

Executive Summary

Introduction

The U.S. Fish and Wildlife Service is required to prepare and implement a Comprehensive Conservation Plan (CCP) for each unit in the National Wildlife Refuge System. We developed this document as part of preparing a plan for Crab Orchard National Wildlife Refuge.

Located in southern Illinois, Crab Orchard National Wildlife Refuge (NWR) was established in 1947 for wildlife, agriculture, recreation and industry. The Refuge consists of 43,888 acres. Figure 1 shows the location of the Refuge.

We are preparing an Environmental Impact Statement (EIS) as part of the comprehensive conservation planning process. Preparation of the EIS establishes scientific data on which we can base our selection of a management direction and it provides an opportunity for residents, communities, state agencies and governments, and non-government organizations to express their ideas on Refuge management. The EIS will establish a management direction for the Refuge for the next 15 years, and it will assure that this direction best achieves the Refuge's purposes, vision and goals; contributes to the mission of the National Wildlife Refuge System; is consistent with principles of sound fish and wildlife management; and addresses relevant mandates and major issues developed during scoping.

For Crab Orchard National Wildlife Refuge, there is a need to resolve the inconsistencies between the purposes of the Refuge as stated in its establishing legislation and the mission of the Refuge System. There is a need to specify the priority species of management concern and allocate habitat components among them. There is a need to recognize the recreational demands of the public and the Refuge's role in fulfilling those demands. Also, there is a need to improve the relations between the community and the Refuge.

We, the U.S. Fish and Wildlife Service, have thoughtfully considered how we should manage the Crab Orchard NWR. We have drafted a recom-

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mended management plan for the next 15 years. The highlights of our proposed plan are:

- # Provide for wintering Canada geese at approximately current levels.
- # Continue current management of resident fish and wildlife.
- # Recommend an additional 120 acres for Wilderness designation.
- # Propose the acquisition of lands that are surrounded by the Refuge and some land along the boundary from willing sellers.
- # Reduce forest and grassland fragmentation to benefit certain birds.
- # Improve the quality of recreation through consolidation and improvement of facilities,
- # Eliminate area designations.
- # Maintain the existing group camps.
- # Limit camping stays to 14 days.
- # Simplify the recreational fee structure.
- # Officially designate a trail through the Wilderness for hiking and equestrian use.

In the rest of this summary we describe the steps that led us to our recommended approach and a further discussion about our approach. The details of our process and results are in the body of the Final Environmental Impact Statement and Comprehensive Conservation Plan.

Figure 1: Location of Crab Orchard NWR

Steps in Formulating Our Plan

Our planning process began in 1999 when we discussed what issues we thought needed to be addressed and how the planning process should be organized. Our planning team consists of refuge staff, regional office planning staff, representatives from other programs within the Fish and Wildlife Service, and representatives from the Illinois

Department of Natural Resources. Sometimes we asked other experts to help us address a particular topic.

In late 2000 we asked citizens for their ideas on what the plan should include and the issues that should be addressed. We gave citizens the opportunity to comment at open houses and through written comments. In three meetings early in 2001, we asked a diverse group of stakeholders to identify and prioritize issues facing the Refuge. Then, we formed special work groups made up of the planning

Issues Addressed in Our Plan

Citizens brought up many of the issues, and we identified some others. We organized the issues into major topics – wildlife conservation, recreation, refuge purposes, recreational boating, role in regional economy, communication between refuge and community, and Wilderness.

Wildlife Conservation

From comments submitted by the public and the State of Illinois, we knew that we had to address how we intended to provide for wintering Canada geese. In the past we considered reducing the amount of croplands that we provide for geese. Local citizens, particularly waterfowl hunters, and the Illinois Department of Natural Resources were critical of a reduction of croplands. Early in the planning process we decided that we would continue to provide close to the current amount of cropland for wintering geese. We think that more food will be available for geese than they will use in most years. In our proposed plan we provide for ‘worst case scenario’ conditions of poor crop years and large migrations of geese. In the plan we propose to provide approximately 1,760 acres of corn, 880 acres of winter wheat, and 1,760 acres of clover each year for the geese on the average. We also plan to actively manage 500 acres of moist-soil habitat for geese, ducks, shorebirds, and other waterbirds.

As the primary federal agency providing for migratory birds, we want to identify and manage for those birds that are particularly important. Within our eight-state region we have identified the species that are the priority species for us. There are also collaborative efforts among several groups to provide a coordinated approach toward bird conservation across the North and South American continents. We looked at how Crab Orchard NWR might contribute toward these efforts and concluded that the Refuge would contribute by providing unfragmented forest and grassland to benefit species that need these kinds of habitat. In our planning process we looked at three alternative ways to provide unfragmented habitats. In one of our alternatives we looked at maximizing the unfragmented forest habitat. In another alternative we looked at maximizing the unfragmented grassland habitat. In the third alternative we looked at making small changes in the current habitat cover to gain larger,

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team and subject area experts. We asked the groups to review the past vision and goals and to draft new goals for the next 15 years.

In April 2001, we considered the issues that had been raised, the new goals, rules and regulations, and what we thought could reasonably be accomplished in 15 years, and we developed four alternative management concepts. We described the management concepts in a newsletter that we sent to everyone on the planning mailing list in September 2001. We invited citizens and stakeholders to comment on the concepts.

