective 4**

Control or eradicate invasive species (especially autumn-olive, multiflora rose, Amur honeysuckle, white poplar, and Oriental bittersweet) over the 15-year life of the CCP.

#### *Strategy*

1. Prepare and implement an Integrated Pest Management Plan following guidance developed by the Service's "Promises Invasive Species Team."

#### **Objective 5**

Explore ways to increase cooperation with the U.S. Forest Service on management of the Crab Orchard Wilderness and the adjoining Panther Den Wilderness within 2 years of approval of the CCP (Figure 5).

#### *Strategy*

1. Contact the Forest Supervisor of the Shawnee National Forest and discuss ways our agencies could work together in managing the adjoining wildernesses.

#### **Objective 6**

Provide opportunities for primitive recreation, such as hiking, hunting, nature study and wild food collection, over the 15-year life of the CCP.

#### *Strategies*

1. Continue current primitive recreational opportunities.
2. Prepare and distribute a wilderness brochure and conduct interpretive programs to inform the public about primitive recreational opportunities available.

#### **Objective 7**

Within 5 years of approval of the CCP, determine an appropriate level of opportunities to offer equestrians based on an evaluation of the current level and extent of horseback riding use and its effects on the Wilderness.

#### *Strategy*

1. Evaluate the current, unauthorized River to River route. Cooperate with partners to plan, construct, and maintain an authorized River to River trail route through the Refuge.

#### **Volunteers and Support Groups Goal**

*Volunteers and Refuge support groups will be stewardship partners and strong advocates for the Refuge.*

*Background:* Volunteers, support groups, and other partnerships strengthen Refuge activities and contribute to making the Refuge an integral part of the community.

#### **Objective 1**

Improve Refuge support for volunteer and Friends of Crab Orchard NWR activities to a point where at least 95 percent of volunteers and Friends members feel like valued contributors to the success of Refuge programs and endeavors.

#### *Strategies*

1. Continue to manage volunteer and support programs in accordance with Service guidelines detailed in "A Guidebook for Working with Volunteers." Maintain an active liaison with support groups and partners.
2. Provide in-depth initial training to Refuge volunteers that will enable them to effectively and efficiently complete projects and responsibilities. Encourage involvement in diverse volunteer activities that match volunteer interests.
3. Continue demonstrating Refuge appreciation for volunteer contributions and Friends support annually through a Volunteer

Appreciation Banquet and other appropriate means. Present awards for service hours in accordance with Service guidelines.

### 2.6.1.1. Operational Policies

#### ***Area Designations***

*Background:* Twice since the establishment of the Refuge, the Service has published its land use policy in the Federal Register. These documents used the concept of dividing the Refuge into three areas and describing the types of use that would be considered within a particular area. This policy was last published in the Federal Register on September 6, 1961. It called for using Area I for “various forms of recreation, including public hunting and fishing in accordance with State laws, picnicking, boating, swimming, and similar activities;” Area II for “industrial purposes;” and Area III “for use and administration as a public recreation area on which group recreation, group camps and private cabin or cottage site developments on lands zoned for those purposes.”

Since the publication of the policy described above, Congress has passed several laws governing the management of the National Wildlife Refuge System. The most recent, the National Wildlife Refuge System Improvement Act of 1997 (Act) sets forth guiding principles for management of all national wildlife refuges, such as wildlife-dependent recreation having priority over non-wildlife-dependent recreation. It challenges the managers of Crab Orchard National Wildlife Refuge to balance Refuge purposes, which are “...conservation of wildlife and for the development of agriculture, recreation, industrial and related purposes...,” with the Refuge System mission of “administering a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife and plant resources and their habitats...” The Act states that: “... if a conflict exists between the purposes of a refuge and the mission of the System, the conflict shall be resolved in a manner that first protects the purposes of the refuge, and, to the extent practicable, that also achieves the mission of the System.”

*Proposed Policy:* With this comprehensive conservation plan, the Service is attempting to balance its management responsibilities across all portions of the Refuge. Under all alternatives described in Chapter 2 of this plan, the concept of classifying uses of the Refuge into Areas I, II and III would be dropped. Only the industrial area of the Refuge, for-

merly known as either Area II or the Closed Area, would retain the designation of “restricted use area” because of safety and security concerns.

The safety and security concerns are associated with property protection, contaminants and the storage of explosive materials. Under all alternatives described in Chapter 2 of this plan, the warehouse area on the east end of Ogden Road (Area 7) would be closed to the general public, thereby precluding access to Blue Heron Pond for recreational fishing.

Wildlife management is a major focus for all lands encompassed by the boundaries of Crab Orchard NWR.

#### ***Camping Length of Stay***

*Background:* People camped near Crab Orchard Lake before the Refuge was established. In the early days of the Refuge, camping was allowed throughout the open areas of the Refuge. However, the dispersed camping caused unacceptable litter and resource damage. In order to minimize the problems, four concession-operated campgrounds were constructed and camping was permitted only in the campgrounds. Crab Orchard Lake Campground began operation in 1964. Since then, the Refuge campgrounds have been operated by both concessionaires and the Service at different times.

Refuge regulations have not limited the length of stay for campers. By not limiting the length of stay, campers have been able to occupy a site for an entire season. The result is that sometimes families on a short vacation or a weekend visit have limited opportunity to camp in the most desirable sites near the water. Some people who have occupied sites for the entire season have brought in equipment and material that have created an atmosphere more typical of a permanent trailer park than a campground. The lack of a length of stay regulation is unusual in public campgrounds. In order to provide a more equitable opportunity to stay in desirable camping sites, we would establish a maximum length of stay at all Refuge campgrounds.

*Proposed Policy:* We would limit the length of stay at Refuge campgrounds to 14 nights comparable with other Federal and State campgrounds in the area. For the first 2 years, approximately one-half of the campsites would remain available for long-term camping and the other half for stays up to 14 days maximum. The second 2-year period would permit up to one-third of campsites to be available for 28 days and the remaining two-thirds would be limited to 14-day maximum stays. Finally, beginning in the

fifth year, a 14-day maximum stay would apply to all campsites. At the end of a camping stay, we would require persons to remove all camping equipment from the campground for a minimum of 48 hours. Personal property such as trailers or recreational vehicles may not be stored in the campground during this 48-hour period. In addition, a reservation system would be phased in for Refuge campgrounds.

### ***Group Camps***

*Background:* Refuge policy that immediately followed establishment of the Refuge had provisions that permitted group recreation, group camps and private cabin or cottage site development on lands zoned for that purpose. The areas chosen for group camps were along the shoreline of the proposed Little Grassy Lake. Interest from organizations on how to establish a group camp in this area was shown as early as December 1947.

The Service prioritized the availability of this opportunity for planned group camping with the policy of first serving strictly youth camping groups, second youth/adult church camp educational programs and last fraternal organizations. In 1950, the Refuge began reviewing applications for group camping from a number of organizations. The Service issued several group camping leases to organizations such as: The Boy Scouts of America, the Girl Scouts, the Educational Council of 100 Inc., Pioneer Communications Club, Independent Order of Odd Fellows, The United Methodist Church, The Presbyterian Church and others. Many of these organizations began using the area in 1952. Today there are four group camps still operating on the Refuge: Pine Ridge Camp (Boy Scouts), Camp Cedar Point (Girl Scouts), Camp Carew (Presbyterian Church), and the United Methodist Church Camp.

*Proposed Policy:* Group camps would continue with the requirement that they provide environmental education as specified in current agreements. The infrastructure associated with the existing camps would not expand beyond current square footage occupied by the camps. The camps would be assessed a fee for use of federal lands. Because the use authorized under the agreements includes environmental education with no profit gained by the camps, the fees will be minimal administrative and use fees. If an organization decides to no longer operate their camp, the Refuge would determine if the site should be closed or leased to another organization based on Refuge's environmental education goals, the purpose and mission of the organization

wishing to occupy the camp, the condition of the facilities and existing National Wildlife Refuge System policies.

### ***Recreational Fees***

*Background:* Entrance fees were implemented in 1988 under the authorization of the Emergency Wetland Resource Act of 1986. The entrance fee program admitted anyone holding a permit and accompanying passengers in their vehicle to the Refuge. In 1997, under authorization of the Omnibus Consolidated Rescissions and Appropriations Act of 1996, the entrance fee program was modified to a recreation use fee program. The user fee program requires all vehicles and boats using the Refuge to have a valid fee decal. In evaluating the use fee program as part of the comprehensive conservation planning process, we recognized that the current program does not fairly implement the intent of the Federal Demonstration Fee Program.

*Proposed Policy:* We would implement a recreational fee program that is comparable to other fee programs within the Service. These changes would be consistent with the new Federal Lands Recreation Enhancement Act and increase convenience for the visiting public. The refuge would have an entrance fee as well as an expanded amenity recreation fee. Federal Duck Stamps, America the Beautiful Passes, and Crab Orchard Refuge annual, weekly and daily passes would permit entry to the Refuge. An expanded amenity recreation fee would be charged in addition to the entrance fee for using boat launching facilities and participating in quota hunts. Table 1 summarizes proposed recreational fees.

### ***Fishing Tournaments***

*Background:* Five fishing tournaments are held each year on the Refuge's three lakes under special use permits. Devils Kitchen Lake and Little Grassy Lake each host one tournament. Crab Orchard Lake hosts three tournaments. The tournaments are well established and require minimal assistance from Refuge staff, although Refuge and Illinois Department of Natural Resources officers do conduct spot checks for violations during the tournaments. Anglers and biologists have expressed concern over reduced fish populations because of post-release mortality and the lack of vegetation for spawning bass.

*Proposed Policy:* The five current fishing tournaments would continue on the Refuge's three lakes. However, if any of these five organizations decide to discontinue a tournament, the event would be elimi-

**Table 1: Proposed Recreational Entrance Fees and Federal Passes That Will Permit Entry**

Fee Option	Cost	Eligibility	Allows Entry to...	Validation Period
Daily Fee	\$2/vehicle	Anyone	Crab Orchard NWR	1 day
Weekly Fee	\$5/vehicle	Anyone	Crab Orchard NWR	7 consecutive days
Commercial bus	\$20	For buses up to 20 passengers	Crab Orchard NWR	1 day
Refuge Annual <sup>1</sup>	\$15/vehicle	Anyone	Crab Orchard NWR	1 year (July 1 - June 30)
Duck Stamp	\$15	Anyone	Any national wildlife refuge	1 year (July 1 - June 30)
Golden Eagle	\$65	Anyone	Any federal fee area	1 year from month of purchase
Golden Age	\$10	Persons 62 years or older	Any federal fee area	Lifetime
Golden Access	Free	Anyone who is permanently disabled	Any federal fee area	Lifetime
Hologram <sup>2</sup>	\$15	Anyone holding a National Park Pass	Any federal fee area	1 year from month of purchase
Daily boat launch fee	\$2/boat	Anyone	Crab Orchard NWR	1 day
Daily boat launch fee	\$2/boat	Anyone	Crab Orchard NWR	1 day
Weekly boat launch fee	\$5/boat	Anyone	Crab Orchard NWR	7 consecutive days
Annual boat launch <sup>3</sup>	\$10/boat	Anyone	Crab Orchard NWR	1 year (July 1 to June 30)

1. Additional passes for vehicles and boats may be purchased for \$5.
2. The National Park Pass (\$50) can be upgraded through the purchase of a \$15 Golden Eagle hologram. The Golden Eagle hologram can be affixed to the Park pass to allow for entrance into all federal fee areas. The National Park pass will not be available at the Refuge, but the hologram can be made available.
3. Additional passes for vehicles and boats may be purchased for \$5.

nated and not replaced in the future. We will continue to work with tournament organizers to reduce post-release mortality.

#### ***Fish-offs***

*Background:* The three lakes receive many visits from fishing clubs hosting events called “fish-offs.” A fish-off is defined as an organized club fishing event having 20 boats or fewer. Recreational anglers and biologists have expressed concern over reduced fish populations and catch rates as a result of fishing pressure on Refuge lakes. In the past, the total number of fish-offs has not been limited, and as many as 95 Refuge-authorized fish-offs have been held in a single year, in addition to unauthorized events.

*Proposed Policy:* Organizers of fishing events must obtain a fish-off use permit. The permit allows the organizer to have one fish-off per lake, per year. The total number of fish-offs allowed on the Refuge will be determined annually by the Refuge Manager.

There is a \$35 charge for the permit and the organizer must follow terms and conditions of the permit.

#### ***Recreational and Technical Rock Climbing:***

*Background:* Crab Orchard NWR is not typically considered a climber's destination, but some demanding and varied rock climbs can be found in the southern portions of the Refuge. Over the years Refuge visitors have inquired about climbing, but climbing has never been officially permitted. Rock climbing has occurred in the Devils Kitchen and Little Grassy areas. The Refuge has in the past discouraged rock climbing activities such as jumping and diving from the rocks of Devils Kitchen Lake by not permitting swimming in the lake and by closing the area below the Crab Orchard Dam spillway to public access. Climbing opportunities can be found at nearby Giant City State Park.

*Proposed policy:* Recreational and technical rock climbing would not be permitted on the Refuge. This includes free-style rock climbing, rappelling and technical rock climbing.

### ***Scuba Diving***

*Background:* Limited opportunities for scuba diving do exist on Crab Orchard NWR, however this activity has never explicitly been permitted. Some visitors have participated in this activity under the assumption that it was allowed. Due to the relatively shallow and turbid condition of Crab Orchard Lake and the fact that swimming is prohibited on Devils Kitchen Lake, Little Grassy Lake is the only location where a visitor could reasonably expect to participate in this activity.

*Proposed Policy:* Due to the fact that swimming is already allowed in Little Grassy Lake, the lake is already heavily used by youth camps, and it is a popular fishing destination, we propose to prohibit scuba diving on the Refuge to reduce conflicts between these user groups.

### ***Trapping***

*Background:* Opportunities for trapping do exist on Crab Orchard NWR. In the past, trapping has been loosely regulated through special use permits in areas designated by the refuge biologist. A maximum number of 50 recreational trapping permits had been determined, but due to changes in culture and markets, that number does not reflect actual demand.

*Proposed policy:* Limited trapping will be allowed in designated areas of the Refuge through special use permits. Carefully controlled trapping is considered a management tool, and contributes to the habitat and wildlife management goals of the Refuge. In some cases it is the only means by which nuisance wildlife can be removed. The activity will be limited in scope to areas of the Refuge that are identified by the Refuge biologist, and carefully regulated through the use of special use permits.

### ***Dog Training:***

*Background:* Dog field trials were a part of the Crab Orchard Creek Project before the establishment of Crab Orchard National Wildlife Refuge. Training of dogs has occurred sporadically on the Refuge, and is regulated through special use permits. In addition, dogs are allowed on the Refuge, provided they are leashed. Hunting is a priority public use and supports the recreation purpose for which the Refuge was established, and well trained

hunting dogs contribute to this activity by locating and retrieving game that may otherwise be lost.

*Proposed policy:* The training of dogs that are to be used for hunting will be allowed in designated areas of the Refuge through special use permits. This use does not include field trials or commercial/professional dog training, which remains prohibited. This use also does not include training of dogs from sunset to sunrise, also known as “running” furbearers with dogs, which will also be prohibited.

### ***2.6.1.2. Fire***

The following section contains detail about the prescribed fire and wildland fire suppression procedures used on the Refuge. We have included detail here to fully document the Refuge’s Fire Management Plan in compliance with the National Environmental Policy Act.

#### ***Prescribed Fire***

Prescribed fire is used regularly on the Refuge as a habitat management tool.

Periodic burning of grasslands reduces encroaching woody vegetation such as autumn-olive and encourages the growth of desirable species such as native, warm-season grasses. Periodic burning of pine and hardwood forest reduces encroaching, low-value, and shade-tolerant species and reduces hazardous fuel buildup. Fire also encourages regeneration of desirable species, enhances biodiversity, and improves wildlife habitat. Additionally, prescribed burning in the wilderness will reduce encroachment of undesirable species and encourage biodiversity.

Trained and qualified personnel perform all prescribed burns under precise plans. A burn is conducted only if it meets specified criteria for air temperature, fuel moisture, wind direction and velocity, soil moisture, relative humidity, and several other environmental factors. The specified criteria (prescription) minimize the chance that the fire will escape and increase the likelihood that the fire will have the desired effect on the plant community.

How often we burn established grassland and forest units depends on management objectives, historic fire frequency, weather conditions, and funding. The interval between burns may be 2 to 5 years or longer. As part of the prescribed fire program, we will conduct a literature search to determine the effects of fire on various plant and animal species, and we will begin a monitoring program to verify that objectives are being achieved.

The normal prescribed fire season begins October 1 and ends March 31. Additionally, an open burn permit is obtained from the Illinois EPA prior to each burn season, and all EPA air quality standards and guidelines are adhered to. We cannot and will not start a prescribed fire without the approval of the Regional Fire Management Coordinator when the area is at an extreme fire danger level or the National Preparedness level is V. In addition, we will not start a prescribed fire without first getting applicable concurrence when local fire protection districts or the State of Illinois have instituted burning bans.

Spot fires and escapes may occur on any prescribed fire. The spot fires and escapes may result from factors that cannot be anticipated during planning. A few small spot fires and escapes on a prescribed burn can usually be controlled by the burn crew. If so, they do not constitute a wildland fire. The burn boss is responsible for evaluating the frequency and severity of spot fires and escapes and, if necessary, slowing down or stopping the burn operation, getting additional help from the Refuge staff, or extinguishing the prescribed burn. If the existing crew cannot control an escaped fire and it is necessary to get help from the Shawnee National Forest or Lake Egypt Fire Protection District, the escape will be classified as a wildland fire and controlled accordingly. Once controlled, we will stop the prescribed burning for the burning period.

We will use existing firebreaks, which we may improve through mowing or tilling. By policy, if we contemplate any new firebreaks or below surface improvements to existing firebreaks, the Regional Historic Preservation Officer will be consulted before the work begins.

Burn plans written by the Refuge staff document the treatment objectives, the prescription parameters, and the plan of action for carrying out a burn. A burn plan includes all the elements specified in the Service's Fire Management Handbook. Details regarding fire resources and procedures can be found in the Refuge's Fire Management Plan.

#### ***Wildland Urban Interface***

Wildland Urban Interface (WUI) is defined as the area where houses meet or intermingle with undeveloped wildland vegetation. This makes the WUI a focal area for human-environment conflicts such as wildland fires, habitat fragmentation, invasive species, and biodiversity decline. FIREWISE is a community safety program developed to educate the public to the wildland urban interface and cor-

rective measures needed. Additional examples include working toward a comprehensive social awareness and support system to inform the public concerning the benefits of management ignition in fire adapted ecosystems.

The WUI creates the need to reduce wildland and urban intermix fire threats. The fire management program will mitigate any interface risks by a combination of mechanical fuels treatments near any buildings and prescribed fire to reduce and eliminate hazard fuel loadings while creating wide buffers around developed areas and adjacent to private property.

#### ***Mechanical Fuel Treatments***

Mechanical fuel reduction is the use of mechanical equipment (i.e. weed whackers, chainsaws, dozers, rubber tired skidders, chippers, mowers, etc.) to cut and remove, or prepare for burning, woody fuels. Mechanical treatments are intended to help in achieving resource management goals and objectives, most often a combination of ecosystem restoration and reduction of high hazard fuel loadings. Mechanical fuel treatments must be described in a fuels project plan. The plan will contain a prescription defining goals, objectives, and treatment methods employed to achieve the objectives.

Mechanical fuel treatment is often used in concert with prescribed fire treatment. High hazard fuel conditions can be reduced while meeting structural objectives in areas immediately adjacent to buildings or on boundary areas through a mix of mechanical treatment and prescribed fire. Mechanical treatment can be used as the primary method of reaching structural goals while prescribed fire actually removes and eliminates the hazardous fuels. The timing of the mechanical treatment to ensure that soil compaction and disturbance does not occur during wet season or times of high precipitation is important. Conducting mechanical treatments during frozen ground conditions or late in the growing season tend to yield the best results.

#### ***Fire Prevention and Detection***

In any fire management activity, firefighter and public safety will always take precedence over property and resource protection.

Historically, fire influenced the vegetation on the Refuge. Now, fires burning without a prescription are likely to cause unwanted damage. In order to minimize this damage, we will seek to prevent and quickly detect fires by:

- # Discussing fire prevention at safety meetings prior to the fire season and during periods of high fire danger and periodically training staff in fire prevention.
- # Posting warnings at visitor information stations during periods of extreme fire danger.
- # Notifying the public via press releases and personal contacts during periods of extreme fire danger.
- # Investigating all fires suspected of having been set illegally and taking appropriate action.
- # Depending on neighbors, visitors, cooperators, and staff to detect and report fires.
- # Requesting additional resources from the Illinois Interagency Fire Dispatcher if adequate resources are not available locally.

