

OFFICE OF RESOURCE CONSERVATION

State of Illinois

State Wildlife Grant

PROJECT NUMBER: T-80-D-1

PROJECT TITLE: Strategic Regional Coordination and Implementation for Southern Illinois Conservation Opportunity Areas (COAs) and Streams and Forests campaigns, as delineated in the Illinois Wildlife Action Plan (WAP).

NEED:

The Illinois Wildlife Action Plan (WAP) sought to establish a common vision for the conservation of Illinois' wildlife and habitat. The plan identified a variety of components, from biologically-diverse hotspots in the state to specific conservation goals, noting that it has become "increasingly difficult for conservationists to identify priorities, efficiently direct funding and staffing to address priorities, and effectively evaluate the success of efforts" (Illinois Department of Natural Resources, 2005, p. 5). As a way to tackle the awesome conservation task before the residents of Illinois, the plan identified Conservation Opportunity Areas (COAs) – areas where "partners are willing to plan, implement and evaluate conservation actions, where financial and human resources are available, and where conservation is motivated by an agreed-upon conservation philosophy and set of objectives," (Illinois Department of Natural Resources, 2005, p. 18-19). The specific pathways to the achievement of these goals, including their impediments was the focus of a Southern Illinois University research report that examined factors for success, which encompassed stakeholders, planning, implementation, expectations, priorities and threats. Not surprisingly, community and financial support emerged as the two most important items for COAs success. Additionally, the report found successful implementation of the Illinois Wildlife Action Plan in COAs also depends largely on coordinated efforts and strong leadership (Mountjoy, Davenport, Myers & Whiles, 2009).

The importance of leadership in achieving conservation success is well recognized. In fact, it has been called the "most important attribute in the tool kit of a conservation biologist" (Dietz et al, 2003, p. 274). In specific, some of the most valued leadership characteristics for conservation actions include having a long-term vision, offering an organized way to approach and focus on conservation actions, as well as containing the ability to build coalitions (Dietz et al, 2003). Yet, the selection of the right actions can be quite difficult (Salafsky, Margoluis, Redford & Robinson, 2002), leading to a research-implementation gap in conservation planning

(Knight et al, 2008), or an “implementation crisis” (Knight, Cowling & Campbell, 2006). In fact, Knight et al (2006) cautions that “Systematic assessments ... can never, alone, lead to the implementation of conservation action” (p. 416).

The Cache River-Cypress Creek COA is poised to bridge this gap through its work to identify biodiversity conservation targets (hereafter *conservation targets, sensu* Noss, 1996; The Nature Conservancy 2000; Salafsky, Margoluis, Redford, Robinson, 2002). Using a model outlined in *Bioscience* and implemented regionally at The Nature Conservancy’s Emiquon project, the Cache River-Cypress Creek COA identified conservation targets, determined attributes necessary for ecological integrity and assessed ranges for them; a finalized document for the Cache River Watershed is expected June 30 (see Appendix I for a nearly-complete draft). For the purpose of this work, conservation targets are defined as species or natural communities of ecological systems that, if “conservation efforts (are) focused on them, will help ensure that suitable environmental conditions exist for the persistence of all native species within the conservation area or conservation landscape of interest” (The Nature Conservancy, 2006, p. 1). Although the effort to determine conservation targets was approached with the intention of focusing monitoring activities within the region, cooperators and scientists became enthused by the ability of this approach to document and measure conservation actions (as noted in Hocking et al 2000, Salafsky et al 2002). The *Bioscience* article (Parrish, Braun & Unnasch, 2003, p. 859) that outlined this framework identified six reasons for this approach to science planning, including:

- It focuses strategy development along ecological, rather than jurisdictional, boundaries.
- It provides consistency and specificity in setting conservation objectives
- It enhances the identification and anticipation of threats to biodiversity.
- It promotes the development of comprehensive conservation strategies
- It helps identify crucial research needs.
- It promotes focused and efficient monitoring programs

This framework offers a way to focus broad conservation actions outlined in the WAP. For example, the WAP calls for land in the Cache River-Cypress Creek COA in public ownership to increase from about 32,000 acres to 60,000 acres but says little about how this goal should be achieved, or where to target land for acquisition. Further, it does not take into account the importance of private land protection in the Cache River-Cypress Creek COA. As conservationists know, “nearly half of all species threatened with extinction occur on private lands, and nearly all threatened species have at least part of their distribution on private lands” (Knight, 1999, p.223). The Cache River-Cypress Creek COA conservation target process provides specificity to the WAP while offering a roadmap for collaboration. It does this by providing measurable and specific

goals, such as prescribing the need for 7,000-acre forest blocks. It also outlines the specific number of upland and bottomland blocks needed to reach the minimum acceptable for ecological integrity (two in the uplands and two in the bottomlands), as well as goals for “good” and “excellent.” This level of detail, then, can be used to focus and justify the acquisition of either land or conservation easements in specific areas of the watershed.

Further, the best practices and efforts in the Cache River-Cypress Creek COA offer an opportunity to provide focused leadership in other regional COAs — such as Larue-Pine Hills-Western Shawnee-Trail of Tears COA and the Eastern Shawnee COA — while further strengthening conservation action through direct coordination with the campaigns identified in the WAP. Specifically, the Forests and Streams Campaigns provide the greatest opportunity for collaboration due to crossover between identified goals, regional expertise and local priorities because of the direct applicability of practices (such as the development of conservation targets and strategies) and of techniques (such as the assessment of fish assemblages, or guilds, conducted in the Cache).

Additionally, focusing efforts on this trio of COAs – the Cache River-Cypress Creek COA, Larue-Pine Hills-Western Shawnee-Trail of Tears COA and the Eastern Shawnee COA — makes considerable sense when considering key habitats and species in greatest need of conservation. (See Appendix II for map of Map of Illinois Conservation Opportunity Areas and Appendix III for detailed maps of priority Conservation Opportunity Areas). The key habitats contained in these three areas and identified in the WAP include forests, barrens, wetlands and streams. Further, they are known to contain a high number of species listed as species in greatest need of conservation. Species listed for “greatest need of conservation” were selected because they were: 1) threatened or endangered in Illinois, including federally listed species; 2) containing a global conservation rank indicator of G1, G2, or G3; 3) rare species, i.e. with low populations or declining abundance 4) depending on rare or vulnerable habitat; 5) endemic to Illinois, or the Illinois population is disjunct from the rest of the species’ range; 6) Illinois’ population is important to the global population; 7) represents other species found in a particular habitat; 8) poorly known, but available evidence suggests conservation concern (Illinois Department of Natural Resources, 2005, p. 262).

In particular, the Cache River-Cypress Creek COA — determined a “wetland of international importance” under the Ramsar Convention — harbors 91 percent of the state’s high quality swamp and wetland communities and shelters more than 100 species listed as threatened or endangered in Illinois. The plan specifically says that conservation efforts here “benefit amphibian Species in Greatest Need of Conservation” (IDNR, 2005, p. 79), though when the full list of species in greatest need of conservation is considered, a great number emerge, and not only the threatened and endangered species. For example, the Cache River-

Cypress Creek COA is home to a number of listed neotropical birds and fish species (IDNR, 2005, Appendix II). The WAP notes that the Larue-Pine Hills-Western Shawnee-Trail of Tears COA contains the key habitats of “swamp, sloughs of the Big Muddy River” and in terms of species of greatest needs contains a “high diversity of reptiles and amphibians” (p. 157). For the Eastern Shawnee COA, the WAP notes that it contains such key habitat as “high-quality streams ... barrens, large oak-hickory forest tracts” (p. 201). (See Appendix IV for complete detail on Coastal Plain, which ended up being the defined boundary for Cache River-Cypress Creek COA. This entry lists the COAs key habitats and species in greatest need of conservation.)

In fact, when compared to other regions of the state, the Southern Illinois region emerges as a critical spot for conservation by many measures. WAP’s Figure 11 (Appendix V) shows priority conservation areas identified by other plans, including Illinois Natural Areas Inventory sites, which are known locations of endangered and threatened species, and resource rich areas, among others. Figure 12 of the WAP (Appendix VI) shows a ranking of upland forest habitat for Illinois’ species with the greatest need of conservation. And lastly, Figure 17 (Appendix VII) of the WAP shows areas selected as priority areas for conserving Illinois’ species of greatest need of conservation.

When taken together – the need for progress, the challenges and the opportunities presented by the Cache River-Cypress Creek COA model – it becomes evident that a directed effort to facilitate regional implementation of the COAs in a strategic, measurable fashion would greatly enhance Illinois’ achievement of its protection of species in greatest need of conservation, as identified in its WAP. In specific, this proposal chose sub-projects within each of the COAs because they targeted key habitats and species in the greatest need of conservation.

The Shawnee RC&D, a long-time Southern Illinois leader in the conservation arena, will implement the WAP for Southern Illinois COAs, with an eye towards determining and sharing best leadership practices. To complete the goals outlined in this proposal, a regional COAs coordinator will be contracted and given the specific tasks outlined herein. Further, the coordinator will function as an agent of the state, largely because doing so will allow the coordinator to connect cooperators with ongoing DNR programs, such as conservation easements.

The effort will model the integrative leadership approach outlined by Manolis et al, 2008 which “extends beyond the research community and changes the way policy makers, managers, citizens, and scientists interact with research and with each other. Integrative leadership aims to increase the degree to which conservation science informs choices in policy, management, or daily life” (p. 881). This approach extends

beyond the traditional norm of building partnership and represents “the greatest opportunity for expanding the influence of conservation science and ultimately improving conservation effectiveness” (p. 881).