Using the comments that we received, land cover data analysis, and other data, we modified and refined the concepts – which became the alternatives described in Chapter 2 of the Environmental Impact Statement. After we had the alternatives well defined, we estimated the consequences of implementing each alternative. That analysis is described in Chapter 4 of the Environmental Impact Statement. After comparing the consequences of each alternative, we chose one alternative to develop into a Comprehensive Conservation Plan, which is presented in Appendix A of the Environmental Impact Statement. Following the close of the comment period for the Draft Environmental Impact Statement in January 2006, we reviewed the comments we received and revised the document when it was warranted.

unfragmented blocks of both forest and grassland habitats. We chose this third alternative as our proposed course of action.

In comparing our different approaches to habitat, we were surprised by how little difference there was in land cover among alternatives. The difference in core acres (the acres that are particularly beneficial to area-sensitive birds) of mixed hardwood upland forest between an alternative where we emphasized grasslands and where we emphasized forests was only 476 acres, which is a very small percentage of the Refuge. We expect that natural succession will greatly contribute to changes in land cover over time. Our role may be only to speed up that succession in some cases.

The management activities that we propose in our plan to benefit forest and grassland birds include, among other things: reforestation of selected areas, accelerated succession of pine plantations to native hardwoods, removal of woody fencerows and roadside vegetation, control of invasive species, and conversion of fescue pastures to native, warm-season grasses and more desirable cool-season grasses.

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. We constructed a goal, objective, and strategies for the protection of these species in our plan. We will follow established management guidelines for the bald eagle, and we will coordinate with the Ecological Services staff of the Fish and Wildlife Service to avoid possible impacts to Indiana bats from our management activities.

Our planning requirements and past land transactions caused us to look at the desirability and need for acquiring interests in lands adjacent to the Refuge. In the past we have had neighbors who wanted to sell their land to the Service and a purchase had biological benefits to the Refuge. We analyzed each purchase individually. But, this tract-by-tract analysis is inefficient and does not provide for an overall, cumulative analysis of possible land transactions. We propose in our plan to acquire interests, from willing sellers only, in approximately 4,242 acres of land either completely surrounded by or adjacent to the Refuge as part of a boundary modification. The boundary modification would allow the acquisition of inholdings from willing sellers and move segments of the boundary to coincide with roads that would better define the limits of the Refuge (see

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Figure 2). The boundary modification would increase the efficiency of management, reduce incompatible land uses, and enhance public use opportunities.

Recreation

The recreation issue was made up of several parts and elicited the most comments from the public. Citizens were concerned about the loss of recreational opportunities and lack of support for recreation by the Refuge. At Crab Orchard NWR, we have had a difficult time meeting people's expectations and providing for certain kinds of recreation that are not traditionally a part of Service activities. Also, we are obligated by a 1997 law to facilitate wildlife-dependent recreation on national wildlife refuges, if possible. We examined two alternatives to doing a better job of providing recreation. One alternative calls for what we consider a major change at Crab Orchard – exchanging part of the Refuge with developed recreation facilities to Southern Illinois University for undeveloped land that the University owns adjacent to the Refuge. In the other alternative we considered how we could do a better job of providing recreation without the land exchange. In this second alternative we thought that it would be necessary to consolidate the facilities that we have and improve them. We do not think that it is likely that we could support high quality facilities at all of the sites that currently exist.

During our initial analysis, we considered the alternative with the land exchange as our “working” preferred alternative. We thought that the University would be able to offer better swimming, camping, boating, and picnicking facilities than we have been able to. We also thought that the University

Figure 2: Crab Orchard NWR Proposed Boundary Modification and Other Assorted Public Lands

would be able to develop a hotel and resort complex that is beyond the capabilities of the Refuge. By having the University provide the majority of the non-wildlife oriented recreation, we thought that we would be able to provide better quality wildlife-dependent recreation – hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

We abandoned the alternative with the land exchange, however, when we confronted the difficulties of implementing the exchange. 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 would exceed the value of the Southern Illinois University property by as much as \$20 million. The proposed exchange 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 the likelihood for its resolution in the political process would be lengthy and out of our control. Rather than pursue a course with an uncertain timetable and outcome, we chose the alternative to consolidate and improve our recreational facilities, which we can implement within our current authority.

We plan to make visitors feel more welcome by improving our signs, kiosks, and facilities. We propose to work with the administrators of the group camps on the Refuge to emphasize the mission of the National Wildlife Refuge System in their programs. We plan to reduce the campground at Devils Kitchen Lake to primitive campsites only because the current site is too steep and there are no better alternatives on the lake. In order to reduce conflicts among recreational boaters, we propose to prohibit water skiing east of Wolf Creek Road and expand no-wake zones on Crab Orchard Lake. (See Figure 3.)

We also propose changing the classification of areas on the Refuge. When the Refuge was established we published a classification of lands indicating where wildlife would be emphasized and where recreation would take place. We propose to do away with the past classification of areas and treat the entire Refuge as one unit, which will allow more balanced management responsibilities across all portions of the Refuge. Only the industrial area will be designated as “restricted access.”

During the planning process we examined our current way of doing business and saw a need for revision and additional explicitness for some topics. We propose to restrict length of camping stays to 14 days. This is a change from the unlimited length stays that are now permitted. We think limiting the length of stays is more equitable and will lead to higher quality camping experiences. We also propose to simplify the recreational fee system, and make it consistent with national standards to the extent practicable. We have not explicitly addressed scuba diving or rock climbing in past regulations, and some visitors who have engaged in these activities have been unsure of their legality. Because neither of these activities are wildlife-dependent public uses, and are available on nearby public areas, we propose to prohibit them on the Refuge.