### **Fire Suppression**

We are required by Service policy to use the Incident Command System (ICS) and firefighters meeting National Wildfire Coordinating Group (NWCG) qualifications for fires occurring on Refuge property. Our suppression efforts will be directed towards safeguarding life while protecting Refuge resources and property from harm. Mutual aid resources responding from cooperating agencies must meet the qualification standards of their agency.

All wildland fires occurring on the Refuge and staffed with Service employees will be supervised by a qualified Incident Commander (IC). The IC will be responsible for all management aspects of the fire. The IC will obtain the general suppression strategy from the Fire Management Plan, but it will be up to the IC to implement the appropriate tactics. Minimum impact suppression tactics will be used whenever possible. As a guide, on low intensity fires (generally flame lengths less than 4 feet) the primary suppression strategy will be direct attack with hand crews and engines. On higher intensity fires (those with flame lengths greater than 4 feet) we may use indirect strategies of back fires or burning out from natural and human-made fire barriers. The barriers will be selected based on their ability to safely suppress the fire, minimize resource degradation, and be cost effective.

During periods of drought we may use severity funding under guidelines of the Service Fire Management Handbook to provide adequate fire protection for the Refuge.

In suppressing a fire, we will:

- # Use existing roads and trails, bodies of water, areas of sparse or non-continuous fuels as primary control lines, anchor points, escape routes, and safety zones.
- # Conduct backfiring operations from existing roads and natural barriers to halt the spread of fire when appropriate.
- # Use burnouts to stabilize and strengthen the primary control lines.
- # Use either direct or indirect attack methods, depending upon the situation. Using backfire in combination with allowing the wildland fire to burn to a road or natural firebreak would be least damaging to the environment. However, direct attack by constructing control lines as close to the fire as possible may be the preferred method to establish quicker control.
- # Use retardants on upland areas when appropriate.
- # Not use earth moving equipment (dozers, graders, plows) for suppression activities on the Refuge without the approval of the Refuge Manager or his/her designated representative.
- # Evaluate all areas where wildland fires occur on Refuge administered lands prior to the aerial or ground application of foams and/or retardants. Only approved chemical foams and retardants will be used (or not used) in sensitive areas such as those with riparian vegetation.
- # Not use wildland fire for resource benefits.
- # Keep engines on roads and trails to the fullest extent possible.
- # Ensure additional resources are ordered whenever it appears a fire will escape initial attack efforts, leave Service lands, or when the fire complexity exceeds the capabilities of the existing command or operations.
- # Monitor Refuge fires until declared out.
- # Conduct rehabilitation prior to firefighters leaving the fire. All trash will be removed. Fire lines will be refilled and water bars will be added, if needed. Hazardous trees and snags will be cut and all stumps will be cut as low as practicable to the ground. Damage to improvements caused by suppression efforts will be repaired, and a rehabilitation plan will be completed if necessary. If re-seeding is necessary, it will be accomplished according to Service policy and regulations.

## 2.6.2 Alternative A: Current Management/No Action

### 2.6.2.1. Wildlife Conservation Goals

#### Canada Geese Goal

*Provide enough food for wintering Canada geese to support 6.4 million goose-use-days annually, in support of the Mississippi Valley Population Canada Goose Management Plan.*

*Background:* When established, the Refuge was recognized as being important to providing habitat for wintering Canada Geese. The Refuge was also established with an agricultural purpose. The agricultural purpose and supporting wintering Canada Geese are interrelated. The importance of wintering refuge habitat to the Mississippi Valley population of Canada Geese has been recognized in population management plans. The Refuge has about 4,500 acres of cropland, 1,000 acres of pasture, 700 acres of hay fields, and 450 acres of moist-soil units commonly used by geese (see Figure 6 on page 36). Other goose management activities include seasonal closure to boating on the east end of Crab Orchard Lake and fall mowing around selected ponds.

#### Objective 1

Provide enough food for wintering Canada Geese to support 6.4 million goose-use-days.

#### Strategy

1. Maintain 4,500 acres of cropland in agricultural production (Figure 6). Manage 1,000 acres of pasture and 700 acres of hay fields. Manage 450 acres of moist-soil units. Continue fall mowing around selected ponds. Maintain seasonal closure to boating on the east end of Crab Orchard Lake.

#### Forest, Early Successional and Grassland Birds Goal

*Maintain or enhance populations of forest, early successional and grassland birds, with emphasis on priority species, as identified in Partners in Flight Physiographic Area Bird Conservation Plans.*

*Background:* The Refuge has about 25,000 acres of forest habitat. Studies have shown that forest fragmentation reduces nesting success of migratory birds because of increased nest predation and parasitism. The Refuge has carried out reforestation activities in recent years to reduce fragmentation of forested habitats and retire former agricultural fields and pastures.

The Refuge has about 3,300 acres of pine plantations. Most of the pine plantations were established between 1938 and 1941 by the USDA Soil Conservation Service for the purpose of controlling soil erosion. Pines, which are not native to the Refuge, generally provide lower quality wildlife habitat than native hardwoods. The existing plans call for thinning and prescribed burning pine plantations to encourage the growth of desirable, mast-producing hardwoods.

The Refuge has about 2,500 acres of early successional habitat. Some migratory birds primarily use early successional habitats, such as shrubland and fallow herbaceous fields. Without active management, these habitat types will succeed to forest. These habitat types are identified in Figure 6 on page 36.

Refuge grasslands include pastures (1,000 acres), hay fields (700 acres), and native grasslands (240 acres). Pastures and hay fields provide the majority of the grassland habitat for migratory birds. However, the pastures are relatively poor quality habitat for many migratory birds because they are dominated by fescue, a non-native grass. Refuge hay fields are commonly mowed in spring and summer when migratory birds are nesting, which reduces nesting success. The presence of woody vegetation along fence rows and roadsides tends to reduce the value of grasslands for some birds.

The Refuge has 4,500 acres in the row crop program. The crop rotation is generally corn/soybeans/corn/clover/clover. Grassland birds, such as the dickcissel and eastern meadowlark, use clover fields for nesting habitat. Cooperative farmers commonly mow second year clover to make hay during the nesting season of migratory birds, which reduces nesting success.

The forest, shrubland and grassland resource conservation priority bird species that would benefit under this alternative are listed in Table 34 on page 132. These priority bird species are a regional subset of the priority species found in Partners in Flight plans.

#### Objective 1

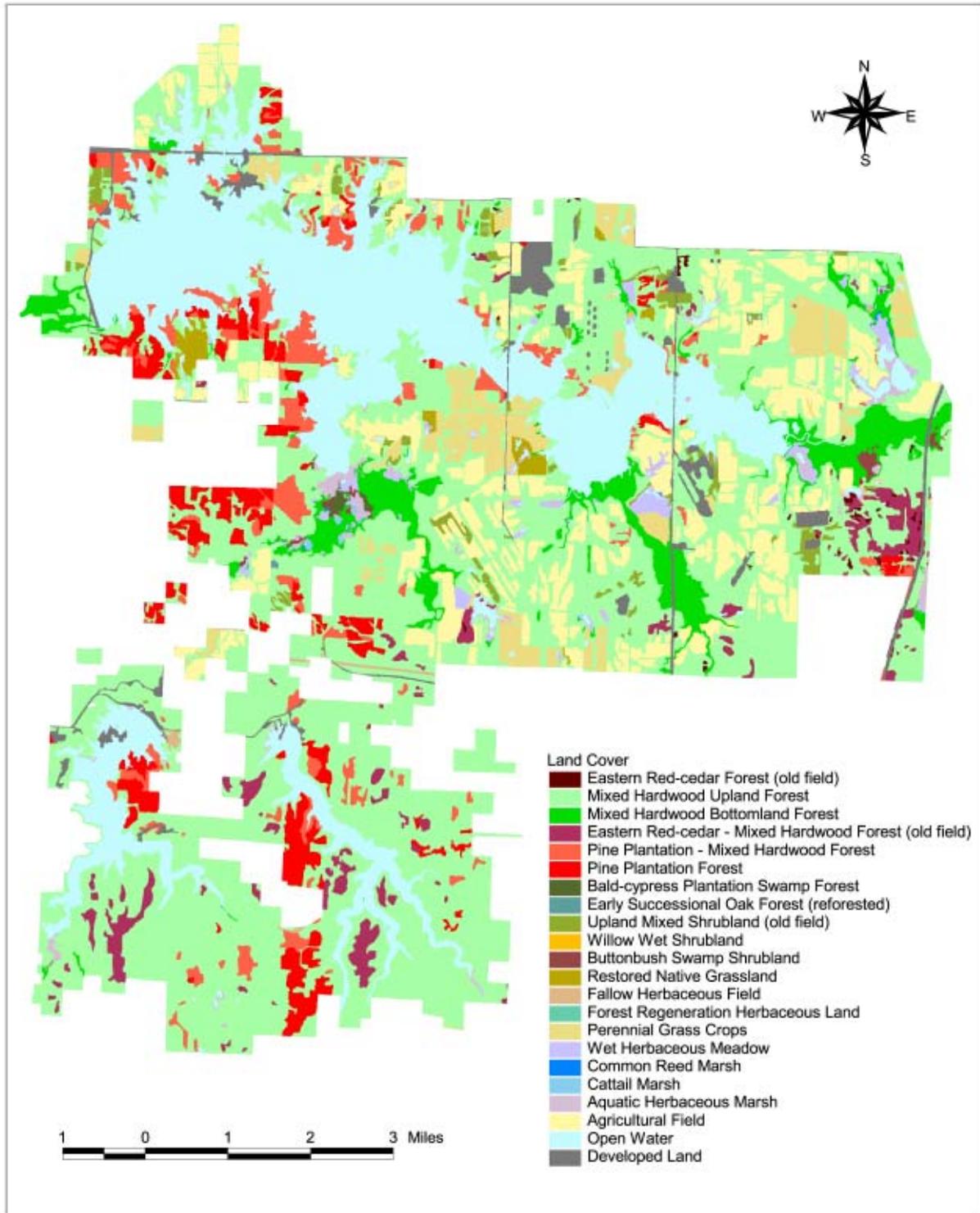
Complete about 240 acres of reforestation as outlined under the existing Refuge reforestation plan to benefit forest wildlife species.

#### Strategy

1. Conduct reforestation activities that may include site preparation (mechanical clearing and/or applying herbicides to unwanted

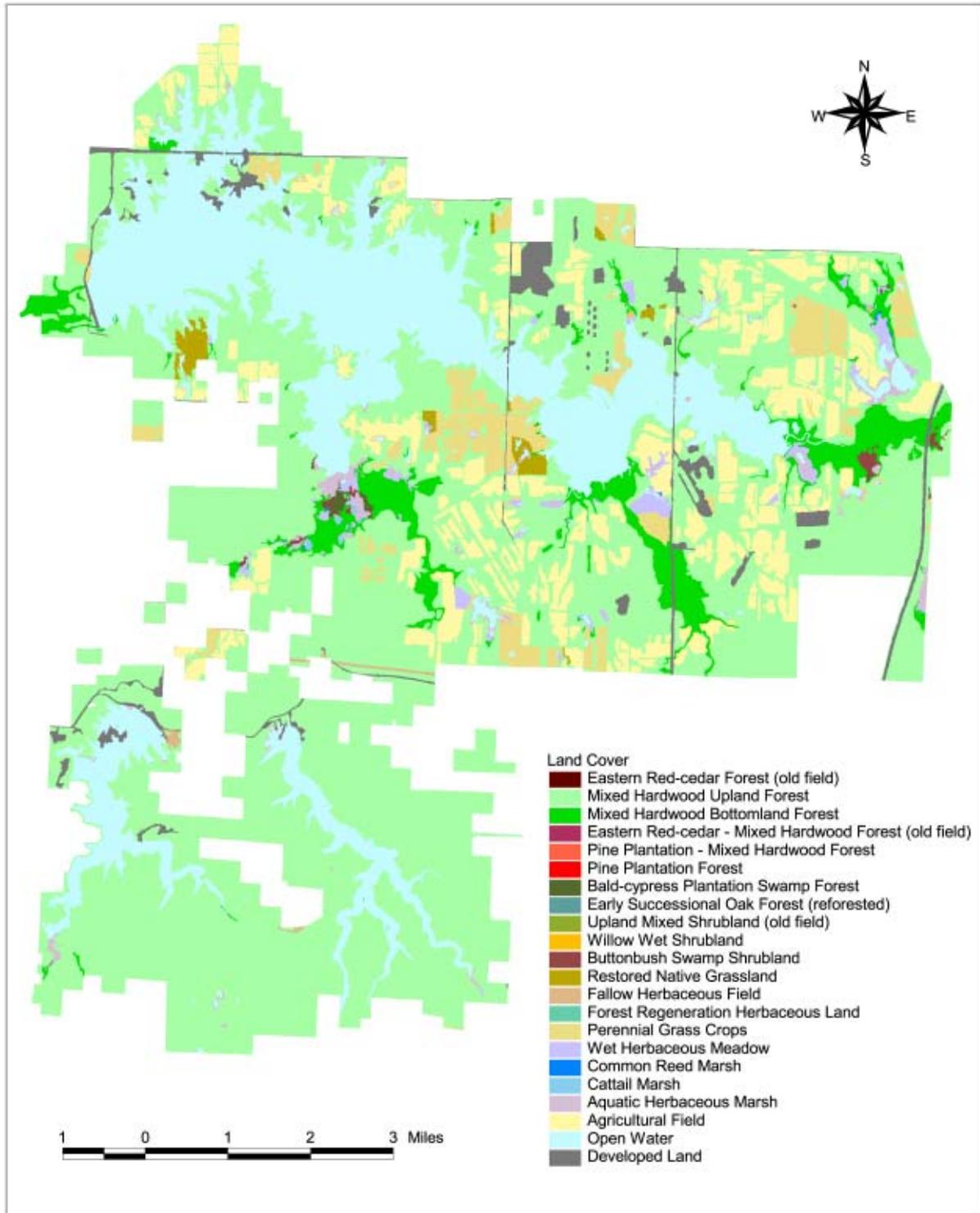
Alternative A: Current Management (No Action)

**Figure 6: Land Cover of Crab Orchard NWR, Alternative A, Current Management (No Action) Projected Conditions 2015**



**Figure 7: Land Cover of Crab Orchard NWR, Alternative A, Current Management (No Action), Projected Conditions, 2100**

Alternative A: Current Management (No Action)



vegetation), planting hardwood tree seedlings, and follow-up mechanical or chemical treatments.

#### Objective 2

Accelerate succession of all (about 3,300 acres) pine plantations to native hardwood forest.

##### Strategy

1. Thin pine plantations to promote establishment and growth of native hardwoods. Most thinning treatments will be conducted under contract by commercial timber harvesting firms. Conduct prescribed burning during the dormant season (November through March) on a 3- to 5-year cycle to enhance habitat conditions and promote desirable hardwood regeneration.

#### Objective 3

Maintain 240 acres of native warm-season grassland to benefit grassland birds, such as northern bobwhite, eastern meadowlark, and Henslow's sparrow. (Figure 6)

##### Strategy

1. Prescribed burn all native warm-season grasslands on a 2- to 3-year cycle to favor grassland vegetation and control undesirable plants. Apply mechanical or herbicide treatments to control vegetation, when needed.

#### Objective 4

Maintain 1,000 acres of pasture, 700 acres of hay fields, and about 1,600 acres of clover fields with increased emphasis on habitat quality for grassland birds.

##### Strategy

1. All mowing of pastures, hay fields, and clover fields will take place after August 1.

#### Ducks, Shorebirds, and Other Waterbirds Goal

*Maintain or enhance populations of ducks, shorebirds, and other waterbirds, with emphasis on priority species, as identified in the North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, and North American Waterbird Conservation Plan.*

*Background:* The Refuge has several types of habitat that support ducks, shorebirds, and other waterbirds: 9,100 acres of open water in artificial lakes and ponds, 1,900 acres of bottomland forest, and 500 acres of swamps, marshes, and wet meadows. The Refuge manages about 450 acres of these

wetlands to encourage the growth of moist-soil plants and aquatic invertebrates to provide food for waterfowl, shorebirds, and other waterbirds.

#### Objective 1

Provide 350 to 450 acres of moist soil habitat during fall, winter and spring for migrating shorebirds, waterfowl, and other waterbirds.

##### Strategy

1. Maintain dikes and water control structures. Manipulate water levels and vegetation to encourage production of food.

#### Water Quality Goal

*Provide and manage for quality of water in streams and lakes at Crab Orchard National Wildlife Refuge.*

*Background:* Water quality in streams and lakes on the Refuge is impacted by sedimentation, agricultural chemicals, and contaminants from past industrial uses.

#### Objective 1

Keep Refuge soil erosion and chemical inputs at levels that do not impair water quality or fish and wildlife.

##### Strategies

1. Work with farmers to establish buffer strips and keep livestock away from streams and ponds. Continue using current soil and water protection measures in the Refuge farm program: use no insecticides, use only Service-approved herbicides, use minimum tillage practices, and use winter cover crops.
2. Continue cleanup of contaminated sites. Ensure Refuge industrial operations conform to prescribed environmental standards.

#### 2.6.2.2. Recreation/Public Use Goals

#### Hunting, Fishing, Wildlife Observation and Photography, Interpretation and Environmental Education Goal

*Hunters, anglers, viewers and photographers of wildlife, general visitors, and students enjoy high-quality experiences through a variety of opportunities that promote an understanding and appreciation of the Refuge's natural and cultural resources and their management.*

*Background:* The Refuge System Improvement Act of 1997 identified six wildlife-dependent, priority public uses that should be facilitated on National Wildlife Refuges if compatible with the purposes of

the refuge. These priority uses, specifically hunting, fishing, wildlife observation and photography, interpretation, and environmental education, are compatible and can be facilitated at Crab Orchard. Under this alternative, facilities and programs would be provided at the levels and trends present in 2001.

#### **Objective 1**

Provide hunting opportunities at the levels offered in 2001.

##### *Strategies*

1. In the public hunting area of the Refuge, continue the policy of providing hunting opportunities based on state hunting seasons and state and federal regulations.
2. In the restricted use area of the Refuge, maintain current hunting opportunities by permit during shotgun deer and spring shotgun turkey seasons. Maintain shotgun deer season hunting opportunities for youth and persons with disabilities.
3. Continue providing waterfowl hunting opportunities in the controlled waterfowl hunting area through an agreement with a partner organization.

#### **Objective 2**

Provide fishing opportunities at the levels offered in 2001.

##### *Strategies*

1. In the public fishing areas, continue the policy of providing fishing opportunities based on state and federal regulations.
2. Continue to provide bank and boat fishing opportunities in accordance with state and federal regulations. Maintain existing Refuge boat ramps, fishing piers, and parking facilities.

#### **Objective 3**

Provide wildlife observation and photography opportunities at the levels offered in 2001.

##### *Strategies*

1. Continue popular, established programs and tours like the October Discovery Auto Tours, January Eagle Tours, and Spring Wildflower Walks that enhance visitor experience, bring visitors in closer proximity to



*Wilson's Snipe, Crab Orchard NWR*

resources, and provide optimum seasonal opportunities for observation and photography.

2. Maintain existing photo blinds, observation blinds, and identified observation areas.

#### **Objective 4**

Provide interpretive opportunities and materials at the levels offered in 2001.

##### *Strategies*

1. Continue to maintain and replace damaged and outdated interpretive and information panels on Refuge kiosks, wayside exhibits, trails, ramps, and other facilities. Ensure all panels comply with Service standards.
2. In cooperation with Refuge volunteers and other partners, conduct a variety of quality interpretive programs annually. Continue popular and established interpretive programs and special events, such as the Families Understanding Nature program and National Wildlife Refuge Week.
3. Continue to plan interpretive auto tour route, using existing roads, that will facilitate opportunities for wildlife and cultural resource observation and provide visitors with an overview of the Refuge, its resources, and its management.

#### **Objective 5**

Provide environmental education programs and materials at the levels offered in 2001.

##### *Strategies*

1. Within 2 years of the plan's approval, develop the environmental education portion of the Visitor Services Plan outlining a

comprehensive, curriculum-based approach structured to be compatible with state learning standards.

2. Continue the development and maintenance of a multi-faceted environmental education resource library, available for use by educators and in Refuge educational programs, comprised of books, videos, posters, audio tapes, written materials, and environmental education kits.
3. Continue currently-offered environmental education programs done by request, including on-site and off-site programs, special educational events, group camp programs, and special interest group programs.
4. Conduct an annual review of the Refuge environmental education program. Invite feedback from area educators. Revise as necessary.