OBJECTIVES:

This project drives conservation actions, as outlined in the WAP, in a strategic, science-driven manner to result in on-the-ground conservation, such as the creation of 7,000-acre forest blocks in the Cache River-Cypress Creek COA and the enhancement of Round Pond, located in the Eastern Shawnee COA, for river cooter and other reptile species. Specific actions are outlined in “results” section below. This project will result in increased collaboration between stakeholders (defined as a broad group of agencies, organizations, landowners, interested parties, etc.) by increasing understanding through the development of specific analyses (from hydrogeomorphic challenges to determining reforestation priorities for upland and bottomland communities) and providing specific, implementable actions. This approach will also provides increased participation in identified projects that will be measurable. It will result in the advancement of the Streams Campaign, the Forests Campaign and Cache River-Cypress Creek, Larue-Pine Hills-Western Shawnee-Trail of Tears and the Eastern Shawnee Conservation Opportunity Areas. Specifically, the objectives of this project are to:

- Drive strategic, science-based restoration in collaboration with multiple cooperators and in coordination with regional stakeholders.
- Advance the Illinois State Wildlife Action plan through coordination at multiple scales, from campaign coordination to specific actions for Conservation Opportunity Areas.
- Provide coordination between identified COAs and Streams Campaign on mutually identified goals that harbor or provide refugia for species in greatest need of conservation, such as the protection and restoration of Round Pond, restoration of tributary streams and dredging of sediment to restore deep water habitat for fish species in greatest need of conservation.
- Provide coordination between identified COAs and Forest Campaign on mutually identified goals, such as reduction of forest fragmentation in Shawnee Hills and Ozarks, restoring floodplains and riparian corridors while promoting ecological connectivity among habitats for neotropical bird and amphibian species in greatest need of conservation.
- Advance the hydrologic and hydraulic understandings of the Cache River in a way that leads to and supports direct conservation action, especially the restoration of a more natural hydrology between the upper and lower segments of the Cache River, as well as reductions in peak flows for Big Creek, which is expected to greatly benefit fish species in greatest need of conservation, as well strengthen the health of bottomland forests and wetlands, listed as key habitats for many species in greatest

need of conservation, including the state-endangered little blue heron, state-endangered cypress minnow and the state-threatened rice rat.

EXPECTED RESULTS OR BENEFITS:

The expected results and benefits of this proposal include the analyses, development and implementation of interagency restoration projects and other management strategies across Southern Illinois for the period of September 2012 to August 2015. This proposal will provide funds to allow Shawnee RC&D to provide analyses needed to refine and develop conservation plans for species in greatest need of conservation at a fine scale, develop implementations plans and launch implementation. Specifically, the expected results for the grant are to:

(Please note: The connection to SWG-eligible key habitats and species in greatest need are in elucidated in the sub bullets.)

1. Support neotropical bird species in greatest need of conservation through the strategic, science-based restoration and creation of 7,000-acre forest blocks in the Cache River bottomlands and Ozarks/Shawnee Hills uplands, as well as the development of other assessment/implementation tools as identified through the Cache River Watershed science-planning process for ecological integrity.
 - 1.1. In addition to benefiting neotropical bird species in greatest need of conservation, this effort will enhance key forest habitat by reducing forest fragmentation. The WAP states Illinois' forests "have been fragmented into small parcels of land, and the abundance of species that require large forested tracts to survive have declined. Small fragmented parcels are also more susceptible to intrusion by invasive species of plants and animals, such as garlic mustard and brown-headed cowbirds" (IDNR, 2005, p.37).
 - 1.2. While many forest birds depend on these upland and bottomland forests — including the state-threatened cerulean Warbler, yellow-billed cuckoo, red-headed woodpecker, wood thrush, prothonotary warbler and Kentucky warbler (U.S. Fish & Wildlife Service, p. 38) — other species in greatest need of conservation, such as the state-threatened rice rat, do too. For example, this effort is also expected to benefit the federally-endangered Indiana bat. Southern Illinois research shows the bat regionally roosts in bottomlands, swamps and other floodplain areas (Carter, 2001).
2. Identify areas where cane restoration would benefit swamp rabbit, state-endangered Swainson's warbler, state-threatened golden mouse and the state-threatened canebrake rattlesnake (a subspecies of the timber rattlesnake), then create large cane patches and support cane restoration as part of a forest matrix.

- 2.1. Although plants are not listed as “species of concern,” it should be noted that less than 2 percent of this unique habitat remains, earning this habitat the dubious distinction of “critically endangered” (U.S. Department of the Interior, 1995). What is relevant to the WAP, however, is that cane’s benefits to fauna are well-documented, including swamp rabbit, Swainson’s warbler, golden mouse, white-tailed deer and wild turkey (Platt & Brantley, 2001) – all species listed in greatest need of conservation.
3. Document and enhance cypress and tupelo swamp and marsh communities in the Cache River Watershed for the benefit of state-endangered little blue heron, the state-threatened bird-voiced tree frog, the state-threatened Illinois chorus frog and swamp rabbit.
 - 3.1. The WAP lists wetlands (swamp) and floodplain forests as key habitats. It notes that “Illinois has lost approximately 90% of its 8.2 million acres of wetlands as a result of draining, filling, clearing, and urban development” (p. 38). Further, the plan notes the dire need for conservation efforts for a specific species listed in greatest need of conservation, noting that “swamp rabbits are localized and uncommon in floodplain forests in southern Illinois” (p. 36). Further, the state-threatened bird-voiced tree frog inhabits cypress and tupelo swamps, as well as floodplain forests located adjacent to swamps (U.S. Fish and Wildlife Service, p. 36).
4. Document and enhance stream habitat for fish species in greatest need of conservation, as identified through the Cache River Watershed science-planning process for ecological integrity, and the state-endangered spotted dusky salamander.
 - 4.1. The WAP lists streams as a key habitat, noting that “at the dawn of the 20th century, most of Illinois’ 26,000 miles of streams and rivers had sinuous courses with associated rich marshes and swamps” (p. 39). That certainly is true of the Cache. The WAP also calls for “improving stream habitat and water quality” (p. 39).
 - 4.2. The Cache River is home to 84 freshwater fish species, including the state-endangered cypress minnow, bigeye shiner and redspotted sunfish, and the state-threatened bantam sunfish — all four (among others) listed as species of greatest need of conservation.
 - 4.3. The WAP lists the state-endangered spotted dusky salamander as a critical species in the Cache River Watershed and a species in greatest need of conservation (IDNR, p. 126).
5. Provide regional leadership (in Southern Illinois) for the planned revision of the WAP in 2015.
 - 5.1. “Efforts to update, modify, or revise a State Plan” are listed as eligible for SWG funding.
6. Coordinate with Streams Campaign on mutually identified goals, such as the protection and restoration of Round Pond, restoration of tributary streams (key habitat) and dredging of sediment to create or restore

deep water habitat for fish species in greatest need of conservation. (See Appendix IX for actions identified for the Streams Campaign).

- 6.1. The protection and enhancement of Round Pond, located in the Eastern Shawnee COA, is identified as an action in the Streams Campaign because of its importance to species in greatest need of conservation, including the river cooter and other reptile species (INDR, p. 63).

7. Coordinate with Forest Campaign on mutually identified goals, such as reduction of forest fragmentation in Shawnee Hills and Ozarks, restoring floodplains and riparian corridors while promoting ecologically connectivity among habitats. (Appendix X, actions identified for the Forests Campaign).
 - 7.1. The reduction of forest fragmentation was addressed in result no. 1 for the Cache River bottomlands and Ozarks/Shawnee Hills uplands, with the benefit realized by neotropical bird species in greatest need of conservation and will further enhance key forest habitat by reducing forest fragmentation. This statement holds true for Larue-Pine Hills-Western Shawnee-Trail of Tears and the Eastern Shawnee Conservation Opportunity Areas. Strategies developed for the Cache River-Cypress Creek COA could be applied here.
 - 7.2. The Forest Campaign identifies defragmentation as a priority action: “Reducing fragmentation of forests >5,000 acres (Shawnee Hills, Ozarks, lower Kaskaskia River corridor, Pere Marquette State Park, Lowden Miller State Forest/Castle Rock State Park, and Mississippi Palisades State Park/Hanover Bluff/Witowski/Winston Tunnel areas)” (WAP, p. 69).
 - 7.3. Further, the Forest Campaign lists “restoring floodplains and riparian corridors” as needed actions for this key habitat.

8. Advance the hydrologic and hydraulic understandings of the Cache River in a way that leads to and directly supports stream restoration and conservation action, especially the restored hydrology of the lower Cache River, including reductions in peak flows for Big Creek.
 - 8.1. Altered hydrology in the lower Cache has been linked with the low oxygen levels in the river and connected swamp (pers. Comm., Heidi Rantala) and the disappearance of a group of fish that depends on bottomland forests (Pitts, 2012).
 - 8.2. Research conducted by Southern Illinois University – Carbondale shows that restoration of hydrology would have “positive ecological benefits to the system” (Rantala, Scholl, Whiles & Wilkerson p. 10). “In particular, increasing discharge through reconnection would increase dissolved oxygen concentrations and macroinvertebrate production. Given that current impairments in the lower Cache River are largely related to the lack of flow, especially during the summer months, restoring even minimal flow and easing oxygen stress could result in numerous positive ecological responses and ultimately enhance energy available to higher trophic levels such as fishes.” This result is critical to a

number of fish species of greatest need of conservation because of its ability to enhance this stream habitat (a key habitat).

APPROACH:

This approach to meeting project objectives details the activities proposed over the duration of the grant (September 2012 to August 2015). This approach consists of undertaking activities through a partnership of multiple stakeholders, which brings together all of the major land management agencies and conservation organizations in Illinois in cooperation with the Shawnee RC&D (as fiscal manager). Shawnee RC&D has more than four decades of experience managing large projects and grant efforts.