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. 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 two 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. Horseback use has been occurring on the Refuge without official recognition by our regulations.

Glenn Smart

Figure 3: Recreational Use Zoning, Crab Orchard Lake

Horseback riders want to ride through the Refuge as part of the River-to-River Trail, but a trail through the Refuge has not been officially designated or recognized. We have been concerned about trail erosion caused by horses. In the plan we propose to officially designate a horse trail through the Crab Orchard Wilderness and take measures to actively control erosion. We would prohibit horseback riding elsewhere on the Refuge.

Recreational Boating

When we distributed our initial thoughts about draft conceptual alternatives, we proposed to prohibit gas motors on Devils Kitchen Lake. Our intent was to further reduce the sounds of motors on the lake. We received a number of comments stating that this would unnecessarily reduce anglers' access to the lake. In order to accommodate these concerns, we propose to only prohibit gas motors in Grassy Creek and the eastern arm of Devils Kitchen Lake from the mouth of Grassy Creek south to the Refuge boundary. The portion of the lake south of Line Road No. 6 boat ramp will be designated a no-wake zone. We think this compromise allows anglers with gas motors access to most of the lake and still reduce the sound of motors on a portion of the lake.

Refuge Purposes

An issue that has been a challenge to us and was mentioned by some citizens was the lack of support for the four original purposes of the Refuge and the concern that the purposes might be seen as incompatible with the mission of the National Wildlife Refuge System due to recent legislation and changing policies. Conflicts between the Refuge purposes and the mission of the National Wildlife Refuge System are dealt with in the National Wildlife Refuge System Improvement Act of 1997. In the case of conflict between the purposes of a refuge and the mission of the System, the conflict is to be resolved in a manner that protects the purposes of the refuge, and, to the extent practicable, that also achieves the mission of the System. We think that, overall, we are meeting the intent of the law.

We think that the activities associated with the original purposes of the Refuge are compatible. The compatibility determinations found in Appendix J of the Draft Environmental Impact Statement formalize our thoughts regarding these activities and their compatibility. We determined that all existing activities are compatible.

We considered how we should manage for the agricultural and industrial purposes of the Refuge for the next 15 years. The agricultural program is closely tied to providing food for wintering geese and other wildlife. As we thought about how the agricultural program might be improved, we investigated possible ways to make it more beneficial to wildlife and ways to use better management practices. We learned that in fitting the agricultural program with our wildlife conservation goals, our alternatives varied by small percentages in how many acres were devoted to row crops, pasture, and hayfields. Currently about 4,500 acres are farmed as row crops. We looked at alternatives that ranged from 4,300 to 4,800 acres of row crops. Our proposed plan would maintain about 4,400 acres in row crops. Currently about 1,000 acres of pasture are grazed. All the alternatives we looked at would maintain those acres. Currently about 700 acres are hayed. We looked at alternatives that ranged from 500 to 700 acres of hayfields. Our proposed plan would maintain about 600 acres in hay fields.

We do not plan to make large changes in the number of acres that are a part of the agricultural program. Rather, we propose to place greater emphasis on conservation practices that would provide more benefits to wildlife and improve water quality. We plan to address erosion with buffer strips and discontinue farming in wetlands. We plan to permit cooperators farmers to harvest corn remaining in the field in the spring. To better protect nesting birds, we plan to limit mowing of clover and hayfields until after August 1. We propose to change pastures from fescue grass to other cool-season and native warm-season grasses with higher wildlife value. We will divide existing pastures into three or four paddocks and cattle will be rotated among the paddocks during the season. We will ask for technical oversight

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from the Natural Resource Conservation Service and the University of Illinois Extension for our agricultural program.

Industry on the Refuge was identified by the public as an issue only in the context of its contribution to the regional economy. We were concerned about how to manage industry because of past contamination and the aging infrastructure of buildings, roads, water, and sewer lines. 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 nearby 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 reasons. By providing a safe area for munitions manufacture, the Refuge is able to contribute to and support the national defense. We plan to continue to provide an area for defense munitions manufacture. We will encourage new industrial expansion in the neighboring industrial parks with newer facilities. We plan to maintain water and sewer infrastructure sufficient for current industrial tenants. We will expect industrial tenants to bring their facilities up to prescribed safety, health, environmental and maintenance standards under all new leases. Our intent is to consolidate the areas occupied by industry. We considered discontinuing the use of facilities as they were vacated, which would hasten the move of non-muni-

tions industry off the Refuge. However, we did not think this would be an efficient use of resources. So, if tenants do not renew leases, we plan to seek suitable tenants for facilities that meet standards of occupancy.

Refuge's Role in the Local Economy

In the early stages of planning we learned that several citizens perceive recreation, agriculture, and industry on the Refuge as important to the economy of Southern Illinois. We asked a technical expert to help us determine the role of the Refuge in the local economy and the possible effects the alternatives that we were considering might have on the local economy. The general finding is that the Refuge contributes millions of dollars to the economy of Jackson and Williamson Counties, but the contribution is a small percentage of the total economy. The impacts of the Refuge operating budget and the recreation that occurs on the Refuge account for less than 1 percent of the total economy and employment in the two-county study area. The Refuge crop value is more than 10 percent of the total Williamson County crop value. Grazing value on the Refuge is about 8 percent of the grazing value for Williamson County. For commercial and industrial space, the Refuge accounts for just over one percent of industrial/commercial site acreage in the Greater Marion area.