#### **Other Land- and Water-based Recreation Goal**

*Visitors will enjoy high quality, land- and water-based activities that fulfill the recreation purpose of the Refuge.*

*Background:* The Refuge was established with and has a history of providing recreation that is not wildlife-dependent. Activities that fulfill the recreation purpose of the Refuge but are not wildlife-dependent include motorboating and sailing, water-skiing, swimming, camping and picnicking. The Refuge has been challenged to maintain the quantity and quality of the facilities in support of these activities throughout its existence. Under this alternative, facilities would be provided at the levels present in 2001 and the quality would be improved as time and resources permitted. In the past, two areas were set aside for the Crab Orchard Boat & Yacht Club and The Haven. The Boat & Yacht Club is a private organization requiring a membership for the use of campgrounds and a marina operated by the Club. The Haven is a facility that is operated and used by local veterans for rest and recreation.

#### **Objective 1**

Maintain and gradually improve the quality of boat launches, marinas, beaches, picnic areas, and campgrounds at levels offered in 2001.

#### *Strategy*

1. Use recreation fee funds and compete for Maintenance Management System funds to improve facilities. Follow guidelines for evaluating concession operations.

#### **Customer Service Goal**

*Visitors of all abilities will feel welcome and enjoy a safe visit to an area that they recognize as a national wildlife refuge.*

*Background:* Policy and guidance of the Service directs each refuge to meet basic standards in hosting visitors. The guidance covers signs, kiosks, leaflets, facility and road maintenance, customer service, and opportunities for visitor feedback.

#### **Objective 1**

Meet Service standards for signs, information sources, facilities, and opportunities for visitor feedback at the levels offered in 2001.

#### *Strategy*

1. Maintain and gradually improve kiosks, rest rooms, boundary signing, and opportunities for visitor feedback as time and resources permit.

#### **Objective 2**

Provide visitors with a safe and enjoyable visit and a feeling of security.

#### *Strategies*

1. Conduct annual safety inspections of all Refuge facilities and reaffirm compliance with Service standards.
2. Maintain recognizable, consistent signs that clearly identify public hunting areas.
3. Respond to notification of safety problems and unsafe situations promptly and in accordance with Service standards.

#### 2.6.2.3. Agricultural Goal

#### **Agricultural Goal**

*Provide opportunities for agricultural uses on Refuge lands that help attain wildlife conservation goals.*

*Background:* Agriculture, one of the specified purposes of the Refuge, has been a part of the landscape since early settlement. After many years of soil depletion and erosion, beginning in the 1930s efforts have been made to implement better farming practices. On the Refuge, agriculture has been used to benefit wildlife, chiefly wintering Canada geese.

#### **Objective 1**

Continue farming operations on about 4,500 acres of row crops and 1,000 acres of pastures and 700 acres of hay fields.

*Strategy*

1. Maintain infrastructure (roads, fences) in support of agricultural operations. Address erosion with buffer strips. Enlist technical oversight from the Natural Resource Conservation Service and the University of Illinois Extension.

2.6.2.4. Industrial Goal**Industrial Goal**

*Provide an industrial complex and attendant utility and transportation infrastructure, which conform to prescribed safety, health, environmental and maintenance standards.*

*Background:* The management of industry on the Refuge was reviewed in the early 1980s and an Industrial Policy was established. Most of the goals established under that policy have been accomplished. Under this alternative, management would continue under the existing policy.

**Objective 1**

Meet the guidelines of the Industrial Policy established in December 1981.

*Strategies*

1. Maintain roads, as well as water and sewer lines, in industrial areas as appropriations become available. Building and grounds maintenance are the responsibility of the lessee in accordance with lease requirements.
2. Remove buildings that are no longer suitable for occupancy for reasons of contamination, safety or lack of structural integrity and restore to natural habitats.

2.6.2.5. Boundary Modification

The authorized Refuge boundary would remain unchanged.

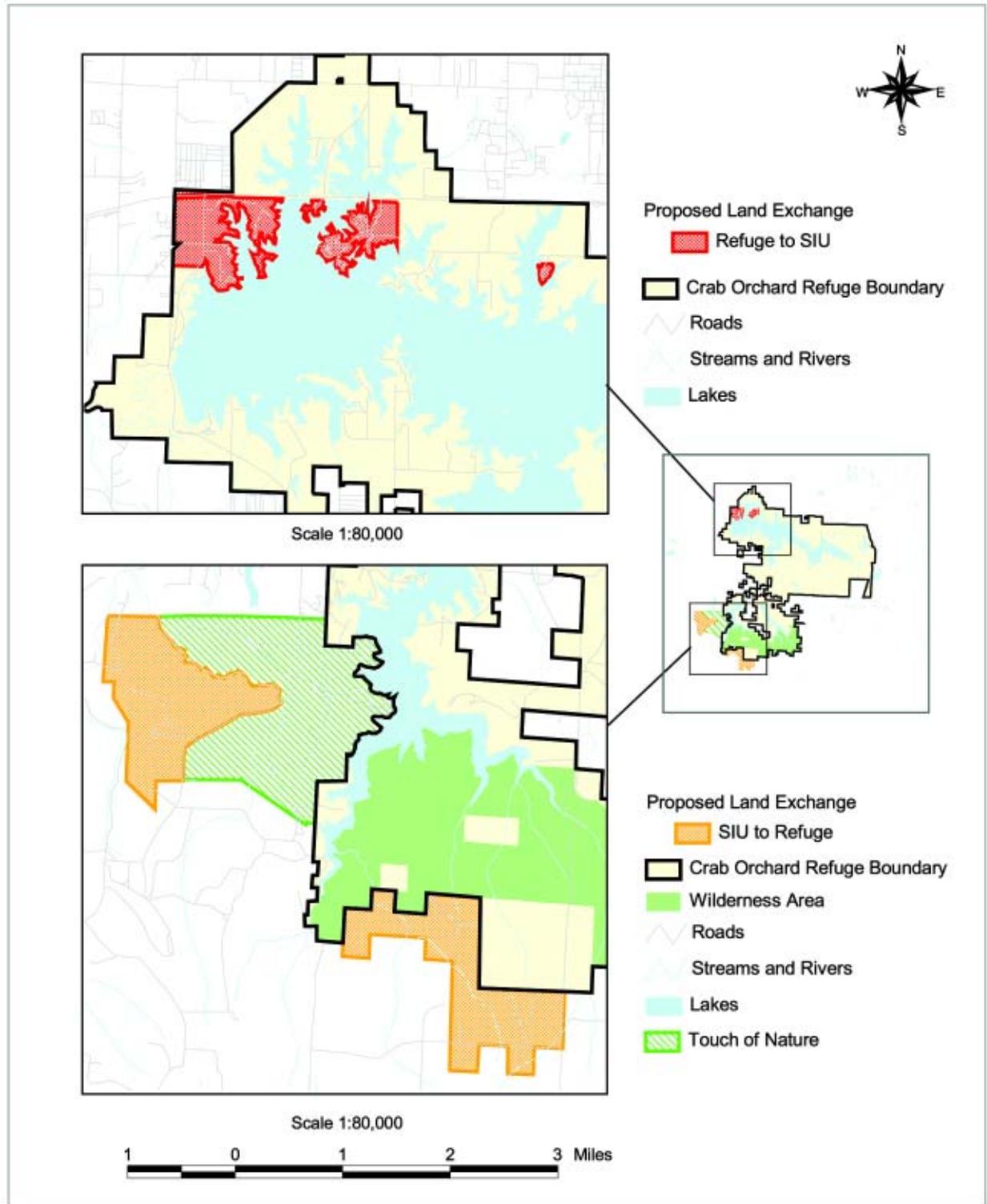
## 2.6.3 Alternative B: Reduced Habitat Fragmentation/Wildlife-dependent Recreation Emphasis With Land Exchange

2.6.3.1. Land Exchange

Early in this planning process, the Service indicated an interest in exchanging land developed for non-wildlife-dependent recreation, such as camping and marina operations, for undeveloped land adjoining the Refuge. Southern Illinois University (SIU) and the Service have agreed upon a framework for a land exchange that included the following:

- # The Service would exchange approximately 500 acres located in the northwest corner of the Refuge for land located south and west of the current boundary that is now owned by SIU (see Figure 8 on page 42 and Figure 13 on page 57).
- # Parcels in this 500 acres include the Crab Orchard Boat & Yacht Club, The Haven, Crab Orchard Campground, Lookout Point, Take Pride Point (formerly Hogan's Point) and the marina areas known as Playport and Images.
- # The land currently owned by the Service would be exchanged with SIU with the expectation of complementing the University's academic mission. Each of the above mentioned parcels would be managed according to a mutually agreeable plan that essentially permits the continuation of existing non-wildlife-dependent recreational uses. (A letter from SIU to the Service outlining the proposed uses can be found in Appendix I on page 451.)
- # The Service would retain a flowage easement on lands exchanged with SIU. Additionally, the Service would maintain a reversionary interest such that if the lands were no longer used as outlined in Appendix I, the land or individual parcels would revert back to Service ownership.
- # The Service would manage the lands received from SIU as forest habitat. The area would be open to the public for wildlife-dependent recreation. Some of this second-growth forest, with proper management and time, may reach a quality sufficient for its inclusion in the Crab Orchard Wilderness. The approximate acreage for the current land cover types of the SIU property are: pine forest, 8 acres; hardwood forest, 1,569 acres; and old fields, 122 acres. In addition to the approximately 125 acres of

**Figure 8: Lands Proposed for Exchange Between Crab Orchard NWR and Southern Illinois University**



**Table 2: Area of Food-producing Canada Goose Habitat by Alternative**

Habitat	Existing Condition (acres)	Alt. A (acres)	Alt. B and E (acres)	Alt. C (acres)	Alt. D (acres)
Corn	1,816	1,800	1,760	1,920	1,720
Wheat	908	900	880	960	860
Clover	1,816	1,800	1,760	1,920	1,720
Hay	800	700	600	700	500
Pasture	1,000	1,000	1,000	1,000	1,000
Moist Soil	450	450	500	500	450
Ponds and Lakes	9,000	9,000	9,000	9,000	9,000
Misc. Mowed Areas	200	200	200	200	200
Total Acres	15,900	15,850	15,700	16,200	15,450
Percent of Existing Acres	100	99	98	101	97

developed land, the land currently owned by the Service that would be part of the exchange has a land cover that includes: pine forest, 150 acres; hardwood forest, 150 acres; agricultural, 40 acres; and grassland/shrubland, 40 acres.

### 2.6.3.2. Wildlife Conservation Goals

#### Canada Geese Goal

*Provide enough food for wintering Canada geese to support 6.4 million goose-use-days annually, in support of the Mississippi Valley Population Canada Goose Management Plan.*

*Background:* When established, the Refuge was recognized as being important to providing habitat for wintering Canada Geese. The Refuge was also established with an agricultural purpose. The agricultural purpose and supporting wintering Canada Geese are interrelated. The importance of wintering refuge habitat to the Mississippi Valley population of Canada geese has been recognized in population management plans.

The Refuge's approach to meeting the goal of 6.4 million goose-use-days is to provide relatively large amounts of a diverse array of food-producing habitats (Table 2). This approach provides relatively high assurance that even if a major habitat fails to provide, sufficient foods will be available in other habitats. The amount of these habitats would vary only 1-2 percent under any CCP alternative (Table 2). The amount of goose food produced by these habitats would vary up to 14 percent (Table 3). This leaves the Refuge with 4,300-4,540 acres of row crops, which agrees with the Illinois DNR recommendation of "Maintain 4,000-5,000 acres of agriculture in crop fields, as winter food for Canada geese and other wildlife" (IDNR 2001).

#### Objective 1

Provide enough food for wintering Canada geese to support 6.4 million goose-use-days.

#### Strategy

1. Maintain 4,400 acres of cropland in agricultural production (Figure 9 on page 46). Manage 500 acres of moist-soil units. Continue fall mowing around selected ponds. Maintain seasonal closure to boating on east end of Crab Orchard Lake. Ensure technical oversight of the agricultural program. Remove woody fence rows and roadside vegetation.

#### Forest, Early Successional and Grassland Birds Goal

*Maintain or enhance populations of forest, early successional and grassland birds, with emphasis on priority species, as identified in Partners in Flight Physiographic Area Bird Conservation Plans.*

*Background:* See the background provided in Alternative A.

#### Objective 1

Manage two portions of the Refuge as large forest blocks to benefit area-sensitive forest birds. The first area (about 13,000 acres) extends from the southern end of Grassy Bay east to Caney Creek, and south including the wilderness area. The second area (about 1,700 acres) extends from the federal prison north and includes the Crab Orchard Creek bottomlands. This will include about 490 acres of reforestation of open habitat to consolidate large blocks of forest habitat.

**Table 3: Millions of Potential<sup>1</sup> Goose-use-days<sup>2</sup> of Food by Habitat and Alternative**

Habitat	Existing Condition (GUDs)	Alt. A (GUDs)	Alt. B and E (GUDs)	Alt. C (GUDs)	Alt. D (GUDs)
Corn	7.1	7.0	6.9	7.5	6.7
Wheat	2.0	2.0	1.9	2.1	1.9
Clover	3.7	3.7	3.6	3.9	3.5
Hay	2.9	2.5	2.2	2.9	1.8
Pasture	3.3	3.3	0.8	0.8	3.3
Moist Soil	0.5	0.5	0.5	0.5	0.5
Ponds and Lakes <sup>3</sup>					
Misc. Mowed Areas <sup>3</sup>					
Total GUDs	19.5	19.0	15.9	17.7	17.7
Percent of Existing GUDs	100	97	82	91	91

1. Results do not reflect food losses due to low production, consumption by other animals, etc.
2. "Goose-use-day" is defined as enough food to feed one goose for one day.
3. Production is not calculated or included in total GUDs.

*Strategy*

1. Reforest about 290 acres of crop fields, 130 acres of fallow fields, and 90 acres of perennial grasslands. This may include site preparation, planting a cover crop, planting tree seedlings, and weed control treatments.

**Objective 2**

Accelerate succession of all (about 3,300 acres) pine plantations to native hardwood forest.

*Strategy*

1. Thin pine plantations to promote establishment and growth of native hardwoods. In some cases, remove pine overstory to release young hardwoods. Most silvicultural treatments will be conducted under contract by commercial timber harvesting firms. Conduct prescribed burning during the dormant season (November through March) on a 3- to 5-year cycle to enhance habitat conditions and promote desirable hardwood regeneration.

**Objective 3**

Maintain about 300 acres in early successional habitat.

*Strategy*

1. Use prescribed fire or mechanical treatment (mowing, discing) to disturb about 200 acres every 3 to 5 years. Add about 100

acres of 30-foot-wide borders of native warm-season grasses in row crop fields in the open portion of the Refuge.

**Objective 4**

Maintain 260 acres of native warm-season grassland.

*Strategy*

1. Prescribed burn all native warm-season grasslands on a 2- to 3-year cycle to favor grassland vegetation and control undesirable plants. Apply mechanical or herbicide treatments to control vegetation, when needed.

**Objective 5**

Maintain 1,000 acres of pasture, 700 acres of hay fields, and about 1,600 acres of clover fields with increased emphasis on habitat quality for grassland birds.

*Strategy*

1. Remove 124 acres of linear forest habitat and 8 miles of hedge rows. Install fences to create paddocks within pastures to enable greater control of grazing intensity. Convert fescue pastures to other cool-season and native warm-season grasses by preparing the site and reseeding. The typical Refuge pasture would become three or four paddocks with a paddock of cool-season grass and two or three paddocks of native

warm-season grasses. Cattle would enter the cool-season grass paddock in the spring switch to the warm season grasses in the summer, and move back to the cool season grass in the fall. The native warm season grass will provide the grassland birds with nesting, migration, and winter habitat. Vegetation structure will be managed by the amount of grazing applied to each paddock. Most of the pasture grass would not require fall mowing and would be taller than 6 inches during the winter. All mowing of hay fields, pastures, and clover fields will take place after August 1.

*Rationale for converting pasture fescue:* Tall fescue (*Festuca arundinacea*) is a cool-season, perennial grass native to Europe that is invasive in many natural communities in the U.S. Tall fescue has been planted for forage and soil conservation and now covers more than 35 million acres in the U.S. (Ball et al. 1993). It has become the most abundant or dominant plant in many areas, including the Refuge's grasslands. Most (75-80 percent) tall fescue in the U.S. is infected with a fungus (*Neotyphodium coenophialum*) that produces compounds that are toxic to insects (Breen 1994), small mammals (Coley et al. 1995, Conover 1998), and birds (Conover and Messmer 1996, Madej and Clay 1991). Tall fescue often results in loss of plant diversity (Clay and Holah 1999). Livestock losses related to tall fescue in the U.S. have been estimated between \$500 million and \$1 billion annually (Ball et al. 1993).

Conversion of tall fescue pastures to native warm-season grasses and cool-season grasses with higher wildlife values will provide several benefits: 1) reduce the abundance of an invasive, non-native species, 2) increase plant diversity, 3) increase plant productivity, 4) improve forage for cattle production, and 5) improve pastures for wildlife production.

#### **Ducks, Shorebirds, and Other Waterbirds Goal**

*Maintain or enhance populations of ducks, shorebirds, and other waterbirds, with emphasis on priority species, as identified in the North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, and North American Waterbird Conservation Plan.*

*Background:* See Alternative A.

#### **Objective 1**

Provide 450 to 500 acres of moist-soil habitat during fall, winter and spring for migrating shorebirds, waterfowl, and other waterbirds.

#### *Strategy*

1. Construct about 100 acres of new moist-soil habitat. Maintain dikes and water control structures. Manipulate water levels and vegetation to encourage production of waterfowl foods.

#### **Water Quality Goal**

*Provide and manage for quality of water in streams and lakes at Crab Orchard National Wildlife Refuge.*

*Background:* Natural processes along with various human activities occurring in the watershed affect water quality on the Refuge. Since the Refuge controls only a portion of the watershed, increased efforts to protect water quality both on the Refuge and beyond its boundaries are essential. Urbanization of lands adjacent to the Refuge is likely to have even greater impacts on water quality in the future.

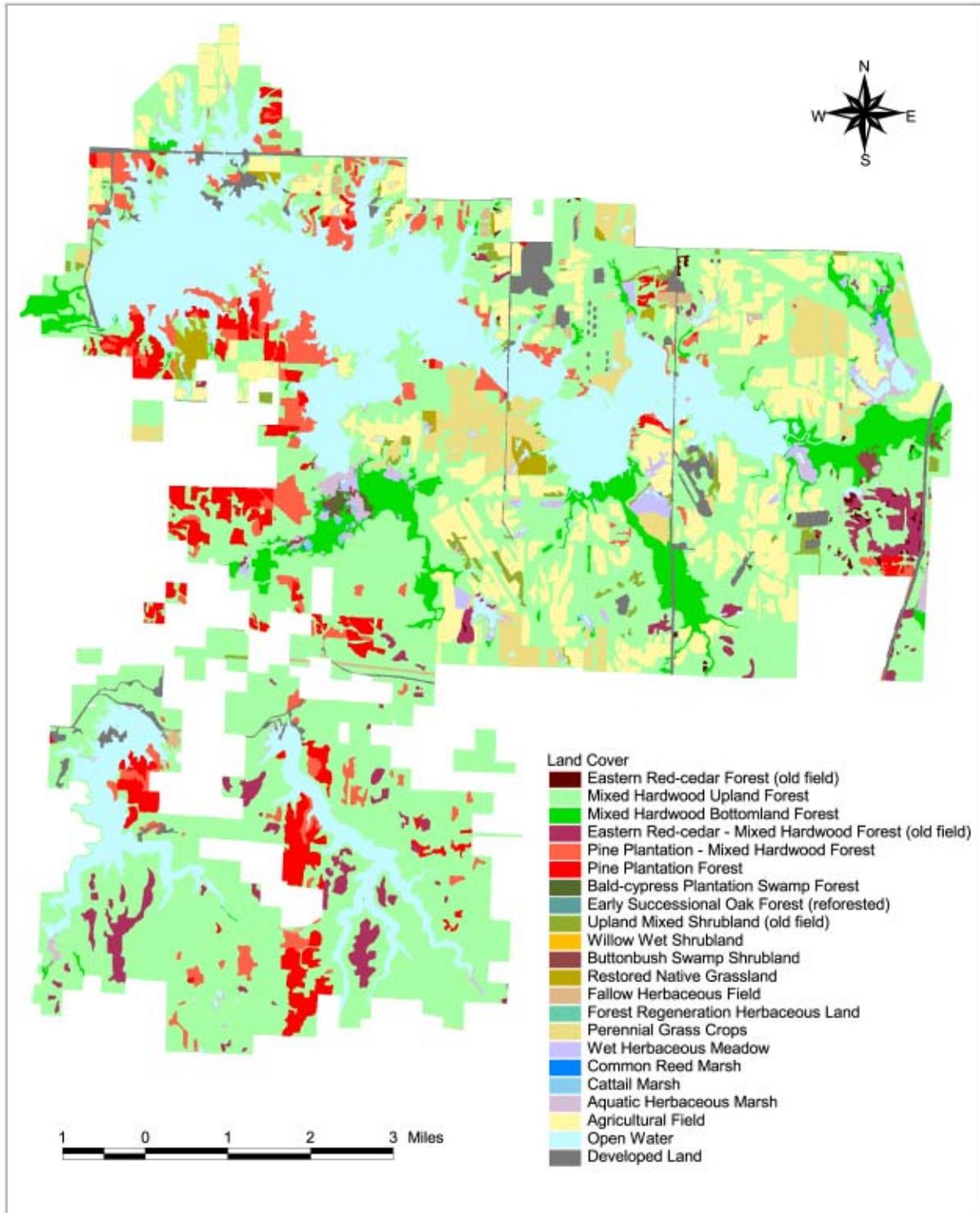
#### **Objective 1**

Improve the quality of water within the watershed of the Refuge.