For this agreement, “**Stakeholder**” is as any group, organization, government agency, private business, or landowner in Illinois that could be impacted by actions in Southern Illinois COAs and could benefit from enhanced management to assist in the protection of SWG eligible species in greatest need of conservation or their key habitats. For this agreement, “**Cooperator**” is defined those whose management actions assist the Department in meeting its goals of Southern Illinois COAs management to benefit SWG eligible species in greatest need of conservation or their key habitats.

Project Area: This project will perform activities in Southern Illinois, with a concentration on Conservation Opportunity Areas and campaign activities as defined in the Illinois Wildlife Action Plan. The three Conservation Opportunity Areas of extreme southern Illinois include Cache River-Cypress Creek, Larue-Pine Hills-Western Shawnee-Trail of Tears and the Eastern Shawnee COAs. Maps of these regions are provided in Appendix II. These areas hold a high diversity of species including Species in Greatest Need of Conservation.

Expected Result 1: Support neotropical bird species in greatest need of conservation through the strategic, science-based restoration and creation of 7,000-acre forest blocks in the Cache River bottomlands and Ozarks/Shawnee Hills uplands, as well as the development of other assessment/implementation tools as identified through the Cache River Watershed science-planning process for ecological integrity. In addition to this result benefiting neotropical bird species in greatest need of conservation, it will enhance key forest habitat by reducing forest fragmentation.

- Using GIS, develop an assessment of current forest blocks that quantifies size of existing forest blocks and identifies potential opportunities for the creation of new ones.
- In collaboration with cooperators, develop and implement a strategic plan to enhance existing forest blocks and form new ones.

- Work with cooperators and stakeholders to review/assess information contained in science plan for additional opportunities for restoration.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through the development of the assessment and plan, as well as measurable increases in forest blocks identified for conservation action and increases in density of neotropical bird species.

Expected Result 2: Identify areas where cane restoration would benefit swamp rabbit, state-endangered Swainson’s warbler, state-threatened golden mouse and the state-threatened canebrake rattlesnake (a subspecies of the timber rattlesnake), then create large cane patches and support cane restoration as part of a forest matrix.

- Research historical and existing data on the distribution of cane in the Cache River Watershed.
- Provide a literature review and develop a summary document for regional cooperators that includes identification of best management techniques/practices and clearly identifies (through literature) importance of cane habitat regionally to species listed in greatest need of conservation.
- Building upon work of U.S. Fish & Wildlife Service, conduct an aerial survey during wintertime to ascertain potential canebrakes located on the eastern/upper eastern portion of the watershed; USFWS has already completed this survey for the western/western/lower portion of the watershed. With this aerial survey, support on-going research at Southern Illinois University to reflect this addition.
- Using current mapping, develop at least two restoration areas of at least one acre and monitor for presence/absence of swamp rabbit, state-endangered Swainson’s warbler, state-threatened golden mouse and the state-threatened canebrake rattlesnake.
- Support Southern Illinois University researchers in their work on cane, as further information on this habitat type is needed to ensure more effective management in the future.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through the dissemination of the briefing document and measurable cane restoration with presence of species in greatest need of conservation.

Expected Result 3: Document and enhance cypress and tupelo swamp and marsh communities in the Cache River Watershed for the benefit of state-endangered little blue heron, the state-threatened bird-voiced tree frog, the state-threatened Illinois chorus frog and swamp rabbits.

- Using aerial imagery, map, then ground-truth, location of existing cypress and tupelo swamps. Then, evaluate swamps as habitat for all listed species in greatest need of conservation, including assessment of the environmental flow since this key habitat type often acts as a nursery for fish species in greatest need of conservation.

- Using the mapping, meet with stakeholders to develop strategies for the enhancement of this key habitat, as defined in the WAP, including (but not limited to) strategies for acquiring conservation easements from private landowners or inclusion in public ownership (especially prime habitat for the river cooter, a species in greatest need of conservation).
- Provide a literature review and develop a summary document for regional cooperators that includes identification of best management techniques/practices for restoring and maintaining healthy cypress and tupelo swamp and marsh habitat.
- Initiate a study that delves into connectivity of off-channel wetlands with the intention of identifying areas in the greatest need of conservation, i.e. wetlands that are now disconnected from the river/tributary system and no longer functioning as nurseries for fishes. This connectivity is important to fish species in greatest need of conservation, particularly the four species listed with the state.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through an assessment and map of cypress and tupelo swamps in the Cache River Watershed and the development of a document that details a conservation approach for this community type, as well as the successful launch of a study into off-channel wetlands.

Expected Result 4: Document and enhance stream habitat for fish species listed as species in greatest need of conservation and identified through the Cache River Watershed science-planning process for ecological integrity.

- Develop and enact a monitoring plan for the Bottomland fisheries guild, which research recently identified as extirpated from the river system (Pitts, 2012). Working with cooperators, develop a plan to improve habitat needed for this cadre of fishes, which includes the four state-listed species, i.e. species listed in greatest need of conservation in the WAP.
- Support an analysis of mussels to support diversity ratings to create rankings; rock pocketbook and little spectaclecase are two mussels listed as species in greatest need of conservation by the WAP and found in the Cache River Watershed. Further, this analysis was identified as a need during the Cache River Watershed science planning process.
- Develop strategies that identify potential areas of restoration for fish and mussels species within the streams of the watershed. Research by Pitts (2012) documented spatial changes in fish assemblages, which are associated with degraded habitat, so detailed information exists on which to base the development of these strategies.
- Support analysis of riffle-pool complex, which was identified as a need during the Cache River Watershed science planning process because of its importance to fish species in greatest need.
- Support professional fish-related research, especially as it relates to Illinois' Streams Campaign as identified in the WAP and conservation targets identified for the Cache River.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through the successful analysis listed above as well as documented, on-the-ground activities related to restoration of bottomland habitat along the river.

Expected Result 5: Provide regional leadership (in Southern Illinois) for the planned revision of the WAP in 2015.

- Document activities of the Illinois State Wildlife Action Plan in areas identified (Streams and Forest campaigns and COAs of grant focus).
- Conduct review of the Cache River Watershed science document. (Appendix I contains the nearly-complete draft.)
- Lead review of the WAP revision for 2015 with stakeholders and collaborators; provide summary document of activities documented and status of Cache River Watershed science document.
- Provide suggested updates to IDNR.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through the successful completion of a regional meeting, development of a briefing document that reviews the Cache River Watershed science document and presentation of suggested revisions, along with documentation of activities to-date, to Illinois Department of Natural Resources.

Expected Result 6: Coordinate with Streams Campaign on mutually identified goals, such as the protection and restoration of Round Pond, restoration of tributary streams (key habitat) and dredging of sediment to create deep water habitat for fish species in greatest need of conservation. (Appendix (IX), actions identified for the Streams Campaign).

- Support protection and enhancement of Round Pond, located in the Eastern Shawnee COA, which is identified as an action in the Streams Campaign because of its importance to species in greatest need of conservation, including the river cooter and other reptile species (IDNR, p. 63).
- Develop assessment of headcutting in the Cache River and tributaries, and support regional cooperators in developing strategies to abate this threat, including the development of a monitoring plan and providing grant support. The headcutting of the lower Cache and its tributaries are deemed a threat to the loss of wetlands – a key habitat and important to species in greatest need of conservation.
- Continue to support the department and community/regional cooperators in achievement of the goal of dredging the Cache River with the intention of creating deep water habitat, deemed necessary for fish refugia because of documented hypoxic conditions in the lower Cache. The lower Cache provides important habitat for the state-endangered cypress minnow, bigeye shiner and redspotted sunfish,

and the state-threatened bantam sunfish, as well as other fish species of greatest need of conservation.

- To support the reduction of Big Creek Water flows, assist the Illinois State Water Survey in their determination of the current effectiveness of retention basins established in the subwatershed, which would support the replication of this effort in other subwatersheds. If deemed necessary, based on this research, support regional agencies in developing strategies for the creation of new retention basins, specifically replicating that work completed in Big Creek for the Cypress Creek watershed. (A conceptual draft plan exists that identifies where in the Cypress Creek watershed work could be conducted.) This work is deemed importance for the enhancement of stream habitat, identified as a key habitat in the WAP, and for the improvement of water quality and to enhance oxygen in the lower Cache, especially important to fish communities because of the hypoxic conditions of the lower Cache River.
- Replicate research on fish assemblages to other priority areas to determine presence/absence of the bottomland fish guild and identify spatial changes in other assemblages. Since fish assemblage work conducted in the watershed by Kristen Pitts (2012) has proved instrumental in assessing the integrity of stream habitat for fish species of greatest need, the replication of this work in other key streams is expected to result in similarly important findings for fish species of greatest need located in the Larue-Pine Hills-Western Shawnee-Trail of Tears COA and the Eastern Shawnee COA.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through the development of a more detailed work plan with the Streams Campaign and the successful coordination on the items listed above.

Expected Result 7: Coordinate with Forest Campaign on mutually identified goals, such as reduction of forest fragmentation in Shawnee Hills and Ozarks, restoring floodplains and riparian corridors while promoting ecologically connectivity among habitats. (Appendix X, actions identified for the Forests Campaign).

- Work with Shawnee National Forest, the Central Hardwoods Joint Venture Partnership and other cooperators to identify opportunities to restore and enhance woodlands and barrens communities in the Cretaceous Hills; barrens are listed as key habitat in the WAP. Because of the prevalence of invasive species in this key habitat, coordinate with the Invasive Species Campaign and Central Hardwoods Invasive Plant Network because invasive species pose a particular threat to this plant community.
- Support the development and implementation of a Forest Habitat Management Plan for Trail of Tears State Forest through a stakeholders meeting that results in identified strategies for cooperator action. The Trail of Tears State Forest is identified in the Forest Campaign as a priority site for Larue-Pine Hills-Western Shawnee-Trail of Tears COA and has been named a pilot site for the Forest Campaign.