Communication With the Community

As we began planning it was apparent to us that the Refuge administration could do a better job of communicating with the community. Our observation was confirmed by comments made by citizens during open houses and focus groups. Because the topic is important to us and the successful accomplishment of the Refuge mission, we established a goal that addressed the understanding of the Refuge by the community and staff receptiveness to concerns of the public. We plan to improve our communication with the public by regularly reviewing comments from the public, providing reports on the "State of the Refuge," and supporting selected community events.

Wilderness

Our refuge planning policy requires us to examine existing Wilderness and the potential for designating additional lands as Wilderness. We recommend that the Wilderness Management Plan that was approved in 1985 be reviewed for possible revision. The plan will need to be revised if horseback use is to be officially recognized as an appropriate use in the Wilderness. We reviewed the entire Refuge for possible additions to the Wilderness. We identified two tracts that total 120 acres and are surrounded by Wilderness and meet the criteria for Wilderness Study Areas. We propose that these tracts be recommended for Wilderness designation by the U.S. Congress.

Affected Environment

This section reviews the main points of the physical and social environment and current management of Crab Orchard National Wildlife Refuge. For a more complete and detailed description, see Chapter 3 of the Draft Environmental Impact Statement.

Physical Environment

Low relief, broad valleys, and relatively well-developed drainage systems characterize the northern portion of the Refuge. The southern portion consists of narrow ridges dissected by deep, narrow valleys with steep slopes and numerous sandstone outcrops. Water quality, drainage modification, shoreline erosion and sedimentation remain ongoing concerns for water bodies on the Refuge. Refuge waters are impacted by agricultural runoff, wastewater treatment effluent, urban runoff, stream channelization, and industrial contaminants.

Crab Orchard Lake, which was created in 1938, is the oldest, largest, and most heavily used lake on the Refuge. Created for water supply and recreation purposes, it is no longer used as a source for industrial or drinking water. Little Grassy Lake was impounded in 1950 as a recreation resource and today is most commonly used for sport fishing. Devils Kitchen Lake was impounded in 1959 as a recreation resource and today is most commonly used for sport fishing. Devils Kitchen is one of the deepest and clearest lakes in Illinois.

Following World War II and the transfer of the War Department's Illinois Ordnance Plant to the Department of the Interior, explosives production continued to be the principal industry on the property. New industries moved into buildings formerly used by wartime companies. A number of locations on the Refuge were contaminated with hazardous substances as a result of handling and disposal methods that were once considered acceptable. Approximately \$85 million has been spent so far for investigation and clean up of contaminated sites. Investigation and cleanup are continuing at several sites in existing and former industrial areas. These activities are expected to continue into the foreseeable future.

Habitat

The landcover of the Refuge area has changed dramatically in the last 200 years. The area that is now the Refuge was 90-95 percent forest prior to European settlement. During the late 1800s and the first half of the 1900s, nearly all of the area was either logged for timber or cleared and converted to other uses, particularly agriculture. By the 1930s, the soils in the area were depleted and eroding. Starting in 1938, the Resettlement Administration acquired 32,000 acres of the land along Crab Orchard Creek in an effort to prevent further degradation. Additional clearing and development occurred with the establishment of the Illinois Ordnance Plant during World War II. The changes in Refuge landcover since 1807 can be summarized as follows: the original hardwood forest was converted to open habitats of agricultural fields and open water by the 1930s. The forests that exist today are pine plantations or hardwood forest in an earlier seral stage than the forests of the past. Savannah (7 percent of original area) and native prairie (1 percent of original area) have been completely converted to other habitats. The overall result has been the fragmentation of the hardwood forest and an increase in aquatic habitats with the construction of

the lakes. The current land cover for the Refuge is displayed in Figure 4. .

About 56 percent of the Refuge is covered by forest. Examples of wildlife that use Refuge forests are deer, squirrels, raccoons, hawks, owls, and a variety of forest bird species. A Refuge goal has been to manage for productive oak-hickory forest dominated by native species. Management activities have included tree planting, prescribed burning, thinning, and control of exotic and invasive plants.

About 2 percent of the Refuge is covered by shrubland. Examples of wildlife that use shrubland are deer, rabbit, loggerhead shrike, Bell's vireo, and field sparrow. Most Refuge shrubland is the result of abandoning farm and industrial areas.

About 4 percent of the Refuge is covered by grassland. Examples of wildlife that use grassland are deer, rabbit, northern bobwhite, grasshopper sparrow, loggerhead shrike, dickcissel, and eastern meadowlark. The majority of Refuge grassland is managed pasture (55 percent) and hay (35 percent) with the remainder (10 percent) represented by planted, native warm-season grasses. Management activities have included planting agricultural land to native grasses, prescribed fire, mowing, control of exotic and invasive plants, and fertilizing

Before European settlement, there was little wetland habitat in the area. Most wetland habitat on the Refuge consists of man-made ponds and lakes. Wetlands cover about 6 percent of the Refuge. Examples of wildlife that use wetlands are Canada geese, other waterfowl, herons, raccoons, turtles, frogs, and other amphibians and reptiles. The majority of the wetlands are bottomland hardwood forests (1,900 acres) and moist-soil units (450 acres).