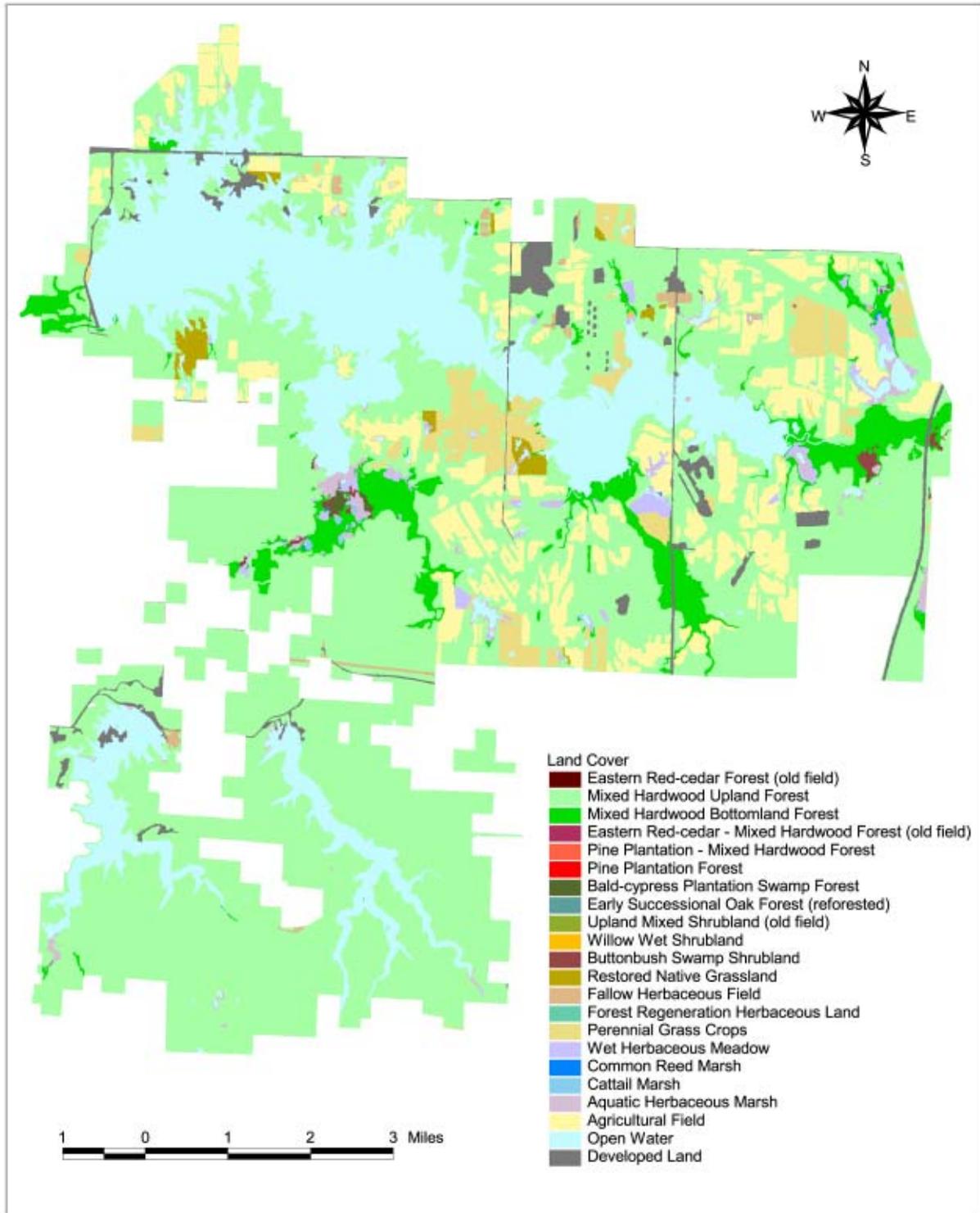
#### *Strategies*

1. Cooperate with Illinois Environmental Protection Agency to monitor water quality. Identify landowners and land uses in the watershed. Provide education and technical assistance to landowners with particularly sensitive riparian areas. Work with municipalities and developers to enhance on-site storm water retention.
2. Work with farmers to establish buffer strips and keep livestock away from streams and ponds. Continue using current soil and water protection measures in the Refuge farm program: use no insecticides, use only Service-approved herbicides, use minimum tillage practices, and use winter cover crops.
3. Continue cleanup of contaminated sites. Ensure Refuge industrial operations conform to prescribed environmental standards.

**Figure 9: Land Covers of Crab Orchard NWR, Alternatives B and E, Projected Conditions 2015**



**Figure 10: Land Covers of Crab Orchard NWR, Alternatives B and E, Projected Conditions 2100**



Alternative B: Reduced Habitat Fragmentation/Wildlife-dependent Recreation With Land Exchange

### 2.6.3.3. Recreation/Public Use Goals

#### Hunting, Fishing, Wildlife Observation and Photography, Interpretation and Environmental Education Goal

*Hunters, anglers, viewers and photographers of wildlife, general visitors, and students enjoy high-quality experiences through a variety of opportunities that promote an understanding and appreciation of the Refuge's natural and cultural resources and their management.*

*Background:* The Refuge System Improvement Act of 1997 identified six wildlife-dependent, priority public uses that should be facilitated on National Wildlife Refuges if compatible with the purposes of the refuge. These priority uses, which include hunting, fishing, wildlife observation and photography, interpretation, and environmental education, are compatible and can be facilitated at Crab Orchard NWR. While all of these uses are provided at the Refuge to some extent, support for some of these uses has been inconsistent and the quality of experience has been variable. Efforts to enhance visitor enjoyment by promoting understanding and appreciation of Refuge resources, management strategies, and purposes have had limited success. The Refuge can provide high-quality experiences for these priority wildlife-dependent users through emphasis on and improvement of supporting facilities, programs, and materials over the next 15 years. A high-quality experience includes uncrowded conditions, no conflicts with other users, a reasonable opportunity, and overall satisfaction. Understanding and appreciation of Refuge resources, management strategies, and purposes also contribute to quality of experience and influence visitor enjoyment.

#### Objective 1

Increase the quality of hunting opportunities to a level where at least 90 percent of hunters experience uncrowded conditions, no conflicts with other users, a reasonable harvest opportunity, and satisfaction with their overall experience. Instill a sense of awareness among hunters of the Refuge as a component of the National Wildlife Refuge System and of hunting as a wildlife management tool.

#### Strategies

1. In the public hunting area of the Refuge, continue the policy of providing hunting opportunities based on state hunting seasons and state and federal regulations.

2. In the restricted use area of the Refuge, maintain current hunting opportunities by permit during shotgun deer and spring shotgun turkey seasons. Maintain shotgun deer season hunting opportunities for youth and persons with disabilities and, within 3 years of the plan's approval, provide these groups with opportunities for spring shotgun turkey season hunting when populations warrant.
3. Within 6 years of the plan's approval, establish additional hunting programs to encourage participation in the Refuge hunting program by non-traditional segments of the public such as youth, persons with disabilities, and women.
4. Administer goose hunts in the controlled area through an agreement with a partner organization.
5. Continue to promote conservation practices and increase hunter adherence to federal and state regulations through effective informational brochures and signs. Increase the visibility of Refuge law enforcement.
6. Over the life of the plan, enhance public understanding of Refuge hunting opportunities, the role of hunting in wildlife management, and the Refuge as a component of the National Wildlife Refuge System by increasing the quality of maps, signs, and brochures.

#### Objective 2

Increase the quality of fishing opportunities to a level where at least 90 percent of anglers experience uncrowded conditions, no conflicts with other users, a reasonable harvest opportunity, and satisfaction with their overall experience. Enhance angler understanding of the issues, strategies, and policies involved in Refuge fisheries management and conservation. Instill anglers with a sense of awareness of the Refuge as a component of the National Wildlife Refuge System.

*Strategies*

1. In the public fishing areas, continue the policy of providing fishing opportunities based on state and federal regulations.
2. Within 5 years of the plan's approval and in cooperation with other partners, promote current and develop additional fishing opportunities and programs to encourage participation by non-traditional segments of the public such as youth, persons with disabilities, and women.
3. Continue to provide bank and boat fishing opportunities in accordance with state and federal regulations. Maintain existing Refuge boat ramps, fishing piers, and parking facilities. Study the feasibility for and construct accessible fishing facilities at Little Grassy Lake and Devils Kitchen Lake within 4 years of the plan's approval.
4. Over the life of the plan, promote Refuge fishing opportunities and encourage conservation practices such as catch-and-release fishing through the development and maintenance of high-quality maps, signs, brochures and the Refuge web page.
5. Ensure that the fishing public clearly understands the fish consumption advisories for Crab Orchard Lake through signs and brochures within 2 years of the plan's approval.
6. Over the life of the plan, provide insight to anglers regarding Refuge strategies, issues, and policies for fisheries management and conservation by redesigning and developing more effective informational signs and brochures. Increase angler



Visitor using a spotting scope, Crab Orchard NWR

awareness of the Refuge as a component of the National Wildlife Refuge System by improving the quality and content of maps, signs, and brochures.

**Objective 3**

Ensure that viewing and photography opportunities meet the needs of 95 percent of participants. Establish and maintain viewing and photography opportunities for all major Refuge habitat types and optimum seasons.

*Strategies*

1. Within 2 years of the plan's approval, develop an annual observation/photography fact sheet for the Refuge that will include a calendar of established tours, programs, and events; information on identified and recommended viewing and photography areas; guidelines to enhance viewing enjoyment; and a Refuge map delineating trails, blinds, platforms, and identified viewing areas.
2. Continue popular, established programs and tours like the October Discovery Auto Tours, January Eagle Tours, and Spring Wildflower Walks that enhance visitor experience, bring visitors in closer proximity to resources, and provide optimum seasonal opportunities for observation and photography and continually evaluate these programs for effectiveness.
3. Within 2 years of the plan's approval, improve the existing photography/observation blinds and platforms by adding camouflage as needed to enhance viewing opportunities. Evaluate location of existing blinds and platforms and move as needed. Position interpretive and identification panels in or near blinds and platforms to promote understanding and appreciation of Refuge resources. Enhance panels to promote awareness of the Refuge as a component of the National Wildlife Refuge System.
4. Within 5 years of the plan's approval, evaluate need for and add additional blinds/platforms, including interpretive and identification panels, where and if needed to ensure observation and photography opportunities in all major Refuge habitat types. Maintain all identified viewing and photography sites.

5. Over the life of the plan and in cooperation with other partners, encourage utilization of the Refuge for birding and other wildlife observation through development of informational materials, programs, trails, tours, and special events. Promote the Refuge as a site for quality wildlife observation and photography through participation in selected community and regional birding, nature, and photography festivals and events.
6. Within 8 years of the plan's approval, identify and create a Refuge birding trail that may include enhancement and coordination of existing trails, viewing areas and signs, and creation of a birding trail brochure and map.
7. Over the life of the plan, expand the Refuge web site to promote wildlife observation and photography. Include updates on Refuge and area sightings of rare birds and other wildlife; profiles of selected seasonally-occurring and resident species; suggested optimal viewing times and locations; and current Refuge programs, facilities, tours, and other opportunities for observation and photography.

**Objective 4**

Increase the effectiveness of the Refuge interpretive program such that 85 percent of participants gain a better understanding of three primary concepts: (1) the value and unique purposes of the Refuge, (2) the Refuge as a component of a national network of refuges, and (3) the significance and mission of the National Wildlife Refuge System. Heighten awareness of conservation and stewardship concepts. Encourage participants to adopt conservation practices and take positive actions that support Refuge goals and the Refuge System mission.

*Strategies*

1. Within 3 years of the plan's approval, develop the interpretive portion of the Visitor Services Plan outlining a comprehensive, multifaceted approach emphasizing selected themes and key Refuge resources. Themes will be selected based on importance to Refuge and System goals and relevance to surrounding communities. All interpretive materials, tours, facilities and programs will focus on one or more of these Refuge themes, along with the three basic

concepts of the Refuge and Refuge System. Refuge interpretive themes may be in a storyline form that includes three or more themes. Themes may include: Exploring the Diversity of Wildlife, Understanding the Past, Protecting the Balance, and Communicating Visitor Opportunities.

2. Within 4 years of the plan's approval, renovate and replace damaged and outdated interpretive and information panels on Refuge kiosks, wayside exhibits, trails, ramps, and other facilities. Ensure that all panels and structures comply with Service standards.
3. In cooperation with Refuge volunteers and other partners, conduct a variety of high-quality interpretive programs annually. Continue popular and established interpretive programs and special events, such as the Families Understanding Nature program and National Wildlife Refuge Week. Ensure interpretive programming remains current and dynamic by continually evaluating and creating new programs, incorporating new ideas, updating information, and revitalizing ongoing programs. Focus each interpretive program on one or more Refuge themes.
4. Over the life of the plan, upgrade the following Refuge trails to enhance interpretive opportunities: Rocky Bluff Trail for neotropical migrants; Woodlands Trail for wildlife observation, fishing and accessibility; and Harmony Trail for wildlife observation.
5. Over the life of the plan and in cooperation with Friends of Crab Orchard National Wildlife Refuge and other partners, revise Refuge interpretive brochures, handouts, and other written materials as needed to improve consistency and to meet Service standards.
6. Within 1 year of the plan's approval, create a custom audiovisual program that provides visitors with orientation information about the Refuge. Ensure this program and a variety of other wildlife-related audiovisual programs are made available for view at the Visitor Center and for use in interpretive programs.

7. Within 3 years of the plan's approval, establish and maintain an interpretive auto tour route, using existing roads, that will facilitate opportunities for wildlife and cultural resource observation and provide visitors with an overview of the Refuge, its resources, and its management. Include identified stations with interpretive panels.

#### Objective 5

Increase the effectiveness of the Refuge environmental education program so that 90 percent of participants gain a better understanding and appreciation of the resources, purposes, and value of the Refuge and the Refuge System. Heighten awareness of conservation and stewardship concepts and encourage participants to take positive actions on the Refuge and in their community that support Refuge goals and the Refuge System mission.

#### Strategies

1. Promote the use of the Refuge as an outdoor classroom and incorporate national environmental education guidelines and state learning standards into programs and materials.
2. Manage the environmental education program as described in Service policy.
3. Within 2 years of the plan's approval, develop the environmental education portion of the Visitor Services Plan, outlining a comprehensive, curriculum-based approach structured to be compatible with state learning standards and national environmental education guidelines. Emphasize key Refuge resources, the Refuge, the National Wildlife Refuge System, and selected Refuge themes. These themes will be based on importance to Refuge and System goals and relevance to surrounding communities. All environmental education materials, facilities, and programs will focus on one or more of these Refuge themes, along with the basic concepts of the Refuge and the Refuge System. Refuge themes may be in a storyline form that includes three or more themes. Themes may include: exploring the diversity of wildlife, understanding the past, protecting the balance, and communicating visitor opportunities.
4. Within 3 years of the plan's approval and in cooperation with Friends of Crab Orchard National Wildlife Refuge and other partners, create an array of environmental education kits, each focusing on one or more aspects of Refuge themes. Educational kits will include interactive materials and a detailed instructional and activity guide designed with a clear, consistent format and coordinated with state learning standards. Develop and maintain a multi-faceted environmental education resource library, available for use by educators and in Refuge educational programs, comprised of books, videos, posters, audio tapes, written materials, and environmental education kits.
5. Within 4 years of the plan's approval and in cooperation with other partners, establish an environmental education complex that incorporates an outdoor amphitheater with educational displays, a set of associated trails, the Refuge Visitor Center, and an educator's trail specifically designed to facilitate environmental education activities and function as an outdoor classroom.
6. Within 4 years of the plan's approval and in cooperation with other partners, create an Educator's Guide to Crab Orchard National Wildlife Refuge that provides an orientation, guidelines, grade-level and state learning standards information, maps, and site-specific activities that focus on one or more Refuge themes. Incorporate input from area educators to ensure that the Refuge guide meets area teachers' needs.
7. In cooperation with other partners, conduct or host bi-annual teacher workshops that encourage area educators to incorporate environmental education into their curriculum and to utilize Refuge materials, staff, and resources, both in the classroom and during field trips. Within 5 years of the plan's approval, develop a Refuge-specific teacher workshop to demonstrate methods for combining use of the Educator's Guide, environmental education kits, and the educator's trail. Explore continuing education credit options for all teacher workshops.
8. Over the life of the plan, establish a positive, cooperative relationship with educators and schools in surrounding communities. Promote use of the Refuge,

environmental education resources, and staff through e-mail newsletters to educators, the Refuge web page, informational fliers and materials, targeted special events, and involvement in area parent-teacher and other organizations.

9. Continue currently-offered environmental education programs done by request, including on-site and off-site programs, special educational events, group camp programs, and special interest group programs. Over the life of the plan, expand the environmental education program to include additional on-site and off-site programs, special educational events, group camp programs, and special interest group programs. Develop pre- and post-visit activities in addition to on-site activities.
10. Over the life of the plan, establish partnerships with selected local schools, agencies, and nonprofit organizations to more effectively develop and expand environmental education programs. Involve volunteers in educational programs and explore the potential for environmental education interns through Southern Illinois University and John A. Logan College. Explore the potential for creating a grant program to help area schools with field trip expenses.
11. Conduct a bi-annual review of the Refuge environmental education program. Invite feedback from area educators. Revise as necessary.

#### **Other Land- and Water-based Recreation Goal**

*Visitors will enjoy high quality, land- and water-based activities that fulfill the recreation purpose of the Refuge when the Refuge was established.*

*Background:* The Refuge has not been able to provide and maintain facilities and services in support of non-wildlife-dependent recreation at the level expected by many visitors, as expressed in comments as part of this planning effort.

In order to better provide non-wildlife-dependent recreation, under this alternative the portion of the Refuge that supports the majority of non-wildlife dependent recreation would be transferred to Southern Illinois University in a land exchange. The assumption is that SIU can provide more and better quality facilities and services than the Refuge to support boating, water skiing, swimming, picnicking

and camping. The Refuge would concentrate its resources on improving the quality of the six priority wildlife-dependent uses.

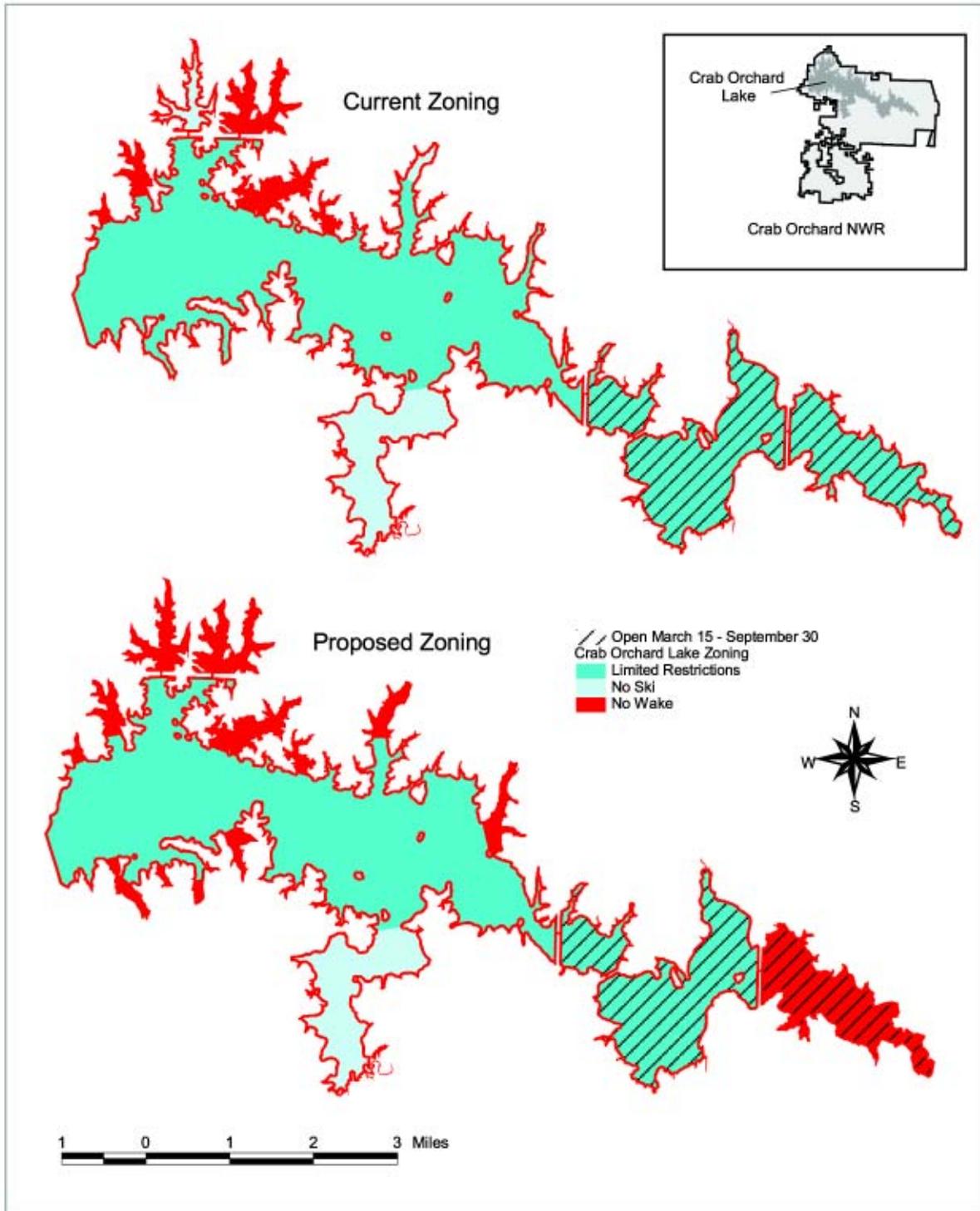
#### **Objective 1**

Maintain the quality of non wildlife-dependent recreation facilities and activities at the levels offered in 2001 until facilities are transferred in a land exchange. Improve the quality of facilities not a part of the exchange to industry standards within 5 years of completion of exchange.