- As identified in the Cache River Watershed science process, develop targeted areas for riparian restoration and work with regional cooperators to develop specific tactics for conservation and restoration of identified corridors. Both the Forests and Streams campaigns list riparian restoration as a needed action (Illinois Department of Natural Resources, p. 61 and p. 69).
- Develop strategies (building off best techniques developed in expected result No. 1) for Larue-Pine Hills-Western Shawnee-Trail of Tears COA and Eastern Shawnee COA that will result in reduction of forest fragmentation. Forest is a key habitat, and its fragmentation was listed in the WAP as a threat to its integrity. Specifically, the Forests Campaign identified this needed action: “reducing fragmentation of forests >5,000 acres (Shawnee Hills, Ozarks, lower Kaskaskia River corridor, Pere Marquette State Park, Lowden Miller State Forest/Castle Rock State Park, and Mississippi Palisades State Park/Hanover Bluff/Witowski/Winston Tunnel areas)” (Illinois Department of Natural Resources, p. 69).

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through the development of a detailed work plan with the Forests Campaign and successful coordination on the items listed above.

Expected Result 8: Advance the hydrologic and hydraulic understandings of the Cache River in a way that leads to and directly supports stream restoration and conservation action, especially the restored hydrology of the lower Cache River, including reductions in peak flows for Big Creek.

- Direct coordination and support of Phase III research with Illinois State Water Survey, which will provide additional detail about the hydrologic and hydraulic understanding of the Cache River.
- Continue to support the department and community/regional cooperators in seeking grant funds for the repair of the Karnak Levee, which has been documented as a threat to lower Cache River fish communities in greatest need of conservation because its failure has resulted in the loss of oxygen-rich water needed to support these species. The Congressional Water and Resources Development Act 2007 recognized the ecological importance of this levee by adding conservation to the levee’s *raison d’être*. Section 3059 reads: “The Cache River Levee constructed for flood control at the Cache River, Illinois, and authorized by the Act of June 28, 1938 (52 Stat. 1217), is modified to add environmental restoration as a project purpose.”
- As part of the effort to support repair of the levee, refine levee matrix (designed to guide repair) with new information being developed by Southern Illinois University and Illinois State Water Survey. This levee matrix delves into, among other things, ways the levee could be repaired that would support fish passage of species in greatest need of conservation.
- Support The Nature Conservancy and its partners in the evaluation of water passage through its Grassy Slough Preserve and/or alternative pathways, designed to restore a more natural hydrology to

the lower Cache, which suffers from hypoxic conditions, which are causing stress to fish species in the greatest need of conservation.

- Develop strategies for the completion of a long-term West Swamp Structure and work with regional cooperators to implement; this structure is deemed critical to the maintenance of swamp habitat, defined as a key habitat through the wetland entry in the WAP.
- Develop tools to support land managers in understanding water level management, including providing support to Southern Illinois University in the refinement of the Buttonland Swamp Model and research into the historical extent of the swamp.

Accomplishment/Outcome tracking – Success will be measured/tracked for this expected result through development of products listed above.

NOTE: For all expected results, any publication, poster, website, etc. developed or enhanced by this SWG grant will have the required EEO statement included, giving US Fish and Wildlife Service appropriate credit (copy attached as Appendix XI).

Schedule:

Items to be completed between September 1, 2012 to December 30, 2013 (**First 3 Months**)

- Contract with Shawnee RC&D to provide Coordinator services.
- Research historical and existing data on the distribution of cane in the Cache River Watershed.
- Provide a literature review and develop a summary document for regional cooperators that includes identification of best management techniques/practices and clearly identifies (through literature) importance of cane habitat regionally to species listed in greatest need of conservation.

Items to be completed by March 31, 2012 (**First 6 Months**)

- Using GIS, develop an assessment of current forest blocks that quantifies size of existing forest blocks and identifies potential opportunities for the creation of new ones.
- Building upon work of U.S. Fish & Wildlife Service, conduct an aerial survey during wintertime to ascertain potential canebrakes located on the eastern/upper eastern portion of the watershed; USFWS has already completed this survey for the western/western/lower portion of the watershed. With this aerial survey, support on-going research at Southern Illinois University to reflect this addition.
- Direct coordination and support of Phase III research with Illinois State Water Survey, which will provide additional detail about the hydrologic and hydraulic understanding of the Cache River.

Items to be completed by August 31, 2013 (**First 12 Months**):

- Using aerial imagery, map, then ground-truth, location of existing cypress and tupelo swamps. Then, evaluate swamps as habitat for all listed species in greatest need of conservation, including assessment of the existing flow regimes since this key habitat type often acts as a nursery for fish species in greatest need of conservation.
- In collaboration with cooperators, develop and implement a strategic plan to enhance existing forest blocks and form new ones.
- Work with cooperators and stakeholders to review/assess information contained in science plan for additional opportunities for forest restoration.
- Provide a literature review and develop a summary document for regional cooperators that includes identification of best management techniques/practices for restoring and maintaining healthy cypress and tupelo swamp and marsh habitat.
- Develop and enact a monitoring plan for the Bottomland fisheries guild, which research recently identified as extirpated from the river system (Pitts, 2012). Working with cooperators, develop a plan to improve habitat needed for this cadre of fishes, which includes the four state-listed species, i.e. species listed in greatest need of conservation in the WAP.
- Develop assessment of headcutting in the Cache River and tributaries, and support regional cooperators in developing strategies to abate this threat, including the development of a monitoring plan and providing grant support. The headcutting of the lower Cache and its tributaries are deemed a threat to the loss of wetlands – a key habitat and important to species in greatest need of conservation.
- As part of the effort to support repair of the levee, refine levee matrix (designed to guide repair) with new information being developed by Southern Illinois University and Illinois State Water Survey. This levee matrix delves into, among other things, ways the levee could be repaired that would support fish passage of species in greatest need of conservation.
- Develop strategies for the completion of a long-term West Swamp Structure and work with regional cooperators to implement; this structure is deemed critical to the maintenance of swamp habitat, defined as a key habitat through the wetland entry in the WAP.
- Develop tools to support land managers in understanding water level management, including providing support to Southern Illinois University in the refinement of the Buttonland Swamp Model and research into the historical extent of the swamp.
- Submit annual (interim) report summarizing status of progress and accomplishments by individual objective.

Items to be completed by August 31, 2014 (**First 24 Months**):

- Using current mapping, develop at least two restoration areas of at least one acre and monitor for presence/absence of swamp rabbit, state-endangered Swainson's warbler, state-threatened golden mouse and the state-threatened canebrake rattlesnake.
- Using the mapping, meet with stakeholders to develop strategies for the enhancement of this key habitat, as defined in the WAP, including (but not limited to) strategies for acquiring conservation easements from private landowners or inclusion in public ownership (especially prime habitat for the river cooter, a species in greatest need of conservation).
- Develop strategies that identify potential areas of restoration for fish and mussels species within the streams of the watershed. Research by Pitts (2012) documented spatial changes in fish assemblages, which are associated with degraded habitat, so detailed information exists on which to base the development of these strategies.
- Document activities of the Illinois State Wildlife Action Plan in areas identified (Streams and Forest campaigns and COAs of grant focus).
- Conduct review of the Cache River Watershed science document.
- Support protection and enhancement of Round Pond, located in the Eastern Shawnee COA, which is identified as an action in the Streams Campaign because of its importance to species in greatest need of conservation, including the river cooter and other reptile species (INDR, p. 63).
- To support the reduction of Big Creek Water flows, assist the Illinois State Water Survey in their determination of the current effectiveness of retention basins established in the subwatershed, which would support the replication of this effort in other subwatersheds. If deemed necessary, based on this research, support regional agencies in developing strategies for the creation of new retention basins, specifically replicating that work completed in Big Creek for the Cypress Creek watershed. (A conceptual draft plan exists that identifies where in the Cypress Creek watershed work could be conducted.) This work is deemed importance for the enhancement of stream habitat, identified as a key habitat in the WAP, and for the improvement of water quality and to enhance oxygen in the lower Cache, especially important to fish communities because of the hypoxic conditions of the lower Cache River.
- Work with Shawnee National Forest, the Central Hardwoods Joint Venture Partnership and other cooperators to identify opportunities to restore and enhance woodlands and barrens communities in the Cretaceous Hills; barrens are listed as key habitat in the WAP. Because of the prevalence of invasive species in this key habitat, coordinate with the Invasive Species Campaign and Central Hardwoods Invasive Plant Network because invasive species pose a particular threat to this plant community.
- Support the development and implementation of a Forest Habitat Management Plan for Trail of Tears State Forest through a stakeholders meeting that results in identified strategies for cooperator action.

The Trail of Tears State Forest is identified in the Forest Campaign as a priority site for Larue-Pine Hills-Western Shawnee-Trail of Tears COA and has been named a pilot site for the Forest Campaign.

- As identified in the Cache River Watershed science process, develop targeted areas for riparian restoration and work with regional cooperators to develop specific tactics for conservation and restoration of identified corridors.
- Develop strategies (building off best techniques developed in expected result No. 1) for Larue-Pine Hills-Western Shawnee-Trail of Tears COA and Eastern Shawnee COA, which will result in reduction of forest fragmentation. Forest is a key habitat, and its fragmentation was listed in the WAP as a specific threat to its integrity.
- Support The Nature Conservancy and its partners in the evaluation of water passage through its Grassy Slough Preserve and/or alternative pathways, designed to restore a more natural hydrology to the lower Cache, which suffers from hypoxic conditions, which are causing stress to fish species in the greatest need of conservation.
- Submit annual (interim) report summarizing status of progress and accomplishments by individual objective.