About 20 percent of the Refuge is covered by open water, almost all of it in man-made reservoirs. Open water serves as habitat for warm-water sport fish, waterfowl and other waterbirds. Management activities include maintenance of dams, levees, and water control structures, and manipulation of water levels.

About 10 percent of the Refuge is covered by cropland. Examples of wildlife that use cropland are deer, Canada goose, northern bobwhite, and turkey. Management activities include mowing, disking, planting, herbicide and fertilizer application, and harvesting.

Invasive, exotic and noxious weed species are relatively abundant on the Refuge. These species are

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quite diverse and are found in most Refuge habitats, including agricultural fields, lakes and ponds.

Current Role of Fire

We use prescribed fire to manipulate vegetation in a safe and cost-effective manner. Our principal purpose is to improve the wildlife habitat conditions in the southern pine plantations. Prescribed burning also reduces hazardous fuels, encourages oak and hickory and discourages sugar maple. Burning improves the condition of the understory. And, although burning is not undertaken for these purposes, burning enhances the aesthetics of the forest by making the understory more open and improves access for both habitat management and recreation.

Areas identified as “fallow herbaceous fields” are old fields that have been invaded by low, woody vegetation and vines and are in an early seral stage. We use fire to maintain the openings and habitat diversity of these lands.

Tallgrass prairie has been established on several areas on the Refuge. Prescribed fire stimulates growth of the grasses, increases seed germination and growth of forbs, creates open ground for wildlife, retards encroachment of woody vegetation, and reduces the fuel load.

Wildlife

Forty-three species of mammals have been recorded in or near the Refuge. Whitetailed deer, Virginia opossum, raccoon, rabbits, squirrels, beaver, and coyote are commonly seen on the Refuge.

Two-hundred sixty-nine species of birds have been recorded in or near the Refuge. Herons, Can-

Figure 4: Current Land Cover Type, Crab Orchard NWR

ada geese and other waterfowl, raptors, wild turkey, and songbirds are commonly seen on the Refuge.

Refuge records indicate that there were only about 2,200 Canada geese on the Refuge in 1947. Establishing a large, wintering population was a priority of early Refuge management. Refuge staff kept pinioned or penned geese as a decoy flock to attract migrating geese and emphasized production of corn and other grains in the Refuge farm program to provide food for wintering geese. Canada geese quickly responded; in 1948 the peak count on the Refuge was 24,000. The average peak count from 1947 to 2001 was 82,000.

Twenty species of amphibians and 28 species of reptiles have been recorded on the Refuge. Cricket frog, Fowler's toad, bullfrog, painted turtle, eastern box turtle, racer, and diamondback water snake are commonly seen on the Refuge. Prior to dam construction, fish habitat in the area consisted primarily of the larger, named streams. Over the last half-century, most fish habitat has been provided by the three large lakes and eight smaller manmade impoundments. Fish management on the Refuge has emphasized mixed-species, warm-water sport fish. Since 1995, the fisheries on the Refuge have been managed cooperatively by Illinois Department of Natural Resources (IDNR) and the Refuge.

Monitoring

We, along with staff from the IDNR and volunteers, survey wildlife use. We use the survey information in Refuge management. Others use the information to support state and national conservation efforts.

Public Use Resources and Trends

Swimming, boating, picnicking, dog trials, camping, hunting and fishing were a part of the Crab Orchard Creek Project before the establishment of Crab Orchard National Wildlife Refuge. A wide spectrum of recreational activities continue to occur on and around Crab Orchard, Devils Kitchen and Little Grassy lakes. The activities include boating, water skiing, swimming, camping, picnicking, hunting, fishing, wildlife observation, environmental education, environmental interpretation, horseback riding, and photography. Public use facilities include campgrounds, marinas, boat ramps, fishing piers, beaches, picnic areas, hiking trails, auto tour, visitor center, environmental education complex, observation decks, and photo blinds.

Small game, big game, and migratory waterfowl are hunted on the Refuge. Most hunting occurs within approximately 23,000 acres open to all hunt-

ing activities in accordance with State hunting seasons. Hunting includes muzzle loader, archery, shotgun and pistol deer hunting, waterfowl hunting, archery and shotgun wild turkey hunting, small game hunting, game bird hunting and furbearer hunting.

Fishing is one of the more popular visitor pastimes on the Refuge. People fish in Crab Orchard, Little Grassy and Devils Kitchen Lakes. The main species of fish sought by the anglers are largemouth bass, crappie, bluegill and channel catfish. Five fishing tournaments are held annually on the Refuge's three lakes under special use permit. The three major lakes receive a lot of visits from fishing clubs hosting club events called "fish-offs" – an organized club fishing event of 20 boats or fewer. The Refuge registered over 130 fish-offs in 2001 and more occur without being registered.

At one time camping was allowed throughout open areas of the Refuge. Because of litter and trash problems, we restricted camping to a concession-operated campground on each of the three major lakes. Crab Orchard Campground began operation in 1964 as a concession. Little Grassy and Devils Kitchen Campgrounds are concession-operated campgrounds and marinas. Crab Orchard Boat & Yacht Club, a private organization, operates a marina and a campground.