#### *Strategies*

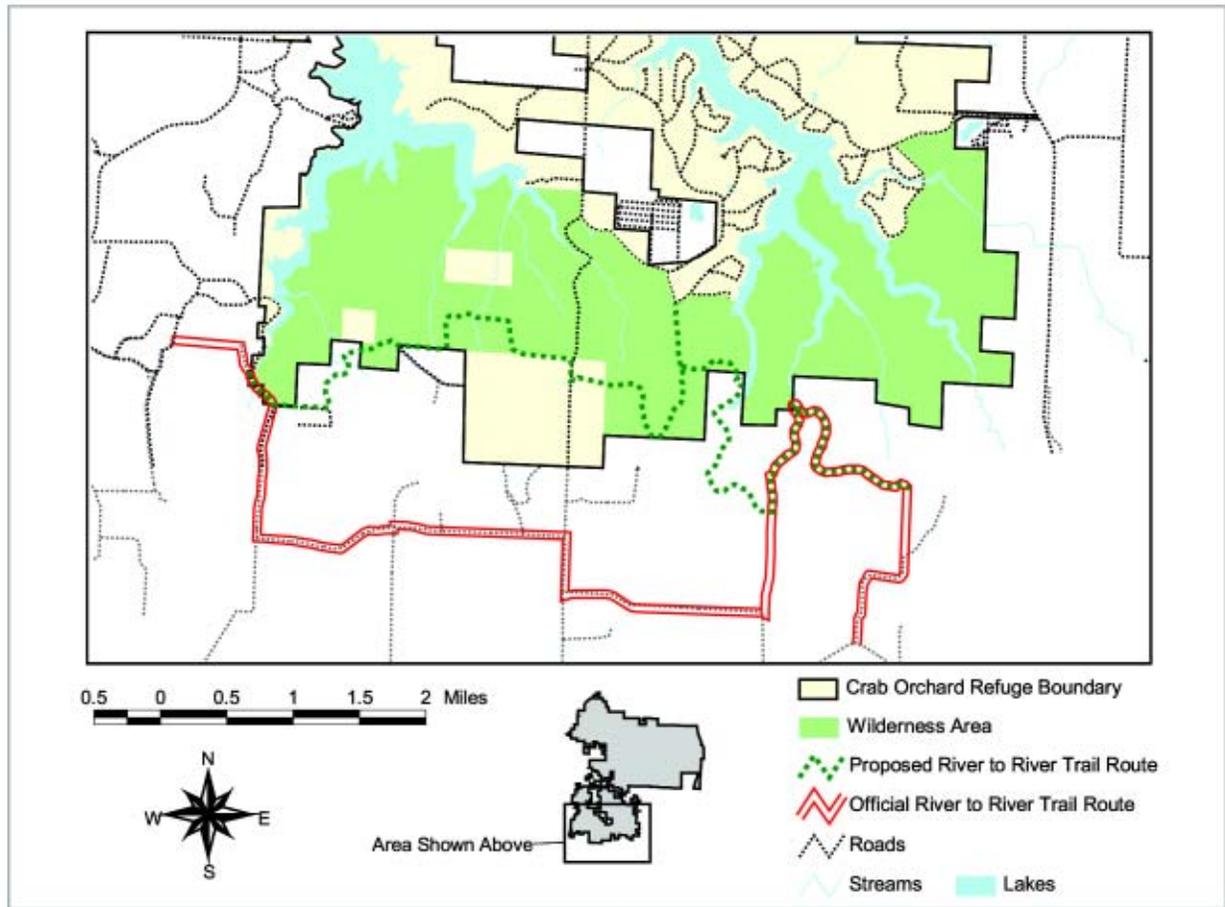
1. Maintain picnicking at Greenbriar, Wolf Creek, Harmony Trail, and Visitor Center recreation areas. Within 2 years of the land exchange convert the Cambria Neck recreational area to foot traffic only.
2. Explore the potential for a bicycle route within the restricted use area of the Refuge. The route would run mainly along old railroad beds.
3. Continue current policies on swimming at Devils Kitchen, Little Grassy, and Crab Orchard Lakes. Swimming is prohibited at Devils Kitchen Lake, east of Wolf Creek Causeway at Crab Orchard Lake, all marina areas, and within 100 feet of all boat ramps, spillways, causeways, and dams.
4. Within 5 years of the plan's approval, upgrade boat ramps and associated parking at Devils Kitchen, Little Grassy and Crab Orchard Lakes.
5. Continue current policies on lake zoning on Crab Orchard Lake (includes 150-foot no-wake zone along shoreline) with an additional no-wake zone east of Highway 148 and in some coves (see Figure 11). Implement the zoning of motorized boating at Devils Kitchen Lake. Gas motors would be prohibited south of the southernmost boat ramp on Devils Kitchen Lake and ponds within the public use area of the Refuge .
6. Horseback use on the Refuge would be confined to public roads and a designated River to River Trail (see Figure 12) and erosion due to trail use would be actively controlled through maintenance and/or seasonal closures.

**Figure 11: Crab Orchard Lake Watercraft Zoning Proposed Under Alternatives B, C, D and E**



Alternative B: Reduced Habitat Fragmentation/Wildlife-dependent Recreation With Land Exchange

**Figure 12: Proposed Horseback Riding Trails on Crab Orchard NWR Under Alternatives B, C and E**



7. Camping at Devils Kitchen would be discontinued. Little Grassy Campground would be upgraded to standards comparable to others in the area.
8. The Crab Orchard Boat & Yacht Club and The Haven would be included in the land exchange with SIU.

**Customer Service Goal**

*Visitors of all abilities will feel welcome and enjoy a safe visit to an area that they recognize as a national wildlife refuge.*

*Background:* Policy and guidance of the Service directs each refuge to meet basic standards in hosting visitors. The guidance covers signs, kiosks, leaflets, facility and road maintenance, customer service, and opportunities for visitor feedback.

Awareness of Crab Orchard National Wildlife Refuge as a national wildlife refuge can also influence visitor experience and enjoyment.

**Objective 1**

Improve Refuge signs, kiosks, and facilities so 90 percent of visitors feel welcome and secure, enjoy their visit, and recognize the area as a national wildlife refuge.

*Strategies*

1. Within 5 years of the plan's approval, develop and install distinct and consistent identification markers that allow visitors to recognize and distinguish between each type of Refuge facility, including trails, observation platforms, photography blinds, bank fishing areas, public hunting areas,

and other similar locations. Design all such markers in accordance with Service standards.

2. Within 3 years of the plan's approval, revise information on existing kiosks, trailhead and other identification markers, boundary signs, structures and other such signs as necessary to meet Service standards.
3. Within 5 years of the plan's approval, create and install additional kiosks where needed at Refuge access points to ensure all visitors are greeted and informed that they are entering a national wildlife refuge. Ensure that all structures comply with Service standards.
4. Verify annually that visitors are welcomed and treated courteously by staff and volunteers. Confirm customer service standards during employee and volunteer orientations. Provide visitors with opportunities for feedback through suggestion cards, verbal reports, written mail, and e-mail through the Refuge web page. Address customer service issues promptly and professionally according to Service standards.
5. Within 2 years of the plan's approval, develop a Refuge brochure with detailed information on accessible facilities, trails, programs, and recreational opportunities at the Refuge.
6. Conduct semi-annual safety inspections of all Refuge facilities and reaffirm compliance with Service standards.
7. Maintain recognizable, consistent signs that clearly identify public hunting areas. Increase awareness among non-hunting visitors of hunting areas and seasons through effective signs and brochures.
8. Respond to notification of safety problems and unsafe situations promptly and in accordance with Service standards. Increase visibility of Refuge law enforcement, particularly during periods of heavy visitation.

#### 2.6.3.4. Agricultural Goal

##### **Agricultural Goal**

*Provide opportunities for agricultural uses on Refuge lands that help attain wildlife conservation goals.*

##### **Objective 1**

Continue farming operations on about 4,400 acres of row crops with greater emphasis on conservation practices.

##### *Strategy*

1. Maintain infrastructure (roads, fences) in support of agricultural operations. Drop small, less profitable fields (less than 5 acres) from row cropping and convert to other cover (about 15 fields totaling 52 acres). Identify and drop farmed wetlands from the farm program. Permit cooperators to harvest corn remaining in the field in the spring. Emphasize Johnsongrass control. Prohibit mowing of clover in the crop rotation until after August 1. Enlist technical oversight from Natural Resource Conservation Service and University of Illinois Extension.

##### **Objective 2**

Continue farming operations on about 700 acres of hay fields with greater emphasis on conservation practices.

##### *Strategy*

1. Prohibit mowing of hay until after August 1. Maintain an updated rate charge for hay.

##### **Objective 3**

Enhance nesting habitat for grassland birds while maintaining or increasing the value for grazing on about 1,000 acres of pastures.

##### *Strategy*

1. Convert fescue pastures to other cool-season grasses and native warm season grasses with higher wildlife value. Divide existing pastures into three or four paddocks with a paddock of cool season grass and two or three paddocks of native warm season grasses. Rotate grazing cattle among the paddocks during the season. Enlist technical oversight from Natural Resource Conservation Service and University of Illinois Extension.

### 2.6.3.5. Industrial Goal

#### Industrial Goal

*Provide an industrial complex and attendant utility and transportation infrastructure, which conform to prescribed safety, health, environmental and maintenance standards, that are utilized by compatible tenants.*

*Background:* Industry began in the area during World War II. When the Refuge was established it was given an industrial purpose, because industry was seen as a way of improving the economy of the area. The war time industry and some subsequent industrial tenants have contaminated the soils and waters of the Refuge. Providing the water and sewer infrastructure in support of industry has been difficult for the Refuge to accomplish. Most of the manufacturing and storage buildings are reaching the limits of their expected lifetime. The buildings require a lot of maintenance and refurbishing to meet today's standards. Recently, several industrial parks have been developed in the area that offer amenities not available on the Refuge. Of the industries on the Refuge, the munitions industry is in a unique position of requiring widely spaced facilities for safety. By providing a safe area for munitions manufacture, the Refuge is able to contribute to and support the national defense. Under this alternative, the Refuge would continue to provide an area for defense munitions manufacture. The Service would seek not to compete with neighboring industrial parks. The Refuge would maintain roads and provide water and sewer services sufficient for current industrial tenants. Tenants would be expected to bring their facilities up to prescribed safety, health, environmental and maintenance standards under any new leases. If tenants do not renew leases, the Refuge would seek new tenants for facilities that continue to be suitable for occupancy. Under this alternative the intent would be to consolidate the areas occupied by industry.

#### Objective 1

Consolidate the areas occupied by industry.

#### Strategies

1. Update Industrial Policy. Maintain the current infrastructure to support existing facilities.
2. Remove buildings that are no longer suitable for occupancy for reasons of contamination, safety or lack of structural integrity and restore to natural habitats.

### 2.6.3.6. Boundary Modification

The authorized Refuge boundary would expand to include land proposed for exchange with Southern Illinois University and additional lands contiguous with the current Refuge boundary.

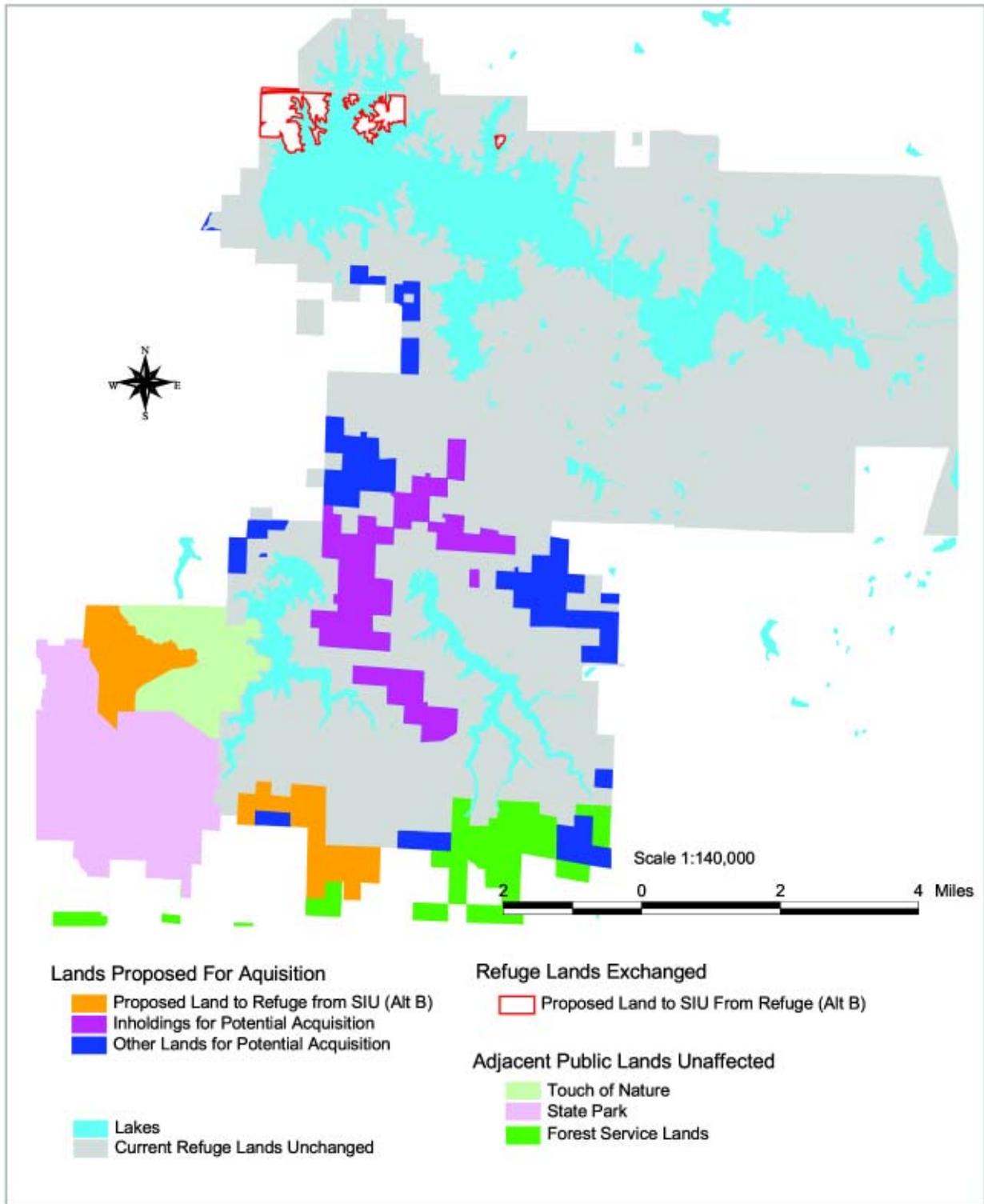
*Background:* The Washington Office of the Service approved the study of potential additional Refuge lands in 1990. The Refuge did not pursue the study of additional lands until the CCP process. The CCP planning effort was the logical time to re-examine all management and land protection issues related to the Refuge. So, during the CCP effort we again looked at the possible need to adjust the boundary of the Refuge. Land acquisition and subsequent habitat management would enhance the purposes of the Refuge and offer additional protection to existing lands as development accelerates along Refuge boundaries.

#### Land Exchange

Early in this planning process, the Service indicated an interest in exchanging land developed for non-wildlife-dependent recreation, such as camping and marina operations, for undeveloped land adjoining the Refuge. Southern Illinois University (SIU) and the Service agreed upon a framework for a land exchange that included the following:

- # The Service would exchange approximately 500 acres located in the northwest corner of the Refuge for approximately 1,700 acres of land owned by SIU located south and west of the current Refuge boundary (see Figure 13 and Figure 8 on page 42).
- # Parcels in the 500 acres of Refuge land include the Crab Orchard Boat & Yacht Club, The Haven, Crab Orchard Campground, Look Out Point, Take Pride Point (formerly Hogan's Point) and the marina areas also known as Playport and Images. The land cover types include approximately 125 acres of developed land, 150 acres of pine forest, 150 acres of hardwood forest, 40 acres of agricultural fields, and 40 acres of grassland/shrubland.
- # The land currently owned by the Service would be exchanged with SIU with the expectation of complementing the University's academic mission. Each of the above mentioned parcels would be managed according to a mutually agreeable plan that essentially permits the continuation of existing non-wildlife-dependent recreational uses and developing additional

**Figure 13: Crab Orchard NWR Inholdings, Boundary Modification, and Adjacent Protected Lands**



Alternative B: Reduced Habitat Fragmentation/Wildlife-dependent Recreation With Land Exchange

facilities. (A letter from SIU to the Service outlining the proposed uses can be found in Appendix I.)

- # The Service would retain a flowage easement on lands exchanged with SIU. Additionally, the Service would maintain a reversionary interest such that if the lands were no longer used as outlined in the letter in Appendix I, the land or individual parcels would revert back to Service ownership.
- # The Service would manage the lands received from SIU as forest habitat. The area would be open to the public for wildlife-dependent recreation. This second growth forest, with proper management and time, may reach a quality sufficient for its designation as Wilderness. The approximate acreage for the current land cover types of the SIU property are: 8 acres of pine forest, 1,569 acres of hardwood forest, and 122 acres of old fields.

#### **Contiguous Lands**

A proposed modification of the Refuge boundary could result in the addition of approximately 4,242 acres to the Refuge. The boundary modification would allow the acquisition of inholdings from willing sellers and moving segments of the boundary to coincide with roads that would better define the limits of the Refuge. The boundary modification would increase the efficiency of management, reduce incompatible land uses, and enhance public use opportunities.

Currently, if a landowner wishes to sell or exchange land that is outside the authorized boundary of the Refuge, the Service must complete an analysis for the individual parcel and complete environmental documents related to the transaction. This tract-by-tract analysis is inefficient and does not provide for an overall, cumulative analysis of the land transactions. The separate analysis also may delay a land transaction to the detriment of the seller.

The inholdings, boundary modification, and adjacent protected lands are depicted in Figure 13. A more detailed analysis of the boundary modification is presented in a Land Protection Plan (Appendix L).

The priority for acquisition of parcels would be determined by Refuge purposes; goals and objectives of the CCP; the potential to contribute to an unfragmented landscape component of forest or grassland; and pending development. Habitat within the proposed modified boundary includes

approximately 2,000 acres of farmland, some of which has reverted back to grasses, brush and hardwoods. The other land is composed of a combination of pasture, old field and mixed stands of oak, hickory, sycamore and tulip-poplar.

Service policy is to buy land only from willing sellers. The policy is that no rights of landowners or citizens would be transferred without the willing participation of the individuals owning land or rights to the land, including appropriate just-compensation for those rights. The Service is required to make purchase offers based on fair market value that matches the price of comparable land in the area.

It is also Service policy to seek the least amount of land ownership necessary to meet resource protection goals. Fee title acquisition is only one option available to the landowner and the Service. Conservation easements, cooperative agreements and other options may meet conservation objectives for some parcels.