Items to be completed by August 31, 2015 (**Project Completion**):

- Support Southern Illinois University researchers in their work on cane, as further information on this habitat type is needed to ensure more effective management in the future.
- Initiate a study that delves into connectivity of off-channel wetlands with the intention of identifying areas in the greatest need of conservation, i.e. wetlands that are now disconnected from the river/tributary system and no longer functioning as nurseries for fishes. This connectivity is important to fish species in greatest need of conservation, particularly the four species listed with the state.
- Support an analysis of mussels to support diversity ratings to create rankings; rock pocketbook and little spectaclecase are two mussels listed as species in greatest need of conservation by the WAP and found in the Cache River Watershed. Further, this analysis was identified as a need during the Cache River Watershed science planning process.
- Support analysis of riffle-pool complex, which was identified as a need during the Cache River Watershed science planning process because of its importance to fish species in greatest need.
- Support professional fish-related research, especially as it relates to Illinois' Streams Campaign as identified in the WAP and conservation targets identified for the Cache River.
- Lead review of the WAP revision for 2015 with stakeholders and collaborators; provide summary document of activities documented and status of Cache River Watershed science document.
- Provide suggested updates of the WAP to IDNR.

- Continue to support the department and community/regional cooperators in achievement of the goal of dredging the Cache River with the intention of creating deep water habitat, deemed necessary for fish refugia because of documented hypoxic conditions in the lower Cache. The lower Cache provides important habitat for the state-endangered cypress minnow, bigeye shiner and redspotted sunfish, and the state-threatened bantam sunfish, as well as other fish species of greatest need of conservation.
- Replicate research on fish assemblages to other priority areas to determine presence/absence of the bottomland fish guild and identify spatial changes in other assemblages. Since fish assemblage work conducted in the watershed by Kristen Pitts (2012) has proved instrumental in assessing the integrity of stream habitat for fish species of greatest need, the replication of this work in other key streams is expected to result in similarly important findings for fish species of greatest need located in the Larue-Pine Hills-Western Shawnee-Trail of Tears COA and the Eastern Shawnee COA.
- Continue to support the department and community/regional cooperators in seeking grant funds for the repair of the Karnak Levee, which has been documented as a threat to lower Cache River fish communities in greatest need of conservation because its failure has resulted in the loss of oxygen-rich water needed to support these species. The Congressional Water and Resources Development Act 2007 recognized the ecological importance of this levee by adding conservation to the levee's raison d'être. Section 3059 reads: "The Cache River Levee constructed for flood control at the Cache River, Illinois, and authorized by the Act of June 28, 1938 (52 Stat. 1217), is modified to add environmental restoration as a project purpose."
- Prepare summary of all Accomplishment / Outcome tracking activities by individual objective.
- Prepare and submit final report for contract completion.

Projected Accomplishments Timeline:

*Note: Accomplishment table divided into 6 month blocks of time, denoted in table by 'H' and years, denoted in table by 'Y'.

Accomplishment	H1Y1	H2Y1	H1Y2	H2Y2	H1Y3	H2Y3
Contract with Shawnee RC&D to provide Coordinator services.	X					
Research historical and existing data on the distribution of cane in the Cache River Watershed.	X					
Provide a literature review and develop a summary document for	X					

regional cooperators that includes identification of best management techniques/practices and clearly identifies (through literature) importance of cane habitat regionally to species listed in greatest need of conservation.						
Using GIS, develop an assessment of current forest blocks that quantifies size of existing forest blocks and identifies potential opportunities for the creation of new ones.	X					
Building upon work of U.S. Fish & Wildlife Service, conduct an aerial survey during wintertime to ascertain potential canebrakes located on the eastern/upper eastern portion of the watershed; USFWS has already completed this survey for the western/western/lower portion of the watershed. With this aerial survey, support on-going research at Southern Illinois University to reflect this addition.	X					
Direct coordination and support of Phase III research with Illinois State Water Survey, which will provide additional detail about the hydrologic and hydraulic understanding of the Cache River.	X					
Using aerial imagery, map, then ground-truth, location of existing cypress and tupelo swamps. Then,		X				

evaluate swamps as habitat for all listed species in greatest need of conservation, including assessment of the environmental flow since this key habitat type often acts as a nursery for fish species in greatest need of conservation.						
In collaboration with cooperators, develop and implement a strategic plan to enhance existing forest blocks and form new ones.		X				
Work with cooperators and stakeholders to review/assess information contained in science plan for additional opportunities for forest restoration.		X				
Provide a literature review and develop a summary document for regional cooperators that includes identification of best management techniques/practices for restoring and maintaining healthy cypress and tupelo swamp and marsh habitat.		X				
Develop and enact a monitoring plan for the Bottomland fisheries guild, which research recently identified as extirpated from the river system (Pitts, 2012). Working with cooperators, develop a plan to improve habitat needed for this cadre of fishes, which includes the four state-listed species, i.e. species listed in greatest need of conservation in the WAP.		X				
Develop assessment of headcutting		X				

<p>in the Cache River and tributaries, and support regional cooperators in developing strategies to abate this threat, including the development of a monitoring plan and providing grant support. The headcutting of the lower Cache and its tributaries are deemed a threat to the loss of wetlands – a key habitat and important to species in greatest need of conservation.</p>						
<p>As part of the effort to support repair of the levee, refine levee matrix (designed to guide repair) with new information being developed by Southern Illinois University and Illinois State Water Survey. This levee matrix delves into, among other things, ways the levee could be repaired that would support fish passage of species in greatest need of conservation.</p>		X				
<p>Develop strategies for the completion of a long-term West Swamp Structure and work with regional cooperators to implement; this structure is deemed critical to the maintenance of swamp habitat, defined as a key habitat through the wetland entry in the WAP.</p>		X				
<p>Develop tools to support land managers in understanding water level management, including providing support to Southern Illinois University in the refinement of the</p>		X				

Buttonland Swamp Model and research into the historical extent of the swamp.						
Submit annual (interim) report summarizing status of progress and accomplishments by individual objective.		X				
Using current mapping, develop at least two restoration areas of at least one acre and monitor for presence/absence of swamp rabbit, state-endangered Swainson's warbler, state-threatened golden mouse and the state-threatened canebrake rattlesnake.			X			
Using the mapping, meet with stakeholders to develop strategies for the enhancement of this key habitat, as defined in the WAP, including (but not limited to) strategies for acquiring conservation easements from private landowners or inclusion in public ownership (especially prime habitat for the river cooter, a species in greatest need of conservation).			X			
Develop strategies that identify potential areas of restoration for fish and mussels species within the streams of the watershed. Research by Pitts (2012) documented spatial changes in fish assemblages, which are associated with degraded habitat, so detailed information exists on which to base the			X			

development of these strategies.						
Document activities of the Illinois State Wildlife Action Plan in areas identified (Streams and Forest Campaigns and COAs of grant focus).			X			
Conduct review of the Cache River Watershed science document.			X			
Support protection and enhancement of Round Pond, located in the Eastern Shawnee COA, which is identified as an action in the Streams Campaign because of its importance to species in greatest need of conservation, including the river cooter and other reptile species (INDR, p. 63).				X		
To support the reduction of Big Creek Water flows, assist the Illinois State Water Survey in their determination of the current effectiveness of retention basins established in the subwatershed, which would support the replication of this effort in other subwatersheds. If deemed necessary, based on this research, support regional agencies in developing strategies for the creation of new retention basins, specifically replicating that work completed in Big Creek for the Cypress Creek watershed. (A conceptual draft plan exists that identifies where in the Cypress Creek watershed work could be			X			

<p>conducted.) This work is deemed importance for the enhancement of stream habitat, identified as a key habitat in the WAP, and for the improvement of water quality and to enhance oxygen in the lower Cache, especially important to fish communities because of the hypoxic conditions of the lower Cache River.</p>						
<p>Work with Shawnee National Forest, the Central Hardwoods Joint Venture Partnership and other cooperators to identify opportunities to restore and enhance woodlands and barrens communities in the Cretaceous Hills; barrens are listed as key habitat in the WAP. Because of the prevalence of invasive species in this key habitat, coordinate with the Invasive Species Campaign and Central Hardwoods Invasive Plant Network because invasive species pose a particular threat to this plant community.</p>			X			
<p>Support the development and implementation of a Forest Habitat Management Plan for Trail of Tears State Forest through a stakeholders meeting that results in identified strategies for cooperator action. The Trail of Tears State Forest is identified in the Forest Campaign as a priority site for Larue-Pine Hills-Western Shawnee-Trail of Tears COA and has been named a pilot</p>			X			

site for the Forest Campaign.						
As identified in the Cache River Watershed science process, develop targeted areas for riparian restoration and work with regional cooperators to develop specific tactics for conservation and restoration of identified corridors.				X		
Develop strategies (building off best techniques developed in expected result No. 1) for Larue-Pine Hills-Western Shawnee-Trail of Tears COA and Eastern Shawnee COA, which will result in reduction of forest fragmentation. Forest is a key habitat, and its fragmentation was listed in the WAP as a specific threat to its integrity.			X			
Support The Nature Conservancy and its partners in the evaluation of water passage through its Grassy Slough Preserve and/or alternative pathways, designed to restore a more natural hydrology to the lower Cache, which suffers from hypoxic conditions, which are causing stress to fish species in the greatest need of conservation.				X		
Submit annual (interim) report summarizing status of progress and accomplishments by individual objective.				X		
Support Southern Illinois University researchers in their work into cane,					X	

as further information on this habitat type is desired for more precise management in the future.						
Initiate a study that delves into connectivity of off-channel wetlands with the intention of identifying areas in the greatest need of conservation, i.e. wetlands that are now disconnected from the river/tributary system and no longer functioning as nurseries for fishes. This connectivity is important to fish species in greatest need of conservation, particularly the four species listed with the state.					X	
Support an analysis of mussels to support diversity ratings to create rankings; rock pocketbook and little spectaclecase are two mussels listed as species in greatest need of conservation by the WAP and found in the Cache River Watershed. Further, this analysis was identified as a need during the Cache River Watershed science planning process.					X	
Support analysis of riffle-pool complex, which was identified as a need during the Cache River Watershed science planning process because of its importance to fish species in greatest need.					X	
Support professional fish-related research, especially as it relates to Illinois' Streams Campaign as					X	

identified in the WAP and conservation targets identified for the Cache River.						
Lead review of the WAP revision for 2015 with stakeholders and collaborators; provide summary document of activities documented and status of Cache River Watershed science document.					X	
Provide suggested updates of the WAP to IDNR.						X
Continue to support the department and community/regional cooperators in achievement of the goal of dredging the Cache River with the intention of creating deep water habitat, deemed necessary for fish refugia because of documented hypoxic conditions in the lower Cache. The lower Cache provides important habitat for the state-endangered cypress minnow, bigeye shiner and redspotted sunfish, and the state-threatened bantam sunfish, as well as other fish species of greatest need of conservation.						X
Replicate research on fish assemblages to other priority areas to determine presence/absence of the bottomland fish guild and identify spatial changes in other assemblages. Since fish assemblage work conducted in the watershed by Kristen Pitts (2012)						X