Wildlife observation is the most popular activity occurring on the Refuge, and there are many good observation areas on the Refuge. Points of interest, trails, auto tours and viewing blinds have been developed in an effort to encourage and enhance wildlife viewing. Refuge volunteers maintain seven trails that are open to the general public and one trail that is provided for educational purposes only. Numerous fire trails have served as hiking trails on the Refuge.

Boating has long been a popular activity on the Refuge. When Crab Orchard Lake was completed in 1938, it was the largest man-made lake in Illinois. The Refuge offers boating on Crab Orchard, Devils Kitchen, and Little Grassy lakes. Crab Orchard Lake has 14 public boat launching facilities; three ramps are provided on Devils Kitchen Lake; four are provided at Little Grassy Lake.

At one time the Refuge supported six public beaches -- four on Crab Orchard Lake and one each on Devils Kitchen Lake and Little Grassy Lake. Today swimming is allowed in Crab Orchard and Little Grassy lakes and prohibited in Devils Kitchen Lake.

From the late 1940s through the 1960s, picnicking was a very popular activity on the Refuge. Today picnicking is encouraged in four locations on the Refuge. The areas vary in size, character and type of use.

Four group camps are located on Little Grassy Lake. The camps operate under a cooperative agreement with the Refuge. About 20,000 campers participate in group camping activities on the Refuge each year. The Refuge provides educational assistance to area teachers, educators, and Refuge group camps.

Refuge staff, interns, and volunteers present both on-site and off-site environmental educational programs to area school groups. Educational materials (books, posters, videos, and other supplies) are maintained by the Refuge and are available for loan to area educators.

Interpretive programs are given by Refuge staff and volunteers to school, civic and other groups. The programs are presented through automobile tours, talks and walks. Some of the better attended programs include Bald Eagle tours, wildflower walks and owl prowls. The Refuge also presents its interpretive message through bulletin boards, signs and wayside exhibits. The Visitor Center consists of an information and exhibit area, conference room, book store and office space for visitor services staff. The Williamson County Tourism Bureau also occupies office space in the building.

The Refuge maintains an extensive system of roads within its boundaries. According to a 2001 survey of Refuge roads completed by the U.S. Department of Transportation, the Refuge maintains 38 miles of paved surface roads and 17 miles of gravel roadway for a total of 55 roadway miles.

Wilderness

Congress designated the Crab Orchard Wilderness as a unit of the National Wilderness Preservation System in 1976. The 4,050-acre wilderness was the first in the State of Illinois. The Crab Orchard Wilderness is located in the extreme southern portion of the Refuge bordering the shores of Devils Kitchen and Little Grassy lakes.

Industry

When the War Department and Soil Conservation Service lands were transferred to the Department of the Interior in 1947, approximately 1.6 million square feet of space suitable for industrial leasing were included in the transfer. The industrial complex currently consists of about 1.2 million square feet. The Refuge collects about \$500,000 in rental receipts each year. Rental receipts are returned to the Refuge and are used as part of its operation and maintenance budget.

Agriculture

The Refuge began farm management in 1948. The original focus of management was to: 1) reclaim farmland that had been fallow during ordnance plant operations, 2) improve soil fertility, 3) improve farm practices, 4) emphasize establishment of pasture, and 5) use crops to help establish a wintering flock of Canada geese. Current row crop management emphasizes soil protection and integrated pest management. Management consists of crop rotation, no-till planting, higher weed tolerance, restricted use of herbicides, and no insecticide use. The current grazing program consists exclusively of cattle grazing on fescue pastures. The current hay program consists of improved timothy fields and unimproved fields that are mostly old fescue pastures.

Archaeological and Cultural Values

About 1,000 acres of the Refuge have been subjected to controlled and reported archeological survey and investigation. One hundred and thirty-six prehistoric sites have been reported on the Refuge. In the 1930s farmsteads and small towns covered the Refuge area. Documents indicate at least 28 farmsteads and habitations, 34 cemeteries, three churches, 12 schools, and two towns existed within the Refuge boundaries.

Socioeconomic Environment

Williamson County population grew at a faster rate than the state but substantially less than the U.S. from 1980 to 2000. Jackson County lost population during this period.

We defined a study area for estimating the economic effects of the recreational, agricultural and commercial use of the Refuge as Williamson and Jackson counties. Most visitors to the Refuge (about 89 percent) come from within a 50-mile radius of the Refuge, and about 90 percent of these visitors come from Williamson and Jackson counties. We estimated the economic impacts of refuge uses and expenditures on the economy and taxes. The impacts are large dollar figures, but a small portion of the total economy.

Current Staff and Budget

The Refuge has a staff of about 30 people. Based on the annual average Refuge budget between 1996 and 2000, the Refuge budget includes \$1.4 million in salaries and \$770,937 in non-salary expenditures.

Partnerships

The Refuge has many partnerships with local, state, and national organizations. These partnerships benefit the Refuge in many ways, including fostering good community relations and enhancing Refuge habitats and wildlife populations. In addition, the Refuge has many dedicated friends and volunteers that assist with a wide variety of tasks. The Refuge needs the help and support of partners, friends, and volunteers to accomplish its mission.

Alternatives Considered

The five alternative approaches to management that we considered are summarized in the following paragraphs and table. For a more extended and detailed discussion of the alternatives, see Chapter 2 of the Draft Environmental Impact Statement .