The Service would evaluate any lands that it may acquire for potential contamination. We do not anticipate finding any contamination, which would hinder the Service's ability to achieve the Refuge purposes, in the area of proposed expansion. The extent of possible contamination is expected to be limited to levels associated with residences and small farming operations.

Any acquired lands would become part of the Refuge. The annual costs for administration, operations and maintenance would be lower than acquiring non-adjacent lands. Operation costs would ultimately depend upon the amount of land purchased in fee and easement and habitat restoration requirements.

## **2.6.4 Alternative C: Open Land Management/Consolidate and Improve Recreation**

### 2.6.4.1. Wildlife Conservation Goals

#### **Canada Geese Goal**

*Provide enough food for wintering Canada geese to support 6.4 million goose-use-days annually, in support of the Mississippi Valley Population Canada Goose Management Plan.*

Goal, background and objectives are the same as those listed under Alternative A.

*Strategy*

1. Maintain 4,800 acres of cropland in agricultural production. (Figure 14 on page 60). Manage 500 acres of moist-soil units. Continue fall mowing around selected ponds. Maintain seasonal closure to boating on east end of Crab Orchard Lake.

**Forest, Early Successional and Grassland Birds Goal**

*Maintain or enhance populations of forest, early successional and grassland birds, with emphasis on priority species, as identified in Partners in Flight Physiographic Area Bird Conservation Plans.*

**Objective 1**

Manage the southern portion of the Refuge as a large forest block to benefit area-sensitive forest birds. This area (about 9,500 acres) extends south from Grassy Road and includes the Crab Orchard Wilderness.

*Strategy*

1. Reforest 1 fallow field (52 acres) south of Grassy Road. This may include site preparation, planting a cover crop, planting tree seedlings, and weed control treatments.

**Objective 2**

Accelerate succession of pine plantations south of Grassy Road and outside the Wilderness (about 650 acres) to native hardwood forest.

2. Thin pine plantations to promote establishment and growth of native hardwoods. Most silvicultural treatments will be conducted under contract by commercial timber harvesting firms. Conduct prescribed burning during the dormant season (November through March) on a 3 to 5-year cycle to enhance habitat conditions and promote desirable hardwood regeneration.

**Objective 3**

Same as Alternative B (page 44).

*Strategy*

Same as Alternative B (page 43).

**Objective 4**

Same as Alternative B (page 44).

*Strategy*

Same as Alternative B (page 44).

**Objective 5**

Same as Alternative B (page 44).

*Strategy*

Same as Alternative B (page 44).

**Ducks, Shorebirds, and Other Waterbirds Goal**

*Maintain or enhance populations of ducks, shorebirds, and other waterbirds, with emphasis on priority species, as identified in the North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, and North American Waterbird Conservation Plan.*

Objectives and strategies same as Alternative B (page 45).

**Water Quality Goal**

*Provide and manage for quality of water in streams and lakes at Crab Orchard National Wildlife Refuge.*

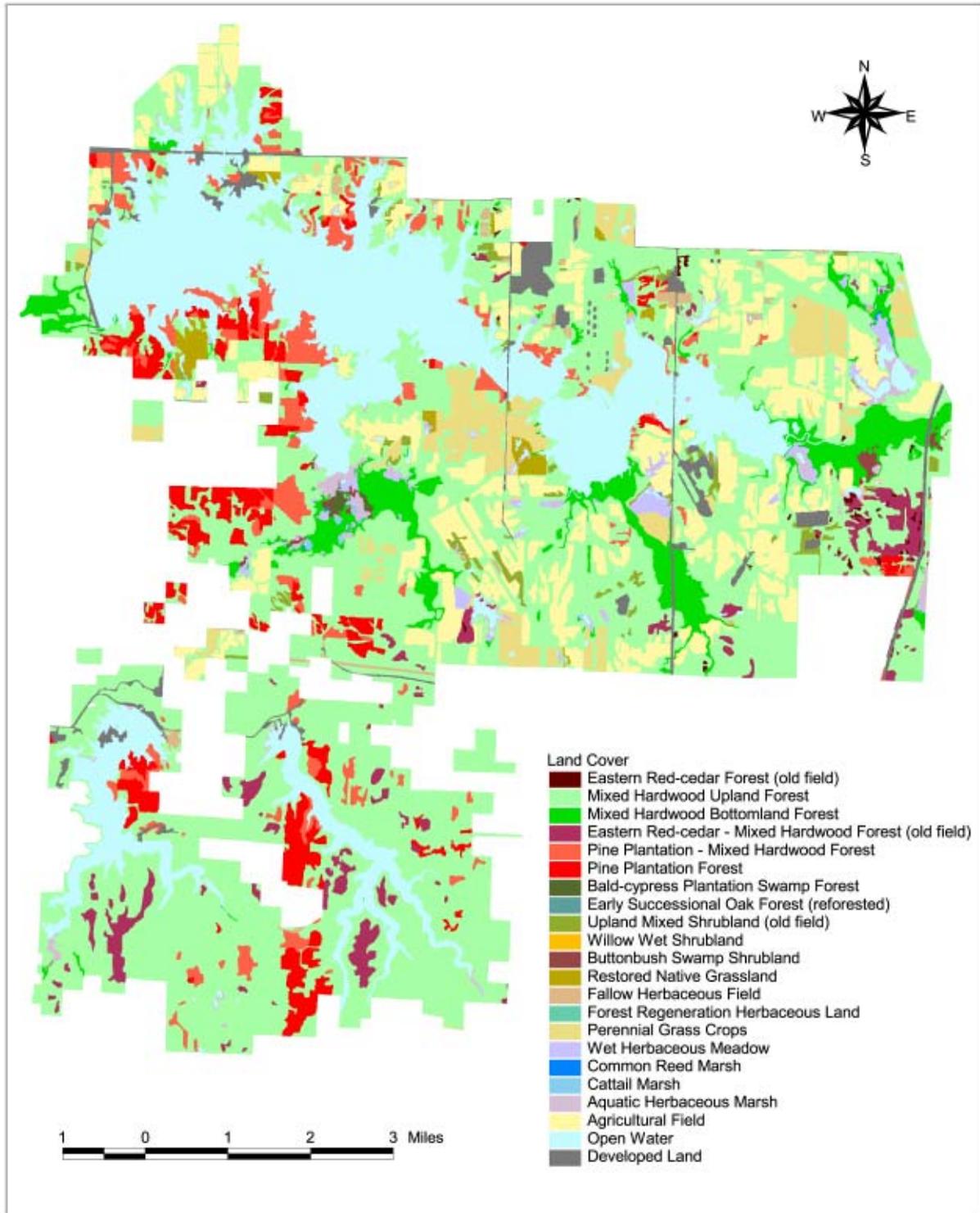
Objectives and strategies same as Alternative A (page 45).

2.6.4.2. Recreation/Public Use Goals**Hunting, Fishing, Wildlife Observation and Photography, Interpretation and Environmental Education Goal**

*Hunters, anglers, viewers and photographers of wildlife, general visitors, and students enjoy high-quality experiences through a variety of opportunities that promote an understanding and appreciation of the Refuge's natural and cultural resources and their management.*

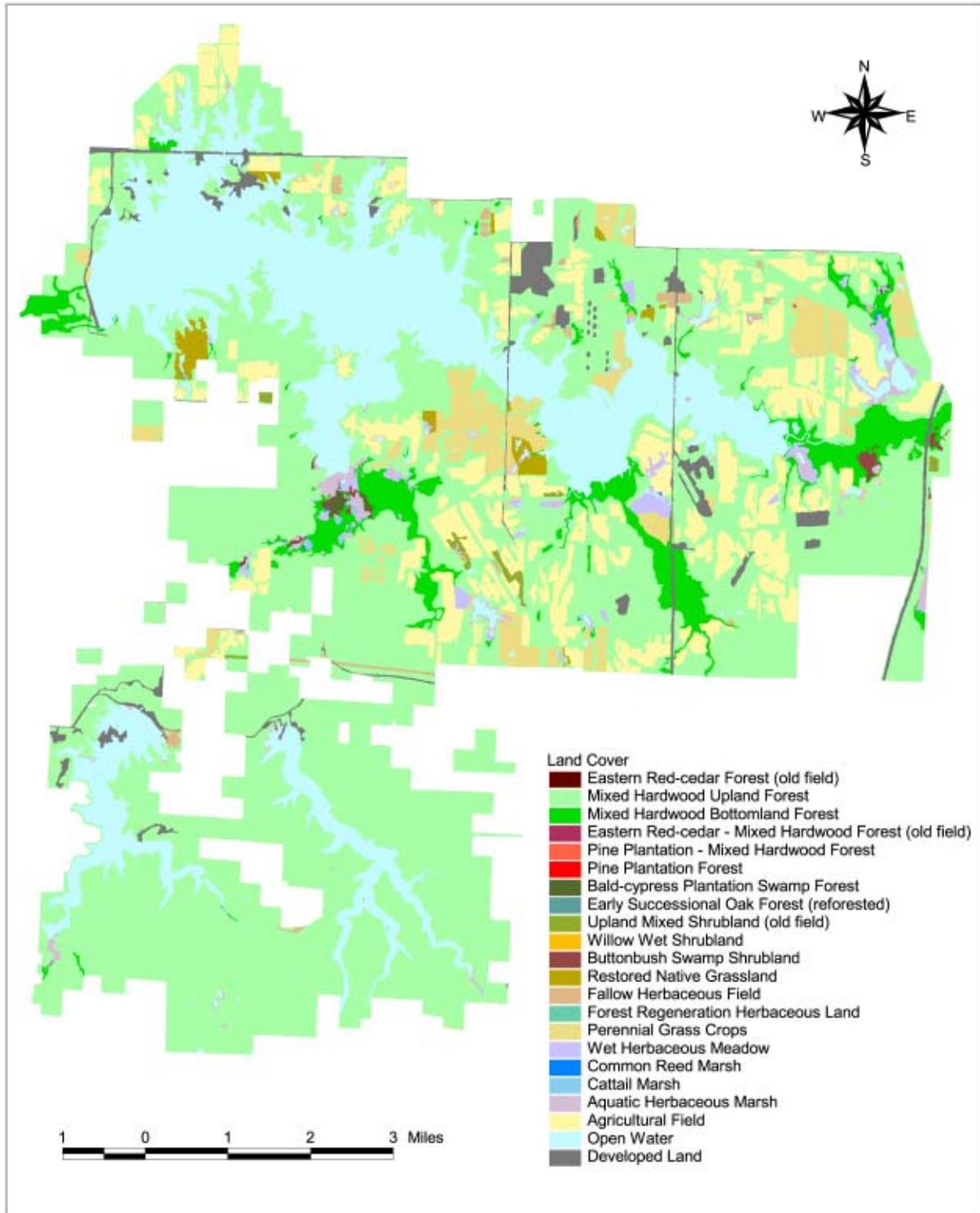
*Background:* The Refuge System Improvement Act of 1997 identified six wildlife-dependent, priority public uses that should be facilitated on national wildlife refuges if compatible with the purposes of the Refuge. These priority uses, which include hunting, fishing, wildlife observation and photography, interpretation, and environmental education, are compatible and can be facilitated at the Refuge. While all of these uses are provided at the Refuge to an extent, support for some of these uses has been inconsistent and the quality of the experience has been variable. The Refuge can provide high-quality experiences for these priority wildlife-dependent uses through improvement of supporting facilities, programs, and materials over the next 15 years. A high-quality experience includes uncrowded conditions, no conflicts with other users, a reasonable opportunity, and overall satisfaction. Understanding and appreciation of Refuge resources, management strategies, and purposes also contribute to quality of experience and influence visitor enjoyment.

**Figure 14: Land Cover of Crab Orchard NWR, Alternative C, Projected Conditions 2015**



**Figure 15: Land Cover of Crab Orchard NWR, Alternative C, Projected Conditions 2100**

Alternative C: Open Land Management / Consolidate and Improve Recreation



**Objective 1**

Increase the quality of hunting opportunities to a level where 75 percent of hunters experience uncrowded conditions, no conflicts with other users, a reasonable harvest opportunity, and satisfaction with their overall experience. Instill a sense of awareness among hunters of the Refuge as a component of the National Wildlife Refuge System and of hunting as a wildlife management tool.

*Rationale:* Without the land exchange, the management of non-wildlife-dependent recreation would reduce the visitor services staff's ability to provide the quality of services for wildlife-dependent recreation anticipated in Alternative B.

*Strategies*

1. In the public hunting area of the Refuge, continue the policy of providing hunting opportunities based on state hunting seasons and state and federal regulations.
2. In the restricted use area of the Refuge, maintain hunting opportunities, by permit, during shotgun deer and spring shotgun turkey seasons. Areas with high concentrations of waterfowl may occasionally be closed during the restricted use area shotgun hunts. Maintain shotgun deer season hunting opportunities for youth and persons with disabilities and, within 3 years of the plan's approval, provide these groups with opportunities for spring shotgun turkey season hunting when populations warrant.
3. Administer goose hunts in the controlled area through an agreement with a partner organization.
4. Over the life of the plan, promote ethical hunting behavior and increase hunter adherence to federal and state regulations through effective informational brochures and signs. Increase the visibility of Refuge law enforcement.
5. Over the life of the plan, enhance public understanding of Refuge hunting opportunities, ethical behaviors, the role of hunting in wildlife management, and the Refuge as a component of the National Wildlife Refuge System by increasing the quality of maps, signs, and brochures.

**Objective 2**

Increase the quality of fishing opportunities to a level where 75 percent of anglers experience uncrowded conditions, no conflicts with other users, a reasonable harvest opportunity, and satisfaction with their overall experience. At least 75 percent of anglers understand the issues, strategies, and policies involved in Refuge fisheries management and conservation.

*Strategies*

1. In the public fishing areas, continue the policy of providing fishing opportunities based on state and federal regulations.
2. Continue to allow tournaments and fish-offs on the Refuge. Continue current policies on limited closures of Refuge waters east of Wolf Creek Road.
3. Continue to provide bank and boat fishing opportunities in accordance with state and federal regulations. Maintain Refuge boat ramps, fishing piers, and parking facilities. Study the feasibility for and construct accessible fishing facilities at Little Grassy and Devils Kitchen lakes within 4 years of the plan's approval.
4. Over the life of the plan, promote Refuge fishing opportunities and encourage conservation practices, such as catch-and-release fishing, through the development and maintenance of high-quality maps, signs, brochures and the Refuge web page.
5. Ensure that the fishing public clearly understands the fish consumption advisories for Crab Orchard Lake through signs and brochures.
6. Over the life of the plan, provide insight to anglers regarding Refuge strategies, issues, and policies for fisheries management and conservation by redesigning and developing more effective informational signs and brochures. Increase angler awareness of the Refuge as a component of the National Wildlife Refuge System by improving the quality and content of maps, signs, and brochures.

**Objective 3**

Objective and strategies for wildlife observation and photography same as Alternative B (page 49).



*Chamnestown Trail Entry, Crab Orchard NWR. Glenn Smart*

#### **Objective 4**

Increase the effectiveness of the Refuge interpretive program so that 70 percent of visitors gain a better understanding of three primary concepts: (1) the value and unique purposes of the Refuge, (2) the Refuge as a component of the national network of refuges, and (3) the significance and mission of the National Wildlife Refuge System. Heighten awareness of conservation and stewardship concepts. Encourage visitors to adopt ethical behaviors and to take positive actions that support Refuge goals and the Refuge System mission.

#### *Strategies*

1. Within 3 years of the plan's approval, develop the interpretation portion of the Visitor Services Plan outlining a comprehensive, multifaceted approach emphasizing selected themes and key Refuge resources. Themes will be selected based on importance to Refuge and System goals and relevance to surrounding communities. All interpretive materials, tours, and programs will focus on one or more of these Refuge themes, along with the three basic concepts of the Refuge and Refuge System. Refuge interpretive themes may be in a storyline form that includes three or more themes. Themes may include: Exploring the Diversity of Wildlife, Understanding the Past, Protecting the Balance, and Communicating Visitor Opportunities.
2. Within 4 years of the plan's approval, renovate and replace damaged and outdated interpretive and information panels on Ref-

uge kiosks, wayside exhibits, trails, ramps, structures and other facilities. Ensure all panels comply with Service standards.

3. In cooperation with Refuge volunteers and other partners, conduct a variety of high quality interpretive programs annually. Continue popular and established interpretive programs and special events, such as the Families Understanding Nature program and National Wildlife Refuge Week. Ensure interpretive programming remains current and dynamic by continually creating new programs, incorporating new ideas, updating information, and revitalizing ongoing programs. Focus each interpretive program on one or more Refuge themes.
4. Over the life of the plan and in cooperation with Friends of Crab Orchard National Wildlife Refuge and other partners, revise Refuge interpretive brochures, handouts, and other written materials as needed to improve consistency and to meet Service standards.
5. Within 1 year of the plan's approval, create a custom audiovisual program that provides visitors with orientation information about the Refuge. Ensure this program and a variety of other wildlife-related audiovisual programs are made available for viewing at the Visitor Center and for use in interpretive programs.
6. Within 3 years of the plan's approval, establish and maintain an interpretive auto tour route, using existing roads, that will facilitate opportunities for wildlife and cultural resource observation and provide visitors with an overview of the Refuge, its resources, and its management. Include identified stations with interpretive panels and corresponding, radio-broadcasted interpretive messages.

#### **Objective 5**

Increase the effectiveness of the Refuge environmental education program so that 75 percent of participants gain a better understanding and appreciation of the resources, purposes, and value of the Refuge and the Refuge System. Heighten awareness of conservation and stewardship concepts and encourage participants to

take positive actions on the Refuge and in their community that support Refuge goals and the Refuge System mission.

#### *Strategies*

1. Within 2 years of the plan's approval, develop the environmental education portion of the Visitor Services Plan, outlining a comprehensive, curriculum-based approach structured to be compatible with state learning standards and national environmental education guidelines. Emphasize key Refuge resources, the Refuge, the National Wildlife Refuge System, and selected Refuge themes. These themes will be based on importance to Refuge and System goals and relevance to surrounding communities. All environmental education materials, facilities, and programs will focus on one or more of these Refuge themes, along with the basic concepts of the Refuge and the Refuge System. Refuge themes may be in a storyline form that includes three or more themes. Themes may include: Exploring the Diversity of Wildlife, Understanding the Past, Protecting the Balance, and Communicating Visitor Opportunities.
2. Within 3 years of the plan's approval and in cooperation with Friends of Crab Orchard National Wildlife Refuge and other partners, create an array of environmental education kits, each focusing on one or more aspects of Refuge themes. Educational kits will include interactive materials and a detailed instructional and activity guide designed with a clear, consistent format and coordinated with state learning standards. Develop and maintain a multi-faceted environmental education resource library, available for use by educators and in Refuge educational programs, comprised of books, videos, posters, audio tapes, written materials, and environmental education kits.
3. Within 4 years of the plan's approval and in cooperation with other partners, establish an environmental education complex that incorporates an outdoor amphitheater with educational displays, a set of associated trails, the Refuge Visitor Center, and an educator's trail specifically designed to facilitate environmental education activities and function as an outdoor classroom.
4. Within 4 years of the plan's approval and in cooperation with other partners, create an Educator's Guide to Crab Orchard National Wildlife Refuge that provides an orientation, guidelines, grade-level and state learning standards information, maps, and site-specific activities that focus on one or more Refuge themes. Incorporate input from area educators to ensure the Refuge guide meets area teachers' needs.
5. In cooperation with other partners, conduct or host annual teacher workshops that encourage area educators to incorporate environmental education into their curriculum and to utilize Refuge materials, staff, and resources, both in the classroom and during field trips.
6. Continue currently-offered environmental education programs done by request, including on-site and off-site programs, special educational events, group camp programs, and special interest group programs. Over the life of the plan, expand the environmental education program to include additional on-site and off-site programs, special educational events, group camp programs, and special interest group programs. Develop pre- and post-visit activities in addition to on-site activities.
7. Over the life of the plan, establish partnerships with selected local schools, agencies, and nonprofit organizations to more effectively develop and expand environmental education programs. Involve volunteers in educational programs and explore the potential for environmental education interns through Southern Illinois University and John A. Logan College. Explore the potential for creating a grant program to help area schools with field trip expenses.
8. Conduct an annual review of the Refuge environmental education program. Invite feedback from area educators. Revise as necessary.

#### **Other Land- and Water-based Recreation Goal**

*Visitors will enjoy high quality, land- and water-based activities that fulfill the recreation purpose of the Refuge when the Refuge was established.*

*Background:* There is a recognized need to improve the facilities at the Refuge. Under current trends of resource allocation, the current facilities

can not be maintained at acceptable standards. Under this alternative, the intent would be to reduce the facilities so that the quality could be improved.

A conflict has existed between anglers and high speed watercraft. A 150-foot no-wake zone along the shoreline of Crab Orchard Lake would reduce this conflict. This alternative also establishes additional no-wake zones in several necks on the lake, as well as east of Highway 148.