<p>has proved instrumental in assessing the integrity of stream habitat for fish species of greatest need, the replication of this work in other key streams is expected to result in similarly important findings for fish species of greatest need located in the Larue-Pine Hills-Western Shawnee-Trail of Tears COA and the Eastern Shawnee COA.</p>						
<p>Continue to support the department and community/regional cooperators in seeking grant funds for the repair of the Karnak Levee, which has been documented as a threat to lower Cache River fish communities in greatest need of conservation because its failure has resulted in the loss of oxygen-rich water needed to support these species. The Congressional Water and Resources Development Act 2007 recognized the ecological importance of this levee by adding conservation to the levee's raison d'être. Section 3059 reads: "The Cache River Levee constructed for flood control at the Cache River, Illinois, and authorized by the Act of June 28, 1938 (52 Stat. 1217), is modified to add environmental restoration as a project purpose."</p>						X
<p>Prepare summary of all Accomplishment / Outcome tracking</p>						X

activities by individual objective.						
Prepare and submit final report for contract completion.						X

COMPLIANCE:

The IDNR will use its CERP (Comprehensive Environmental Review Process) as a tool to aid the Department in meeting NEPA compliance for the project outlined under this grant proposal. It is the Department’s policy to require CERP applications for all major activities, including land acquisition, unless those activities are covered by CERP exemptions (see the enclosed Comprehensive Environmental Review Process documents).

All planned activities will also be in compliance with the Endangered Species act. All determinations and documentation will be in accordance with the current established U.S. Fish and Wildlife Service protocols for Section 7.

All planned activities will be in compliance with the National Historic Preservation Act and the Council on Historic Preservation Act. All determinations and documentation will be in accordance with the terms of the Programmatic Agreement, as amended, effective September 23, 2002.

When applicable, those planned activities that involve a floodplain and/or jurisdictional wetlands will be accomplished in accordance with Presidential Executive Orders 11988 and 11990.

When applicable, those planned activities that involve the use of pesticides, herbicides or other comparable chemicals will be completed in accordance with current state and federal regulations to assure safe and legal application of those chemicals. All chemicals will be applied in accordance with the manufacturer’s label instructions. All persons applying chemicals will be licensed by the Illinois Department of Agriculture as a chemical operator/appliator in accordance with Illinois state law.

No ground disturbance below the plow-line is anticipated for this project.

KEY PROJECT PERSONNEL AND COOPERATORS:

Project Lead:

Glenn Seeber, Chair
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Contractual Services Breakout

Project Service	Potential Vendor	Cost (Federal)	Cost (State)
Using GIS, develop an assessment of current forest blocks, which quantifies size of existing forest blocks and identifies potential opportunities for the creation of new ones.	Shawnee Community College	\$811.92	\$688.08
Aerial photography for cane and cypress and tupelo work.	Illinois Department of Transportation	\$1,055.47	\$944.53
Support for ground-truthing existing cypress and tupelo swamps.	Shawnee Community College	\$568.37	\$431.63
Using GIS, develop a map showing locations of cane and cypress/tupelo swamps.	Shawnee Community College	\$1,055.47	\$944.53
Cane restoration for at least two acres.	Conservation Technologies	\$1,951.73	\$1,888.27
Study of connectivity of off-channel wetlands.	Illinois State Water Survey	\$4,952.26	\$5,047.74
Analysis of mussels to support diversity ratings to create rankings.	Illinois Natural History Survey	\$1,542.57	\$1,457.43
Analysis of Cache River riffle pool complex.	Southern Illinois University - Carbondale	\$7,241.94	\$7,458.36
Replication of research on fish assemblages to other priority areas.	Southern Illinois University - Carbondale	\$1,542.57	\$1,457.43
Printing of Forest Habitat Management Plan for Trail of Tears State Forest, materials for contact with stakeholders, strategic plan to enhance existing forest blocks and form new ones, map of cypress/tupelo swamp and cane, and cane literature review and summary document for regional cooperators that includes identification of best management techniques/practices and clearly identifies (through literature) importance of this habitat regionally to species listed in greatest need	(Yet to be Determined)	\$1,500	

of conservation.			
Southern IL Conservation Opportunity Areas Coordinator (SICOA) salary (see SALARY & WAGES under Budget Justification for details)	Shawnee RC&D	\$108,810	\$30,000
Travel for SICOA salary (see SALARY & WAGES under Budget Justification for details)	Shawnee RC&D	\$5,832	\$0
TOTALS		\$135,364	\$51,818

RELATED FEDERAL GRANTS:

T-77-D-1

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APPENDIX I

Cache River-Cypress COA Conservation Targets

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Bottomland Forest	Animal Species Composition & Abundance	Density of Focus Bird Species	Number of Birds: Minimal Acceptable: Acadian Flycatcher: 2.9 per acre Prothonotary Warbler: 1.20 per acre Kentucky Warbler: 0.46 per acre Wood Thrush: 0.39 per acre Summer Tanager: 0.14 per acre Louisiana Waterthrush: 0.12 per acre Fair: 25% increase over "Minimal Acceptable" Good: 35% increase over "Minimal Acceptable" Excellent: 50% increase over "Minimal Acceptable" Nest Predation Rates: less than 50% for nest predation, and less than 40% for cowbird parasitism	Hoover	Note: This suite of birds was selected because existing research is available to monitor this attribute/indicator, and also because it is a good indicator overall of diversity.
Bottomland Forest	Connectivity	Habitat connectivity - riparian corridors	Undetermined.		

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Bottomland Forest	Connectivity	Habitat connectivity - width of riparian corridors	200 feet	Used largest of minimum suggested for wildlife, excluding large mammals and large predator mammals.	Bentrup, G. 2003. Conservation buffers: design guidelines for buffers, corridors, and greenways. Gen. Tech. Rep. SRS-109. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station. 110 p.
Bottomland Forest	Habitat Size	Block or Patch - Number of	0 = Poor 2 = Minimal Acceptable 4 = Good 6 = Excellent		

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Bottomland Forest	Habitat Size	Block or Patch - Size	7,000 acres that lies within a circle with a 3-km radius	The 7,000-acre block size is smaller than the 10,000 acre block referenced in Mississippi Alluvial Plan (see citation). It is based off Hoover's research on the Heron Pond/Little Black Slough complex, which is roughly 7,000 acres, and has been documented as being a source (as opposed to a sink) for neotropicals. Also, published research of Hoover shows that the percent forest cover within a 3-km radius is a good predictor of cowbird parasitism.	LMVJV Forest Resource Conservation Working Group. 2007. Restoration, Management, and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat. Edited by R. Wilson, K. Ribbeck, S. King, and D. Tweedt.
Bottomland Forest	Species Composition & Abundance	Canopy Cover	60-70%		Lower Mississippi JV: Forest Resource Conservation Working Group
Bottomland Forest	Species Composition & Abundance	Composition	favor hard mast species with minimum of 10-20 dominant/codominant trees/acre in mature stands		Lower Mississippi JV: Forest Resource Conservation Working Group
Bottomland Forest	Species Composition & Abundance	Invasives	Undetermined		

Targets, Attributes and Indicators
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Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Bottomland Forest	Species Composition & Abundance	Recruitment of trees, esp hard mast	Advanced regeneration of shade-intolerant trees in sufficient numbers (circa 400/acre) to ensure their succession to forest canopy.		Lower Mississippi JV: Forest Resource Conservation Working Group
Bottomland Forest	Natural hydrologic regime (depth and duration)	Appropriate seasonal fluctuations in the forest block, as decreed by forester and/or biologist on a site specific basis	0 blocks with a more natural regime = Poor 2 blocks with a more natural regime = Minimal Acceptable 4 blocks with a more natural regime = Good 6 blocks with a more natural regime = Excellent		

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Bottomland Forest	Plant Species Composition & Abundance	Desired Stand Conditions	<p>Overstory canopy cover: 60-70% Midstory cover: 25-40% Basal Area: 13.7 – 16 m²/ha with ≥25% in older age classes Tree Stocking: 60-70%</p> <p>Secondary Management Factors: Dominant Trees: >5/ha Understory cover: 35-40% Regeneration: 30-40 % Coarse woody debris (>25cm diameter): ≥14 m³/ha Small cavities (hole <25cm diameter): >10 visible holes/ha or >10 “snag” stems/ha ≥ 10cm dbh or ≥5 stems/ha > 51cm dbh Den trees/large cavities (hole >35cm diameter): One visible hole/4 ha or ≥5 stems/ha ≥ 66cm dbh (≥1.8 m² BA/ha ≥ 66cm dbh) Standing dead and/or stressed trees: >15 stems/ha ≥ 25cm dbh or ≥5 stems/ha ≥ 51cm dbh (>0.9 m² BA/ha > 25cm dbh)</p> <p>Ranges for meeting desired conditions are: Poor: Less than 35% of desired conditions. Minimally Acceptable: At least 35% of desired conditions. Good: 50% of desired conditions Excellent: More than 50% of desired conditions.</p>		Lower Mississippi JV: Forest Resource Conservation Working Group