Our Preferred Alternative

In selecting a preferred alternative, we considered environmental, economic, and social factors and our ability 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. We selected Alternative E as our preferred alternative.

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Alternative E will fulfil our statutory mission and responsibilities, and we have adequate authority to implement it.

By focussing on relatively small alterations in land cover, we can gain benefits for both forest and grassland area-sensitive bird species at a reasonable cost. In our preferred alternative, as in all alternatives, we intend to provide food to support a significant population of wintering Canada geese.

The conflicts experienced among water users is addressed by increasing areas that are no-wake zones and a recognition that we need to do better enforcement of current use zoning regulations.

The agricultural program on the Refuge and its economic effect will remain pretty much intact. The industrial program will continue to support the munitions manufacturing industry and current tenants. By encouraging other industries to locate in nearby industrial parks, the economic effect of the industry will remain in the local economy, and the needs of the industry will be met more efficiently. Finally, with a goal, an objective, and strategies formalized to better improve communication between the Refuge and the community, we think we will be able to do a better job of informing and listening to the community.

Alternative A: Current Management (No Action)

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. All current recreation uses and patterns on the Refuge would continue. Current industrial policies would remain in place and the Refuge would provide facilities for the exist-

ing tenants at fair market value rental rates. The amount of agricultural land would remain fairly constant. However some loss may occur through installing buffer strips needed for soil and water protection.

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

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.

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.

Some of the current management activities at the Refuge would be modified to provide greater benefits to wildlife. 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 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 were to leave the Refuge and their facilities were

suitable for occupancy, the Refuge would make them available for new tenants. 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.

Alternative C: Open Land Management: Consolidate and Improve Recreation

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. 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 and expanding emphasis on wildlife-dependent recreation.

Under this alternative cropland and grassland would increase slightly. Pasture and hayfield management would change to provide more emphasis on habitat quality for grassland birds. The Refuge would manage one large forest block to benefit area-sensitive forest birds. 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. If an industrial tenant left the Refuge, the Refuge would not seek a new tenant for the vacant facility. The amount of row crops would increase slightly.

Alternative D: Forest Land Management: Consolidate and Improve Recreation

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. 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. 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. If an industrial tenant left the Refuge, the Refuge would not seek a new tenant for the vacant facility. The amount of row crops and hay fields would decrease slightly. The Refuge would increase forage diversity and use rotational grazing in pastures to increase cattle production.

Alternative E: Reduce Habitat Fragmentation: Consolidate and Improve Recreation (Preferred Alternative)

This alternative has the same habitat, industrial, and agricultural programs as Alternative B and the same recreation management program as Alternative C.

Under this alternative, management emphasis would be on reducing habitat fragmentation by making small changes in the current habitat cover to gain larger, unfragmented blocks of both forest and grassland habitats (see Figure 4). Some of the current management activities at the Refuge would be modified to provide greater benefits to wildlife.

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 were to leave the Refuge and their facilities were

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suitable for occupancy, the Refuge would make them available for new tenants. 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.

The Refuge would satisfy the Refuge's recreation purpose as much as possible within Service budget priorities and expanding emphasis on wildlife-dependent 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.

Environmental Consequences Associated with Each Alternative

We estimated the consequences of each alternative in detail. For a full discussion of the analysis, please see Chapter 4 of the Final Environmental Impact Statement. We have summarized the effects

of each alternative in the following table and have described the effects in short phrases to ease comparison among alternatives. The recreational effects under Alternative B include the combined effects of lands managed by the Service and former Refuge lands that would be managed by SIU under a land exchange. Thus, the effects for increased developed recreation reflect increases that would occur on SIU lands under Alternative B.

Summary of the Potential Environmental Impacts Associated with Each Alternative

	Alternative A Current Management (No Action)	Alternative B Reduced Habitat Fragmentation: Wildlife-dependent Recreation Emphasis	Alternative C Open Land Management: Consolidate and Improve Recreation	Alternative D Forest Land Management: Consolidate and Improve Recreation	Alternative E Reduce Habitat Fragmentation: Consolidate and Improve Recreation (Preferred Alternative)
Threatened & Endangered Species					
<i>Bald Eagle:</i>	Minor increase in nesting habitat	Minor increase in nesting habitat	Minor increase in nesting habitat, alternative with highest habitat values	Minor increase in nesting habitat	Minor increase in nesting habitat
<i>Indiana bat:</i>	Minor increase in potential habitat	Minor increase in potential habitat	Minor increase in potential habitat, alternative with lowest habitat values	Minor increase in potential habitat, alternative with highest habitat values	Minor increase in potential habitat
Resident Fish & Wildlife	Minimal impacts	Minimal impacts	Minimal impacts	Minimal impacts	Minimal impacts
Canada Geese	Minor decrease in habitat, alternative with highest production of potential goose food	Minor decrease in habitat, along with Alternative E, lowest production of potential goose food	Minor decrease in habitat	Minor decrease in habitat, higher production of potential goose food than Alternative C	Minor decrease in habitat, along with alternative B, lowest production of potential goose food
Waterbirds	Minimal impacts	Minor increase in habitat	Minor increase in habitat	Minimal impacts	Minor increase in habitat
Grassland Birds	Decrease in habitat (36%), improved nesting conditions	Decrease in habitat (43%), much improved nesting conditions	Decrease in habitat (36%), much improved nesting conditions	Decrease in habitat (43%), improved nesting conditions	Decrease in habitat (43%), much improved nesting conditions
Area-Sensitive Forest Birds	Increase in habitat (8%)	Increase in habitat (9%), improved nesting conditions	Increase in habitat (7%)	Increase in habitat (9%), improved nesting conditions	Increase in habitat (9%), improved nesting conditions
Shrub Land Birds	Decrease in habitat (26%)	Decrease in habitat (26%)	Decrease in habitat (26%)	Decrease in habitat (26%)	Decrease in habitat (26%)
Invasive Species	Most species increase	Most species increase	Most species increase	Most species increase	Most species increase
Agricultural Uses	No acreage change, minor restriction in agricultural practices	Minor acreage decrease, changes in some agricultural practices	Minor acreage increase, changes in some agricultural practices, alternative with largest amount of agricultural land	Minor acreage decrease, addition of practices beneficial to agriculture, alternative with least amount of agricultural land	Minor acreage decrease, changes in some agricultural practices
Wilderness	Minor increase in wilderness designation	Minor increase in wilderness designation	Minor increase in wilderness designation	Minor increase in wilderness designation	Minor increase in wilderness designation