The Haven and the Crab Orchard Boat & Yacht Club are available only to a limited segment of the general population. The facilities and activities at these clubs amount to private use of public land. Our long-term goal is to make these areas available to a broader portion of the public.

The Haven is a 10-acre site located on the north side of Crab Orchard Lake, near the Highway 13 and Cambria Neck Road intersection. This site has been leased to the Egyptian Past Commanders Club of the American Legion since 1948 for the benefit and enjoyment of disabled veterans primarily from the Marion Veterans Hospital and the Anna State Hospital. The Haven includes a one-story lodge building, and several outside picnic sites, that are used for day visits by veterans for recreation and socializing. During the length of the planning period established for this Refuge CCP (next 15 years), the Refuge Staff will work collaboratively with the Egyptian Past Commanders Club to evaluate the effectiveness of this facility in achieving the purpose of Haven's establishment, and to make recommendations for its future use.

We will extend the lease of the Crab Orchard Boat & Yacht Club for 2 years after the approval of the Refuge CCP. After the lease expires, we will convert the operation of the club facilities to a concession contract. This would end what amounts to private use of public land and make the facilities available to a wider portion of the public.

#### **Objective 1**

Improve the quality of boat launches, marinas, beaches, picnic areas, and campground to industry standards within the life of the CCP.

#### *Strategies*

1. Maintain picnicking at the Refuge recreational areas of Greenbriar, Wolf Creek, and Harmony Trail, and relocate picnic facilities from Cambria Neck and Playport Marina to a day use area at the current Images



*Photography is one of the priority wildlife-dependent public uses on national wildlife refuges.*

- Marina site. Explore the option of concession-operated picnic shelters at Little Grassy and Crab Orchard campgrounds.
2. Explore the potential for a bicycle route within the restricted use area of the Refuge. The route would run mainly along old railroad beds.
3. Continue current policies on swimming at Devils Kitchen, Little Grassy and Crab Orchard lakes. Prohibit scuba diving.
4. Within 10 years of the plan's approval, upgrade boat ramps and associated parking at Devils Kitchen, Little Grassy and Crab Orchard lakes.
5. Continue current zoning on Crab Orchard Lake with additional no wake zones (see Figure 11 on page 53). Gas motors would be prohibited in the most southeastern arm of Devils Kitchen Lake, from the mouth of Grassy Creek south to the Refuge boundary, and in ponds within the public use area.
6. Horseback use on the Refuge would be confined to a designated River to River Trail (see Figure 12 on page 54) and erosion due to trail use would be actively controlled through maintenance and/or seasonal closures.
7. Camping at Devils Kitchen would be reduced to primitive sites only. Crab Orchard and Little Grassy campgrounds would be upgraded to standards comparable to others in the area.
8. Within 2 years of the plan's approval, consolidate Playport and Images marinas on Crab Orchard Lake. Images marina slips will be moved to Playport marina. Within 5

years of the plan's approval, remove the building at Images Marina and develop the area into a large access area to the lake with a comfort station.

9. After 2 years of the completion of the CCP, the Crab Orchard Boat & Yacht Club will be converted to a concession.

#### Customer Service Goal

*Visitors of all abilities will feel welcome and enjoy a safe visit to an area that they recognize as a national wildlife refuge.*

*Background:* Policy and guidance of the Service directs each refuge to meet basic standards in hosting visitors. The guidance covers signs, kiosks, leaflets, facility and road maintenance, customer service, and opportunities for visitor feedback. Awareness of Crab Orchard NWR as a national wildlife refuge can also influence visitor experience and enjoyment.

#### Objective 1

Improve Refuge signs, kiosks, and facilities so that 90 percent of visitors feel welcome and secure, enjoy their visit, and recognize the area as a national wildlife refuge.

#### Strategies

1. Within 3 years of the plan's approval, revise information on existing kiosks, trailhead and other identification markers, boundary signs, and other such signs as necessary to meet Service standards.
2. Within 5 years of the plan's approval, create and install additional kiosks where needed at Refuge access points to ensure that all visitors are greeted and informed that they are entering a national wildlife refuge. Ensure that all structures comply with Service standards.
3. Verify annually that visitors are welcomed and treated courteously by staff and volunteers. Confirm customer service standards during employee and volunteer orientations. Provide visitors with opportunities for feedback through suggestion cards, verbal reports, written mail, and e-mail through the Refuge web page. Address customer service issues promptly and professionally according to Service standards.

4. Within 2 years of the plan's approval, develop a Refuge brochure with detailed information on accessible facilities, trails, programs, and recreational opportunities at the Refuge.
5. Conduct semi-annual safety inspections of all Refuge facilities and reaffirm compliance with Service standards.
6. Maintain recognizable, consistent signs that clearly identify public hunting areas. Increase awareness among non-hunting visitors of hunting areas and seasons through effective signs and brochures.
7. Respond to notification of safety problems and unsafe situations promptly and in accordance with Service standards. Increase visibility of Refuge law enforcement, particularly during periods of heavy visitation.

#### 2.6.4.3. Agricultural Goal

##### Agricultural Goal

*Provide opportunities for agricultural uses on Refuge lands that help attain wildlife conservation goals.*

#### Objective 1

Continue farming operations on about 4,500 acres of row crops, and reclaim and farm about 300 acres of former fields, with greater emphasis on conservation practices.

#### Strategies

Same as Alternative B (page 55).

Objectives and strategies for pastures are the same as Alternative B (page 55).

Objectives and strategies for hay fields are the same as Alternative A (page 55).

#### 2.6.4.4. Industrial Goal

##### Industrial Goal

*Provide an industrial complex and attendant utility and transportation infrastructure, which conform to prescribed safety, health, environmental and maintenance standards.*

#### Objective 1

Consolidate the areas occupied by industry.

#### Strategies

1. Non-munitions-related tenants would not be replaced as they leave the Refuge.

- Remove buildings that are no longer suitable for occupancy for reasons of contamination, safety or lack of structural integrity and restore to natural habitats.

#### 2.6.4.5. Boundary Modification

The authorized Refuge boundary would expand to include additional lands contiguous with the current Refuge boundary.

The proposed boundary modification is depicted in Figure 13 on page 57. The background discussion of this proposed modification is presented under Alternative B.

## 2.6.5 Alternative D: Forest Land Management/Consolidate and Improve Recreation

### 2.6.5.1. Wildlife Conservation Goals

#### Canada Geese Goal

*Provide enough food for wintering Canada geese to support 6.4 million goose-use-days annually, in support of the Mississippi Valley Population Canada Goose Management Plan.*

Goal, background, and objectives same as Alternative A (page 35).



Sumac, Crab Orchard NWR. Glenn Smart

#### Strategy

- Maintain 4,300 acres of cropland in agricultural production (Figure 16). Manage 450 acres of moist-soil units. Continue fall mowing around selected ponds. Maintain seasonal closure to boating on the east end of Crab Orchard Lake.

#### Forest, Early Successional and Grassland Birds Goal

*Maintain or enhance populations of forest, early successional and grassland birds, with emphasis on priority species, as identified in Partners in Flight Physiographic Area Bird Conservation Plans.*

Objectives and strategies for reforestation, management of pine plantations, and management of early successional habitat are the same as Alternative B (page 43).

#### Objective 1

Objectives and strategies for native warm-season grassland are the same as Alternative B (page 43).

#### Objective 2

Maintain 1,000 acres of pasture, 500 acres of hay fields, and about 1,500 acres of clover fields with increased emphasis on habitat quality for grassland birds, along with an emphasis on cattle production on pastures.

#### Strategy

- Remove 15 acres of linear forest habitat and 2 miles of hedge rows. Increase forage diversity in fescue pastures by adding legumes, other cool-season or warm-season grasses by reseeding or interseeding. Subdivide larger pastures for rotational grazing to increase cattle production. All mowing of hay fields, pastures, and clover fields will take place after August 1.

#### Ducks, Shorebirds, and Other Waterbirds Goal

*Maintain or enhance populations of ducks, shorebirds, and other waterbirds, with emphasis on priority species, as identified in the North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, and North American Waterbird Conservation Plan.*

Objectives and strategies are the same as Alternative A (page 38).

#### Water Quality Goal

*Provide and manage for quality of water in streams and lakes at Crab Orchard National Wildlife Refuge.*

Objectives and strategies are the same as Alternative A (page 38).

### 2.6.5.2. Recreation/Public Use Goals

#### **Hunting, Fishing, Wildlife Observation and Photography, Interpretation and Environmental Education Goal**

*Hunters, anglers, viewers and photographers of wildlife, general visitors, and students enjoy high-quality experiences through a variety of opportunities that promote an understanding and appreciation of the Refuge's natural and cultural resources and their management.*

Objectives and strategies for hunting, fishing, wildlife observation and photography, interpretation, and environmental education are the same as Alternative C (page 59).

#### **Other Land- and Water-based Recreation Goal**

*Visitors will enjoy high quality, land- and water-based activities that fulfill the recreation purpose of the Refuge when the Refuge was established.*

Objectives and strategies for other land- and water-based recreation are the same as Alternative C except that horseback use would be prohibited on the Refuge and gas motors would be prohibited on Devils Kitchen Lake.

#### **Customer Service Goal**

*Visitors of all abilities will feel welcome and enjoy a safe visit to an area that they recognize as a national wildlife refuge.*

Objectives and strategies for customer service are the same as Alternative C (page 66).

### 2.6.5.3. Agricultural Goal

#### **Agricultural Goal**

*Provide opportunities for agricultural uses on Refuge lands that help attain wildlife conservation goals.*

*Background:* Under this alternative the emphasis would be on producer benefits. Decisions that involve a compromise between agricultural goals and wildlife goals would be weighted toward the agricultural goals.

#### **Objective 1**

Continue farming operations on about 4,300 acres of row crops with greater emphasis on conservation practices, along with reasonable allowances to cooperators.

#### *Strategy*

1. Maintain infrastructure (roads, fences) in support of agricultural operations. Address erosion with buffer strips. Drop small, less

profitable fields (less than 5 acres) from row cropping and convert to other cover (about 15 fields totaling 52 acres). Identify and drop farmed wetlands from the farm program. Permit cooperator to harvest corn remaining in the field in the spring. Emphasize Johnsongrass control, for example: allow cooperators to adjust rotation by planting soybeans in two successive years in one field annually. Prohibit mowing of clover in the crop rotation until after August 1. Enlist technical oversight from Natural Resource Conservation Service and University of Illinois Extension.

#### **Objective 2**

Continue farming operations on about 500 acres of hay fields with greater emphasis on conservation practices.

#### *Strategy*

1. Prohibit mowing of hay until after August 1. Maintain an updated rate charge for hay.

#### **Objective 3**

Continue farming operations on about 1,000 acres of pasture with greater emphasis on conservation practices, along with reasonable allowances to cooperators.

#### *Strategy*

1. Remove 15 acres of linear forest habitat and 2 miles of hedge rows. Increase forage diversity in fescue pastures by adding legumes, other cool-season or warm-season grasses by reseeding or inter-seeding. Subdivide larger pastures for rotational grazing to increase cattle production. All mowing would take place after August 1. Enlist technical oversight from Natural Resource Conservation Service and University of Illinois Extension.

### 2.6.5.4. Industrial Goal

#### **Industrial Goal**

*Provide an industrial complex and attendant utility and transportation infrastructure, which conform to prescribed safety, health, environmental and maintenance standards.*

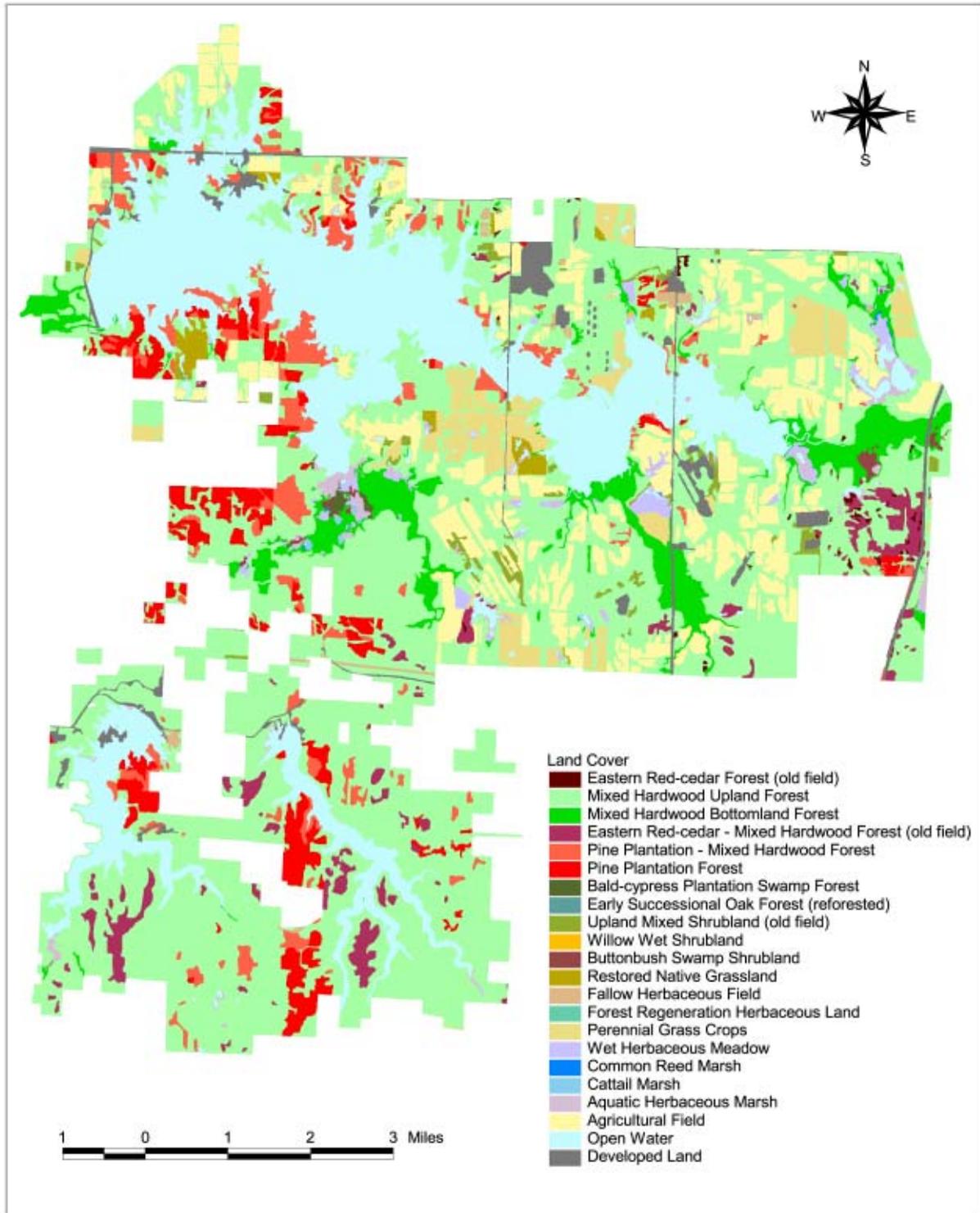
Objective and strategies are the same as Alternative C (page 66).

### 2.6.5.5. Boundary Modification

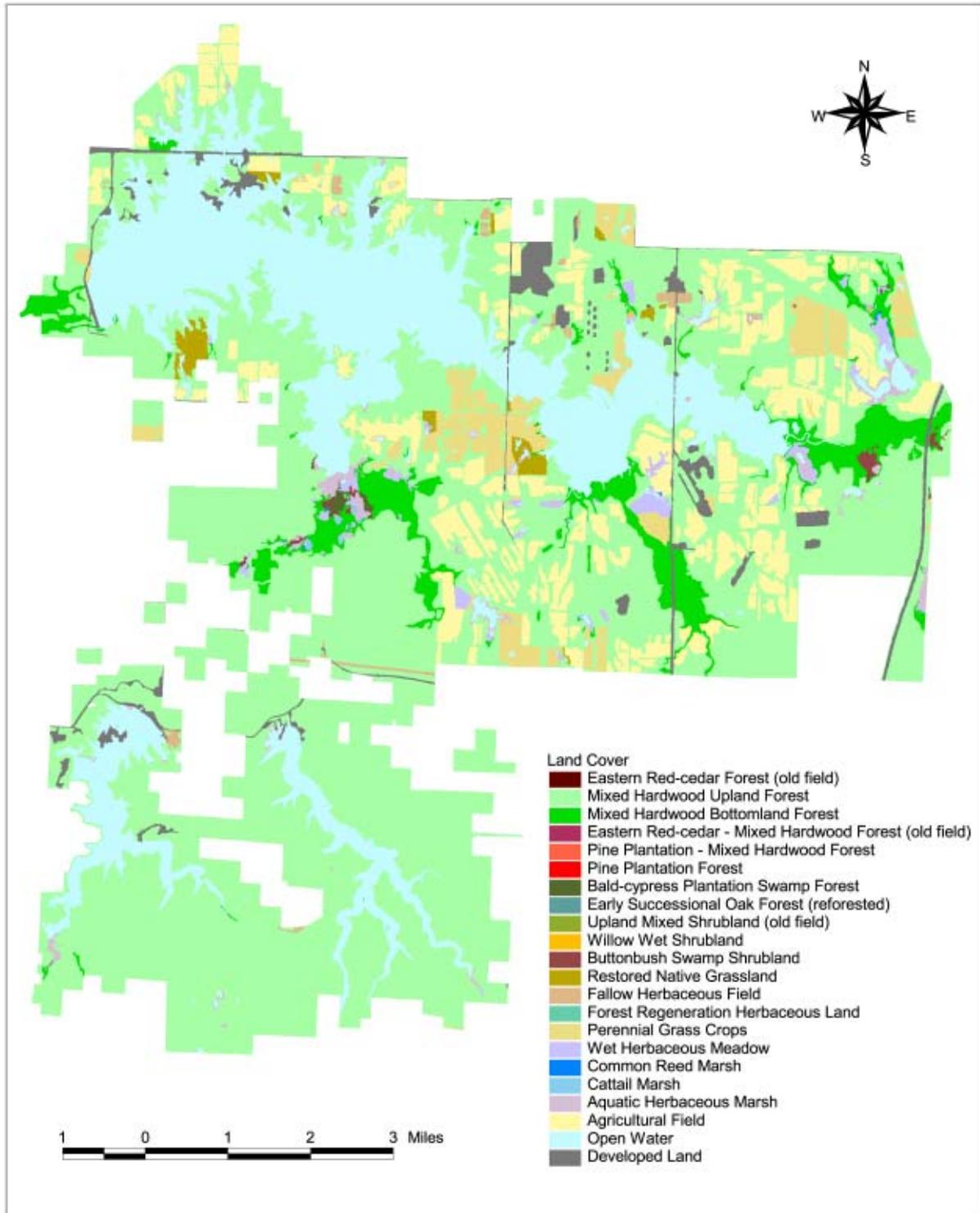
Same as Alternative C (page 66).

**Figure 16: Land Cover of Crab Orchard NWR, Alternative D, Projected Conditions 2015**

Alternative D: Forest Land Management / Consolidate and Improve Recreation



**Figure 17: Land Cover of Crab Orchard NWR, Alternative D, Projected Conditions 2100**



## 2.6.6 Alternative E: Reduced Habitat Fragmentation/Consolidate and Improve Recreation (Preferred Alternative)

### 2.6.6.1. Wildlife Conservation Goals

#### Canada Geese Goal

Provide enough food for wintering Canada geese to support 6.4 million goose-use-days annually, in support of the Mississippi Valley Population Canada Goose Management Plan.

Background and objective same as Alternative A (page 35).

#### Strategy

1. Maintain 4,300 acres of cropland in agricultural production (see Figure 9 on page 46). Manage 450 acres of moist-soil units. Continue fall mowing around selected ponds. Maintain seasonal closure to boating on the east end of Crab Orchard Lake.

#### Forest, Early Successional and Grassland Birds Goal

Maintain or enhance populations of forest, early successional and grassland birds, with emphasis on priority species, as identified in *Partners in Flight Physiographic Area Bird Conservation Plans*.

Objectives and strategies for reforestation, management of pine plantations, management of early successional habitat, and management for native warm-season grasslands are the same as Alternative B (page 43).

#### Ducks, Shorebirds, and Other Waterbirds Goal

Maintain or enhance populations of ducks, shorebirds, and other waterbirds, with emphasis on priority species, as identified in the *North American Waterfowl Management Plan*, *U.S. Shorebird Conservation Plan*, and *North American Waterbird Conservation Plan*.

Objective and strategies are the same as Alternative B (page 45).

#### Water Quality Goal

Provide and manage for quality of water in streams and lakes at Crab Orchard National Wildlife Refuge.

Objective and strategies are the same as Alternative B (page 45).