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Bottomland Forest	Species Composition & Abundance: Diversity and Abundance of Oaks	overwintering populations of red-headed woodpeckers	Based on 20 year average, should expect to see no decreases in population. Number of Birds: Minimal Acceptable: Acadian Flycatcher: 2.9 per acre Prothonotary Warbler: 1.20 per acre Kentucky Warbler: 0.46 per acre Wood Thrush: 0.39 per acre Summer Tanager: 0.14 per acre Louisiana Waterthrush: 0.12 per acre Fair: 25% increase over "Minimal Acceptable" Good: 35% increase over "Minimal Acceptable" Excellent: 50% increase over "Minimal Acceptable" Nest Predation Rates: less than 50% for nest predation, and less than 40% for cowbird parasitism	Literature values per Jeff Hoover - our CBC and others in the region typically have relatively high counts for red-headed woodpeckers compared to other parts of the winter range of the species	Note: This suite of birds was selected because existing research is available to monitor this attribute/indicator, and also because it is a good indicator overall of diversity. http://www.srs.fs.usda.gov/pubs/ia/ia_conner028.pdf
Cypress and Tupelo	Animal Species Composition & Abundance	Density of Focus Bird Species			
Cypress and Tupelo	Habitat Size	Depth of Southern Deep Water Swamp Habitat	depths of 2-10 feet		

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Cypress and Tupelo	Habitat Size/ Specifications	Open Cypress Swamp Size	Undetermined		Vegetative Structure - Strand swamps have small young .pond cypress. trees towards their outeredges, grading into larger and older .bald cypress. towards the interior, giving a strand a distinctly rounded cross-sectional profile. In the central part of the strand, there may be open ponds or deeper sloughs. (http://www.fws.gov/verobeach/MSRPPDFs/Flo wWaterSwamp.pdf)
Cypress and Tupelo	Hydrology	Cypress Tree Regeneration in Seasonally Flooded Areas	Presence vs absence		
Cypress and Tupelo	Hydrology	Species Composition and Abundance/Absence of Understory Trees	Absence		
Cypress and Tupelo	Hydrology - depth and duration	Nesting success of prothonotary warbler	Cowbird nest parasitism <30% & nest predation rates <40%	literature values per Jeff Hoover	

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Cypress and Tupelo	Plant Species Composition & Abundance	Lack of Buttonbush acting as an invasive	Poor: Buttonbush located in swamp at a rate higher than 40% Acceptable: Some Buttonbush located in swamp, within range of 20% to 40% Good: Buttonbush restricted to perimeter of swamp or less than 20% of the swamp		
Cypress and Tupelo	Species Composition & Abundance	Wood duck abundance & breeding vital rates	Wood duck duckling survival 21% and brood survival 64%	literature values per Mike Eichholz	
Cypress and Tupelo	Specifications	"Closed" Forest Size	Overstory canopy cover: 60-70% Midstory cover: 25-40%	MAV Plan, table 2	
Giant Cane	Disturbance	Density	15-40 culms per square meter	literature values per Jon Schoonover	
Giant Cane	Habitat location	Proximity to forest habitat or stream (hydrologic connection)	more than half located adjacent and within a forest OR more than half located within 40 meters of a stream		
Giant Cane	Habitat Size	Amount of watershed	Undetermined. Conduct sampling and make determination within three years.	Amanda Nelson: Will share breaks as percentage.	
Giant Cane	Habitat Structure	Large Patches (1 acre)	0 "large" patches = Poor 1-2 "large" patches = Minimal Acceptable 3 "large" patches = Good 4+ "large" patches = Excellent	Amanda Nelson: 141 patches currently documented.	Ideal management would review soils and species to determine ideal locations for more intensive management efforts.

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Giant Cane	Habitat Structure	Part of a forest matrix	presence versus absence		Management would need to take into account disturbance needed for cane to have the ability to expand. Also management would need to consider planting cane alongside trees (perhaps review Wabash work for suggested matrix.)
Giant Cane	Species Composition and Abundance	White-eyed Vireo, Hooded Warbler and Indigo Bunting	presence versus absence		
Migratory Birds	Complexity of Habitat	Diversity of Bird Species, as indicated through nesting rates of focus species	<p>Number of Birds:</p> <p>Minimal Acceptable: Acadian Flycatcher: 1.20 per hectare Prothonotary Warbler: 0.50 per hectare Kentucky Warbler: 0.19 per hectare Wood Thrush: 0.16 per hectare Summer Tanager: 0.06 per hectare Louisiana Waterthrush: 0.05 per hectare</p> <p>Fair: 25% increase over ⁶⁶Minimal Acceptable⁶⁶ Good: 35% increase over ⁶⁶Minimal Acceptable⁶⁶ Excellent: 50% increase over ⁶⁶Minimal Acceptable⁶⁶</p> <p>Nest Predation Rates: less than 50% for nest predation, and less than 40% for cowbird parasitism</p>	Hoover	

Targets, Attributes and Indicators
draft for review

Key Ecological Attribute		Indicator	Desired Range	Basis for Range	Literature Notes
Migratory Birds	Habitat Size	Block or Patch - Number of upland and number of bottomland	0 = Poor 2 = Minimal Acceptable 4 = Good 6 = Excellent	The 7,000-acre block size is smaller than the 10,000 acre block referenced in Mississippi Alluvial Plan (see citation). It is based off Hoover's research on the Heron Pond/Little Black Slough complex, which is roughly 7,000 acres, and has been documented as being a source (as opposed to a sink) for neotropicals. Also, published research of Hoover shows that the percent forest cover within a 3-km radius is a good predictor of cowbird parasitism.	LMJV Forest Resource Conservation Working Group, 2007. Restoration, Management, and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat. Edited by R. Wilson, K. Ribbeck, S. King, and D. Tvedt.
Migratory Birds	Habitat Size	Block or Patch Size	7,000 acres - this is the area within a circle with a 3-km radius		

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Migratory Birds	Habitat Size & Temporal Distribution of Habitat	(waterfowl and shorebirds) Moist Soil Vegetation and Mud Flats		This moist-soil objective of 400 pounds per acre is at least partially derived from the Lower Mississippi Valley Joint Venture (LMVJV). In addition, they calculated the number of ducks that could obtain daily food requirements (duck use days) from using moist soil habitat to be 1,386 (per acre). In calculating the duck use-day value for moist-soil habitat, the LMVJV assumed an average of about 400 pounds per acre of native seeds were available to waterfowl. These numbers are from the Moist Soil Management Guidelines for the USFWS, Southeast Region.	
Migratory Birds	Productivity (kg per ha)	(waterfowl) Duck Use Days (DUDS) of food	Seeds during spring: More than 100 kg per ha; invertebrates during spring - 20 kg per 2.4 acres - based on long term averages		
Migratory Birds	Species Composition & Abundance	(Waterfowl) Wood ducks and hooded mergansers	Undetermined. Data gap identified here.		

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Migratory Birds	Species Composition & Abundance: Diversity and Abundance of Oaks	over-wintering populations of red-headed woodpeckers	Based on 20 year average, should expect to see no decreases in population.	literature values per Jeff Hoover - our CBC and others in the region typically have relatively high counts for red-headed woodpeckers compared to other parts of the winter range of the species	
Riverine Habitat	Connectivity	Biological connection between upper and lower segments of the river except during flood.	Connection does not exist = Unacceptable Managed connection permanently exists = Acceptable Connection permanently exists = Excellent		
Riverine Habitat	Connectivity	Connection between mainstem and tributaries.	Connection exists		
Riverine Habitat	Connectivity	Hydrologic connection between upper and lower segments of the river except during flood.	Connection does not exist = Unacceptable Managed connection permanently exists = Acceptable Connection permanently exists = Excellent		

Targets, Attributes and Indicators
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Key Ecological					
Target	Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Riverine Habitat	Connectivity	Laterally	Needs to be developed.		Jacobson et al, 2011
Riverine Habitat	Connectivity	Mainstem of Lower Cache	River remains connected, i.e. not a series of pools		
Riverine Habitat	Habitat Size	Deep water habitat in lower Cache	depths of 2-15 feet in the lower Cache and depth of 4-8 feet in the upper Cache	Pickles and Leonard	Bell's survey early 1900's
Riverine Habitat	Habitat Structure	Bank stability in mainstem of Upper Cache	Banks stable	Pitts and Stoebner 2011 survey, Jon Remo with Bell survey	
Riverine Habitat	Habitat Structure	Bank stability in tributaries.	Banks stable	Pitts and Stoebner 2011 survey, Jon Remo with Bell survey	

Targets, Attributes and Indicators
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Key Ecological		Indicator	Desired Range	Basis for Range	Literature Notes
Target	Attribute				
Riverine Habitat	Habitat Structure	Ratio of pools and riffles in upland tributaries	Analysis needed to determine.	Each zone would have its own desired range depending on whether it is on the tributaries or the mainstem.	Leopold
Riverine Habitat	Habitat Structure	woody debris	Undetermined. Recommendation, however, forthcoming.	Rantala, Big and Cypress - Guetersloh. # log jams / km. Basis: Rantala, Big and Cypress - Guetersloh	
Riverine Habitat	Hydrology	Flow Regime	Historic Flow Regime as defined by ISWS		Poff et al. 1997; Richter et al. 1997
Riverine Habitat	Water Quality	Sediment	No increases in current rate of sedimentation.		