Summary of the Potential Environmental Impacts Associated with Each Alternative (Continued)

	<u>Alternative A</u> Current Management (No Action)	<u>Alternative B</u> Reduced Habitat Fragmentation: Wildlife-dependent Recreation Emphasis	<u>Alternative C</u> Open Land Management: Consolidate and Improve Recreation	<u>Alternative D</u> Forest Land Management: Consolidate and Improve Recreation	<u>Alternative E</u> Reduce Habitat Fragmentation: Consolidate and Improve Recreation (Preferred Alternative)
Industrial Uses	Minimal impacts	Minimal impacts	Minor decreases in facilities	Minor decreases in facilities	Minimal impacts
Hunting	Minimal impacts	Increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality
Fishing	Minimal impacts	Increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality
Wildlife Viewing & Photography	Minimal impacts	Increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality
Interpretation and Environmental Education	Minimal impacts	Increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality	Minor increase in opportunities and quality
Swimming	No change	Increased opportunities provided by SIU	Minimal impacts	Minimal impacts	Minimal impacts
Camping	Minimal impacts	Increased opportunities provided by SIU	Fewer campsites, improved facilities, 14-day stay limit	Fewer campsites, improved facilities, 14-day stay limit	Fewer campsites, improved facilities, 14-day stay limit
Picnicking	Minor improvements	Increased opportunities provided by SIU	Minor improvements	Minor improvements	Minor improvements
Motor boating / Sail boating	Minimal impacts	Minor restrictions in use (zoning)	Restrictions in use (zoning)	Minimal impacts	Minor restrictions in use (zoning)

Summary of the Potential Environmental Impacts Associated with Each Alternative (Continued)

	Alternative A Current Management (No Action)	Alternative B Reduced Habitat Fragmentation: Wildlife-dependent Recreation Emphasis	Alternative C Open Land Management: Consolidate and Improve Recreation	Alternative D Forest Land Management: Consolidate and Improve Recreation	Alternative E Reduce Habitat Fragmentation: Consolidate and Improve Recreation (Preferred Alternative)
Waterskiing	Minimal impacts	Reduction in area open	Reduction in area open	Reduction in area open	Reduction in area open
Marinas	Minimal impacts	Increases in facilities provided by SIU	Decreases in facilities	Decreases in facilities	Decreases in facilities
Group Camps	Minimal impacts	Increased costs to camps, limits on expansion, increased environmental education	Increased costs to camps, limits on expansion, increased environmental education	Increased costs to camps, limits on expansion, increased environmental education	Increased costs to camps, limits on expansion, increased environmental education
Private Clubs	Minimal impacts	SIU management	Tradition of Boat & Yacht Club would end. After 2 years the opportunities at site would be available to wider segment of the public.	Tradition of Boat & Yacht Club would end. After 2 years the opportunities at site would be available to wider segment of the public.	Tradition of Boat & Yacht Club would end. After 2 years the opportunities at site would be available to wider segment of the public.
Horseback Riding	Minimal impacts	Fewer opportunities	Fewer opportunities	No horseback riding	Fewer opportunities
Water Quality	Minimal impacts	Minor improvements	Minor improvements	Minimal impacts	Minor improvements
Communication	Improved	Improved	Improved	Improved	Improved
Volunteers	Minimal impacts	Improved	Improved	Improved	Improved
Cultural Resources	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
Economics	No change in economic effect.	Small increase in economic effect.	Minor increase in economic effect.	Minor increase in economic effect.	Minor increase in economic effect.
Environmental Justice	No disproportionate impacts on minority or low-income populations.	No disproportionate impacts on minority or low-income populations.	No disproportionate impacts on minority or low-income populations.	No disproportionate impacts on minority or low-income populations.	No disproportionate impacts on minority or low-income populations.
Climate Change	Minimal mitigation of human-induced global climate changes.	Minimal mitigation of human-induced global climate changes.	Minimal mitigation of human-induced global climate changes.	Minimal mitigation of human-induced global climate changes.	Minimal mitigation of human-induced global climate changes.
Air Quality	Minimal impacts	Minimal impacts	Minimal impacts	Minimal impacts	Minimal impacts