### 2.6.6.2. Recreation/Public Use Goals

#### Hunting, Fishing, Wildlife Observation and Photography, Interpretation and Environmental Education Goal

Hunters, anglers, viewers and photographers of wildlife, general visitors, and students enjoy high-quality experiences through a variety of opportunities that promote an understanding and appreciation of the Refuge's natural and cultural resources and their management.

Objectives and strategies for hunting, fishing, wildlife-observation and photography, interpretation, and environmental education are the same as Alternative C (page 59).

#### Other Land- and Water-based Recreation Goal

Visitors will enjoy high quality, land- and water-based activities that fulfill the recreation purpose of the Refuge when the Refuge was established.

Objectives and strategies for other land- and water-based recreation are the same as Alternative C (page 64) except that gas motors would be prohibited in the most southeastern arm of Devils Kitchen Lake, from the mouth of Grassy Creek south to the Refuge boundary, and in ponds within the public use area. (See Figure 18.) The portion of the lake south of Line Road 6 boat ramp would be designated a no-wake zone.

#### Customer Service Goal

Visitors of all abilities will feel welcome and enjoy a safe visit to an area that they recognize as a national wildlife refuge.

Objectives and strategies for customer service are the same as Alternative C (page 66).

### 2.6.6.3. Agricultural Goal

#### Agricultural Goal

Provide opportunities for agricultural uses on Refuge lands that help attain wildlife conservation goals.

Objectives and strategies for agriculture are the same as Alternative B (page 55).

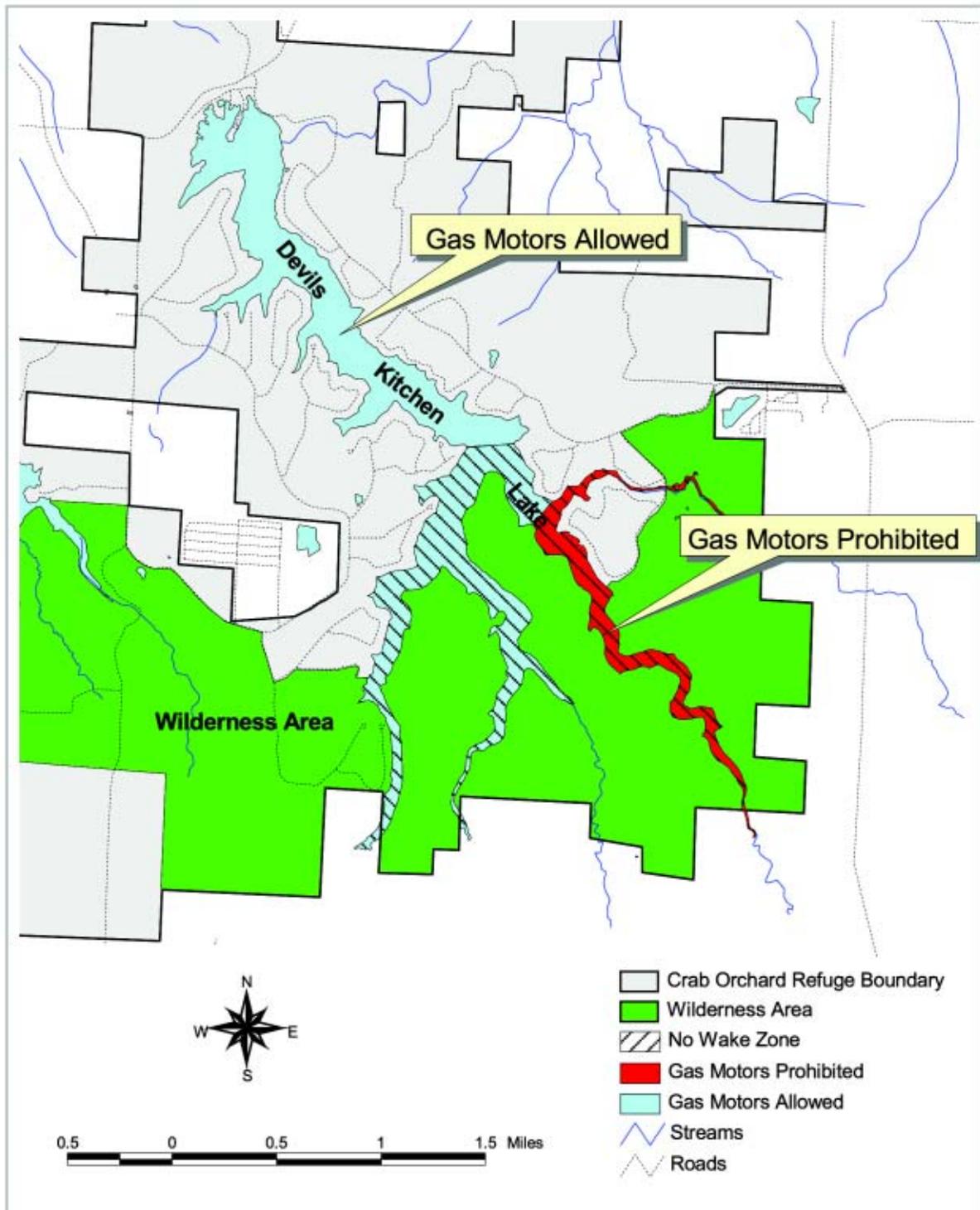
### 2.6.6.4. Industrial Goal

#### Industrial Goal

Provide an industrial complex and attendant utility and transportation infrastructure, which conform to prescribed safety, health, environmental and maintenance standards.

Objective and strategies for industry are the same as Alternative B (page 55).

Figure 18: Devils Kitchen Lake Zoning, Crab Orchard NWR





*Eastern box turtle, Crab Orchard NWR*

#### 2.6.6.5. Boundary Modification

The authorized Refuge boundary would expand to include additional lands contiguous with the current Refuge boundary.

The proposed boundary modification is depicted in Figure 13 on page 57. The background discussion of this proposed modification is presented under Alternative B (page 56).

## **2.7 Comparison of Alternatives**

### **2.7.1 Comparison of Funding and Personnel Needs by Alternative**

#### 2.7.1.1. Alternative A: Current Management (No Action)

Under this alternative, funding and personnel would remain the same.

#### 2.7.1.2. Alternative B: Reduced Habitat Fragmentation/ Wildlife-dependent Recreation Emphasis With Land Exchange

Habitat management increases under this alternative. Reforestation, aggressive control of invasive species, an increase in the number of acres managed as moist soil units, and improvements to the open land units would require additional staff and operating funds. A person with expertise in agriculture and invasive species would be added to the biological program staff. Also, a person with expertise in Geographic Information Systems would be needed to assist the biological staff with mapping and record keeping for invasive species control and other habitat work. Maintenance staff efforts would shift from

the campground and marina operations that would be traded to SIU to assist with the increased habitat work.

Emphasis on recreation would focus on wildlife-dependent activities such as hunting, fishing, and environmental education. To improve the quality of services, the Refuge would add a position in the visitor information center to assist with administrative duties, freeing up the park rangers to provide environmental education and interpretive opportunities. Law enforcement efforts would shift from campgrounds and marinas that would be traded to SIU to resource protection on other parts the Refuge. Funds for new signs, kiosks, courtesy boat docks, improvements to the Little Grassy Campground, trails, and environmental education would be required.

The addition of the new strategies to meet the goals and objectives of this alternative would require a 15 percent increase in the Refuge's current operations and maintenance budget.

#### 2.7.1.3. Alternative C: Open Land Management/ Consolidate and Improve Recreation

Habitat management under this alternative focuses on open land. Many of the new habitat projects found in Alternative B would be undertaken in this alternative. The two new biological staff positions mentioned above would be added under this alternative. A seasonal tractor operator would need to be hired under this alternative to help accomplish the habitat work. This position is not necessary under Alternative B because the land exchange would allow the shifting of maintenance workers from the marina and campground work to habitat work.

Compared to Alternative A, this alternative has an increased focus on wildlife-dependent uses. The management of the campgrounds and marinas would reduce the visitor services staff's ability to provide the quality of services anticipated in Alternative B. The additional staff person to help with the administration of the visitor information center is included in this alternative.

The completion of the consolidation of the Playport and former Images Marinas would occur under this alternative. Funds would be required to move the remainder of the docks from the Images area, removal of the concession building and construction of a boat ramp.

An increase in funding similar to Alternative B would be needed for this alternative.

#### 2.7.1.4. Alternative D: Forest Land Management/ Consolidate and Improve Recreation

Habitat management under this alternative would focus on forests. Under this alternative the additions to the biological staff would be the Geographic Information System Specialist and a biological technician. The biological technician would assist with invasive species control and forestry work.

Compared to Alternative A, this alternative has a greater focus on wildlife-dependent uses. The management of the campgrounds and marinas would reduce the visitor services staff's ability to provide the quality of services anticipated in Alternative B. The additional staff person to help with the administration of the visitor information center is included in this alternative.

The completion of the consolidation of the former Images and Playport Marinas would occur under this alternative. Funds would be required to move the remainder of the docks from the Images area, removal of the concession building and construction of a boat ramp.

Funding of the Refuge's operations and maintenance budget would need to increase about 10 percent if this alternative is implemented.

#### 2.7.1.5. Alternative E: Reduced Habitat Fragmentation/Consolidate and Improve Recreation (Preferred Alternative)

Habitat management increases under this alternative. Reforestation, aggressive control of invasive species, an increase in the number of acres managed as moist soil units, and improvements to the open land units would require additional staff and operating funds. A person with expertise in agriculture and invasive species would be added to the biological program staff. Also, a person with expertise in Geographic Information Systems would be needed to assist the biological staff with mapping and record keeping for invasive species control and other habitat work. A seasonal tractor operator would need to be hired under this alternative to help accomplish the habitat work. This position is not necessary under Alternative B because the land exchange would allow the shifting of maintenance workers from the marina and campground work to habitat work.

Compared to Alternative A, this alternative has an increased focus on wildlife-dependent uses. The management of the campgrounds and marinas

would reduce the visitor services staff's ability to provide the quality of services anticipated in Alternative B. An additional staff person to help with the administration of the visitor information center is included in this alternative.

The completion of the consolidation of the Playport and former Images Marinas would occur under this alternative. Funds would be required to move the remainder of the docks from the Images area, removal of the concession building and construction of a boat ramp.

An increase in funding similar to Alternative B would be needed for this alternative.

**Table 4: Summary of Management Alternatives**

<b>Issue</b>	<b>Alternative A: Current Management (No Action)</b>	<b>Alternative B: Reduced Habitat Fragmentation, Wildlife-dependent Recreation Emphasis</b>	<b>Alternative C: Open Land Management, Consolidate and Improve Recreation</b>	<b>Alternative D: Forest Land Management, Consolidate and Improve Recreation</b>	<b>Alternative E: Reduced Habitat Fragmentation, Consolidate and Improve Recreation (Preferred Alternative)</b>
<b>Wildlife Conservation</b>					
Threatened/ Endangered Species	Management activities would protect Bald Eagle and Indiana bat.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.
Canada Goose	Provide food for 6.4 million goose-use-days annually.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.
Resident Fish and Wildlife	Manage mixed-species, warm-water sport fish population. Manage resident wildlife species at levels that allow hunting opportunities.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.
Forest Birds	Reforest 240 acres.	Reforest 490 acres.	Reforest 52 acres.	Same as Alt. B.	Same as Alt. B.
Prescribed Fire	Prescribed burning and thinning on about 3,300 acres pine plantations.	Prescribed burning and thinning on about 3,300 acres pine plantations.	Prescribed burning and thinning on about 650 acres pine plantations.	Same as Alt. B.	Same as Alt. B.
Early Successional Birds	All early successional habitat matures.	Maintain about 300 acres of early successional habitat.	Same as Alt. B.	Same as Alt. B.	Same as Alt. B.
Grassland Birds	Maintain 240 acres of native warm season prairie. Maintain 3,300 acres of agricultural grasslands. Delay mowing until after August 1.	Maintain 260 acres of native warm season prairie. Maintain 3,300 acres of agricultural grasslands. Delay mowing until after August 1. Remove 124 acres of linear forest habitat and 8 miles of hedge row. Convert fescue grasses in pastures to more desirable wildlife grasses.	Same as Alt. B.	Maintain 260 acres of native warm season prairie. Maintain 3,000 acres of agricultural grasslands. Delay mowing until after August 1. Remove 15 acres of linear forest habitat and 2 miles of hedge row.	Same as Alt. B.
Prescribed Fire	Prescribed burning on 240 acres of native prairie.	Prescribed burning on 260 acres of native prairie.	Same as Alt. B.	Same as Alt. B.	Same as Alt. B.
Ducks, Shorebirds and Other Waterfowl	Manage 450 acres of moist soil units.	Manage 500 acres of moist soil units by constructing about 100 acres of new units.	Same as Alt. B.	Same as Alt. A.	Same as Alt. B.

**Table 4: Summary of Management Alternatives (Continued)**

<b>Issue</b>	<b>Alternative A: Current Management (No Action)</b>	<b>Alternative B: Reduced Habitat Fragmentation, Wildlife-dependent Recreation Emphasis</b>	<b>Alternative C: Open Land Management, Consolidate and Improve Recreation</b>	<b>Alternative D: Forest Land Management, Consolidate and Improve Recreation</b>	<b>Alternative E: Reduced Habitat Fragmentation, Consolidate and Improve Recreation (Preferred Alternative)</b>
Water Quality	Continue use of soil and water protection measures.	Continue use of soil and water protection measures, plus establish more buffer strips and keep livestock away from streams. Work with landowners to improve quality of water within Refuge watersheds. Identify and drop farmed wetlands from the farm program.	Continue use of soil and water protection measures, plus establish more buffer strips and keep livestock away from streams. Identify and drop farmed wetlands from the farm program.	Same as Alt. C.	Same as Alt. B.
<b>Recreation</b>					
Hunting and Fishing	Hunting and fishing programs as offered in 2001.	Strive to provide quality experience for 90 percent of participants. Additional hunting programs to encourage non-traditional participants.	Strive to provide quality experience for 75 percent of participants. Additional hunting programs to encourage non-traditional participants.	Same as Alt. C.	Same as Alt. C.
Wildlife Observation and Photography	Provide programs as offered in 2001.	Strive to provide quality experience for 95 percent of participants. Increase number and quality of services and facilities.	Strive to provide quality experience for 85 percent of participants. Some increase in number and quality of services and facilities.	Strive to provide quality experience for 70 percent of participants. Slight increase in number and quality of services and facilities.	Same as Alt. C.
Interpretation and Environmental Education	Provide programs as offered in 2001.	Strive for better understanding of conservation and stewardship concepts among 85 percent of participants. Increase number and quality of services and facilities.	Strive for better understanding of conservation and stewardship concepts among 70 percent of participants. Some increase in number and quality of services and facilities.	Same as Alt. C.	Same as Alt. C.

**Table 4: Summary of Management Alternatives (Continued)**

<b>Issue</b>	<b>Alternative A: Current Management (No Action)</b>	<b>Alternative B: Reduced Habitat Fragmentation, Wildlife-dependent Recreation Emphasis</b>	<b>Alternative C: Open Land Management, Consolidate and Improve Recreation</b>	<b>Alternative D: Forest Land Management, Consolidate and Improve Recreation</b>	<b>Alternative E: Reduced Habitat Fragmentation, Consolidate and Improve Recreation (Preferred Alternative)</b>
Non-wildlife-dependent Land Based Recreation	Maintain four campgrounds and four group camps. Length of stay at campgrounds would be limited to 14 days. Existing picnic areas would be maintained.	Two campgrounds would become the responsibility of SIU. Refuge would improve and maintain campground at Little Grassy Lake. Devils Kitchen Campground and group picnic area would close. Length of stay at campgrounds would be limited to 14 days. Four group camps would be maintained. Picnic area at Cambria Neck would close.	Sites at three campgrounds would be consolidated and improved. Devils Kitchen Campground would be reduced to primitive campsites only. Length of stay at campgrounds would be limited to 14 days. Four group camps would be maintained. Remaining picnic areas would be improved and in some cases relocated to new picnic and day use areas.	Same as Alt. C.	Same as Alt. C.
	The Boat & Yacht Club and The Haven would continue operations.	The Boat & Yacht Club and The Haven would continue operations under agreement with Southern Illinois University.	The Boat & Yacht Club would be converted to a concession operation 2 years after completion of the CCP. The Haven would continue operations.	Same as Alt. C.	Same as Alt. C.
	Horseback use would remain an unauthorized use.	Horseback use would be permitted on designated trail.	Same as Alt. B.	Horseback use would be prohibited on Refuge.	Same as Alt. B.
Non-wildlife-dependent Water Based Recreation	Five marinas would be maintained.	Three marinas would become the responsibility of SIU. Refuge would maintain two marinas – Devils Kitchen and Little Grassy.	Four marinas would be maintained: Images Marina and Playport Marina would be consolidated at the Playport site.	Same as Alt. C.	Same as Alt. C.

**Table 4: Summary of Management Alternatives (Continued)**

<b>Issue</b>	<b>Alternative A: Current Management (No Action)</b>	<b>Alternative B: Reduced Habitat Fragmentation, Wildlife-dependent Recreation Emphasis</b>	<b>Alternative C: Open Land Management, Consolidate and Improve Recreation</b>	<b>Alternative D: Forest Land Management, Consolidate and Improve Recreation</b>	<b>Alternative E: Reduced Habitat Fragmentation, Consolidate and Improve Recreation (Preferred Alternative)</b>
	Maintain existing lake zoning for boating activities.	A no-wake zone east of Highway 148 and in some bays would be established in addition to existing regulations. Gas motor use at Devils Kitchen Lake would be prohibited south of southern most boat ramps.	Same as Alt. B with the exception that gas motor use at Devils Kitchen Lake would continue.	Same as Alt. B, except that gas motor use at Devils Kitchen Lake would be prohibited.	Same as Alt. B, except gas motors would be prohibited in the most southeastern arm of Devils Kitchen Lake, from the mouth of Grassy Lake south to the Refuge boundary. The portion of the lake south of Line Road 6 boat ramp will be designated a no-wake zone.
	Designated public beaches would remain.	Crab Orchard Lake beach becomes the responsibility of SIU.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.
<b>Agriculture</b>					
Row Crops	Farm 4,500 acres. No mowing until after August 1.	Farm 4,400 acres. Greater emphasis on buffer strips and not farming in wetlands. Allow cooperators to harvest remaining corn in the spring. No mowing until after August 1.	Farm 4,800 acres. Greater emphasis on buffer strips and not farming in wetlands. Allow cooperators to harvest remaining corn in the spring. No mowing until after August 1.	Farm 4,300 acres. Greater emphasis on buffer strips and not farming in wetlands. Eliminate fields smaller than 5 acres. Allow cooperators to harvest remaining corn in the spring, and other allowances to cooperators. No mowing until after August 1.	Same as Alt. B.
Hay Fields	Farm 700 acres. No mowing until after August 1.	Farm 600 acres. No mowing until after August 1.	Farm 700 acres. No mowing until after August 1.	Farm 500 acres. No mowing until after August 1.	Same as Alt. B.
Pastures.	Graze 1,000 acres. No mowing until after August 1.	Graze 1,000 acres. No mowing until after August 1. Convert fescue grasses in pastures to more desirable wildlife grasses.	Same as Alt. B.	Graze 1,000 acres. No mowing until after August 1. Enhance forage diversity and practice rotational grazing to increase cattle production.	Same as Alt. B.

**Table 4: Summary of Management Alternatives (Continued)**

<b>Issue</b>	<b>Alternative A: Current Management (No Action)</b>	<b>Alternative B: Reduced Habitat Fragmentation, Wildlife-dependent Recreation Emphasis</b>	<b>Alternative C: Open Land Management, Consolidate and Improve Recreation</b>	<b>Alternative D: Forest Land Management, Consolidate and Improve Recreation</b>	<b>Alternative E: Reduced Habitat Fragmentation, Consolidate and Improve Recreation (Preferred Alternative)</b>
<b>Industry</b>					
	Continue under 1981 guidelines. Departing tenants replaced if buildings remain suitable for occupancy. Emphasis on munitions manufacturing.	Update 1981 guidelines. Departing tenants replaced if buildings remain suitable for occupancy. Emphasis on munitions manufacturing.	Update 1981 guidelines. Non-munitions tenants would not be replaced as they leave the Refuge. Emphasis on munitions manufacturing.	Same as Alt. C.	Same as Alt. B.
<b>Wilderness</b>					
	Maintain 4,050-acre Crab Orchard Wilderness and recommend 120 acres of inholdings for Wilderness designation. The Wilderness Management Plan would be revised.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.
<b>Protection</b>					
	Natural and cultural resources and the health and safety of visitors would be protected. Integrated Pest Management Plan would be written and implemented. Clean-up of contaminated industrial sites would continue.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.	Same as Alt. A.