Targets, Attributes and Indicators
draft for review

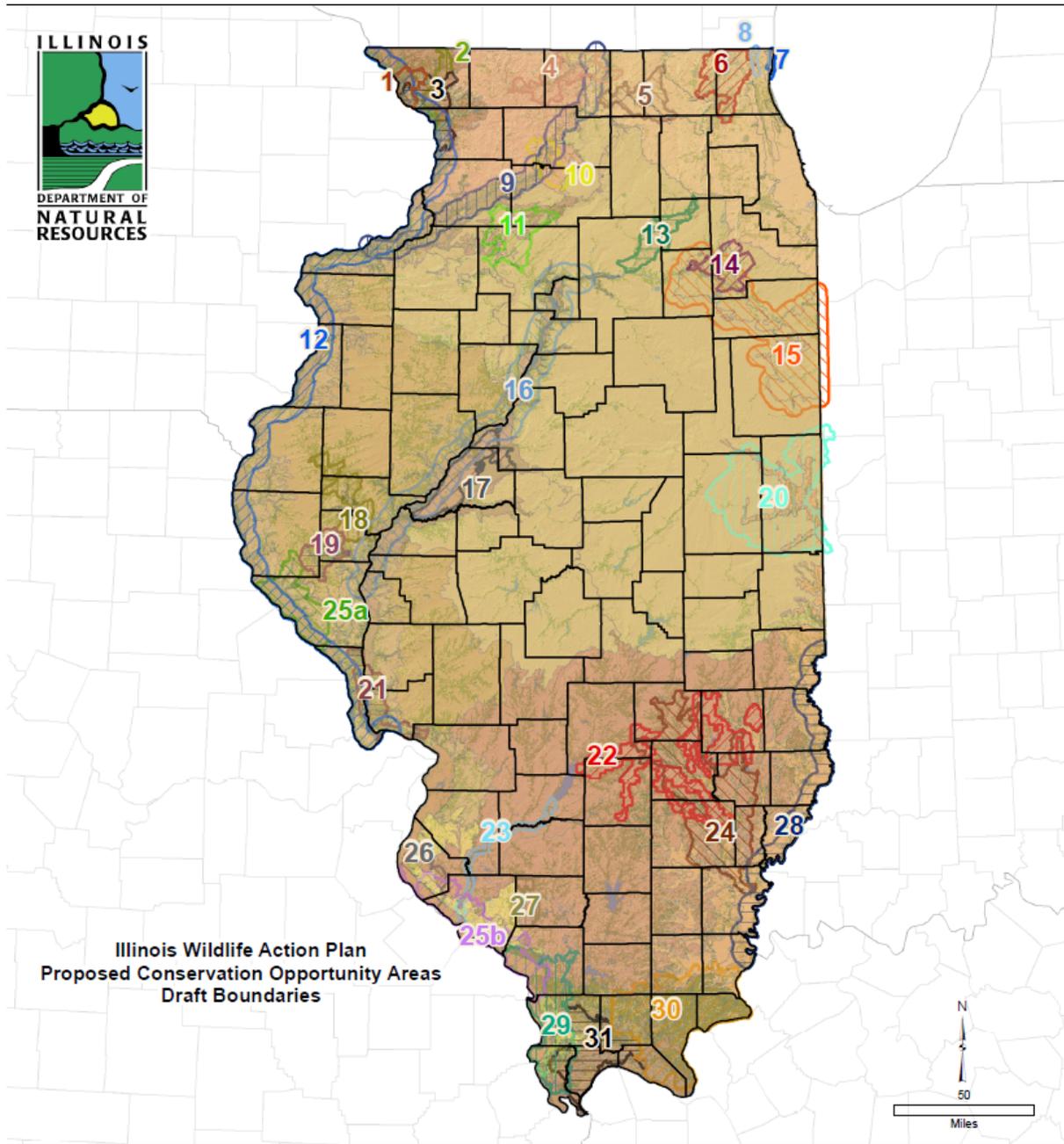
Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Riverine Habitat	Species Composition & Abundance	inverts	Undetermined. Recommendation, however, forthcoming.	Need to determine Reference Stream to develop range. Cache River AR, for lower: Big Creek, Lusk Creek, for Upper	
Riverine Habitat	Species Composition & Abundance	Mussels - presence of Host Fish	Host fish exist for each mussel species with downstream distribution.	Check INHS database, host-species interactions database available (Ohio State??)	
Riverine Habitat	Species Composition & Abundance	Mussels - species richness and community composition	No reduction in species located in Cache. Rankings need to be determined for rating communities.	Check INHS database, host-species interactions database available (Ohio State??)	
Riverine Habitat	Species Composition & Abundance	Native fish species vs exotic species	75 species (to include flier and slough darter), > 75% biomass		Theiling et.al. (1999) indicate flooding and hydrologic fluctuation can increase fish diversity.
Riverine Habitat	Species Composition & Abundance	Presence of generalists vs. specialists in lower Cache	Presence/ absence of mottled sculpin and diversity of slough darter, flier and banded pygmy sunfish	Need to determine Reference Stream to develop range. Cache River AR, for lower: Big Creek, Lusk Creek, for Upper	Cook report "Fishes of the Middle Reach of the Cache River"
Riverine Habitat	Species Composition & Abundance	Presence of generalists vs. specialists in upper Cache	Diversity of darter species	Need to determine Reference Stream to develop range. Cache River AR, for lower: Big Creek, Lusk Creek, for Upper	Cook report "Fishes of the Middle Reach of the Cache River"

Targets, Attributes and Indicators
draft for review

Target	Key Ecological Attribute	Indicator	Desired Range	Basis for Range	Literature Notes
Riverine Habitat	Water Quality	Dissolved Oxygen	minimum of 5mg/l for fish and mussels	For mussels: USACE: http://el.ercd.usace.army.mil/mussels/habitatrequirements.html FS: http://www.nature.nps.gov/water/fisheries/assets/reports/mussels.pdf	
Riverine Habitat	Water Quality	Turbidity	Based on the data collected in the Cache watershed, the reference condition for turbidity is 13 NTU (25th percentile of measurements per the EPA method). Therefore, the goal for turbidity for the watershed should be 13 NTU. This is slightly lower than the EPA reference condition for the Level III Ecoregion 72, in which the Cache River watershed is classified (EPA 2000).	Heidi Rantala - literature and data	available on request

APPENDIX II

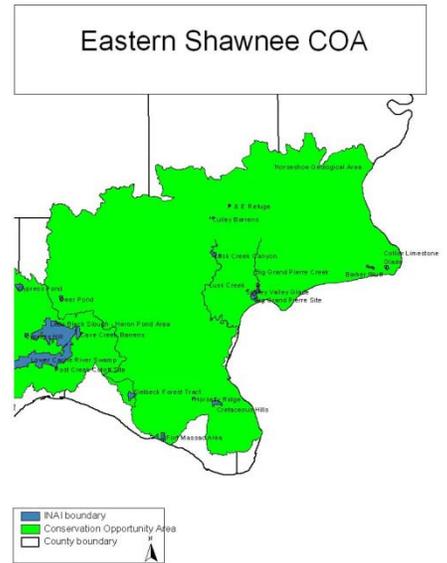
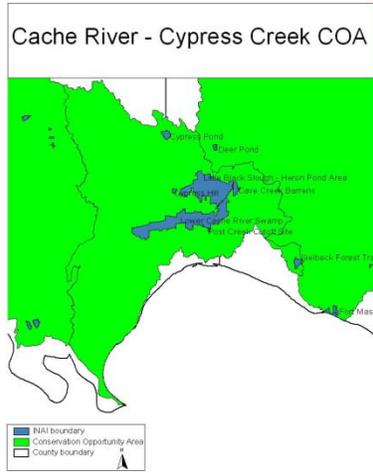
Map of Illinois Conservation Opportunity Areas.



- | Conservation Opportunity Areas | | |
|--|------------------------------|---|
| (1) Wisconsin Driftless Forest | (9) Rock River | (18) Lower LaMoine River |
| (2) Apple River | (10) Nachusa | (19) Siloam Springs |
| (3) Lost Mound | (11) Green River | (20) Vermilion River |
| (4) Sugar - Pecatonica River | (12) Upper Mississippi River | (21) Pere Marquette |
| (5) Kishwaukee River | (13) Lower Fox River | (22) Prairie Ridge Landscape |
| (6) Lake - McHenry Wetland Complex | (14) Midewin | (23) Lower Kaskaskia Bottomlands |
| (7) Illinois Beach - Chiwaukee Prairie | (15) Kanakakee Sands | (24) Middle Little Wabash |
| (8) Upper Des Plaines River Corridor | (16) Middle Illinois River | (25a) Hill Prairie Corridor - North Section |
| | (17) Mason County Sand Areas | (25b) Hill Prairie Corridor - South Section |
| | | (26) Sinkhole Plain |
| | | (27) Pyramid - Arkland Landscape |
| | | (28) Wabash River |
| | | (29) LaRue - Pine Hills |
| | | (30) Eastern Shawnee |
| | | (31) Cache River - Cypress Creek |

APPENDIX III

Detailed maps of priority Conservation Opportunity Areas



APPENDIX IV

Coastal Plain detail from WAP

IV. A. The Coastal Plain Natural Division

Characteristics

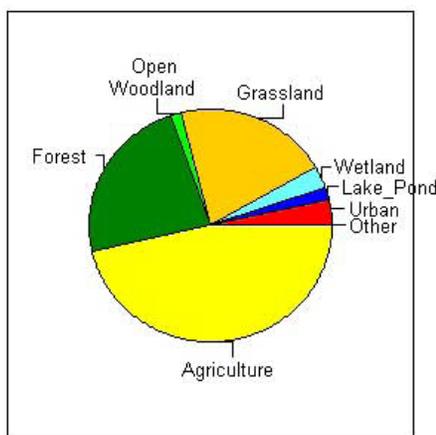
The Coastal Plain Natural Division of extreme southern Illinois is a region of swampy forested bottomlands and low clay and gravel hills that is the northernmost extension of the Gulf of Mexico Plain Province of North America. Baldcypress-tupelo swamps are a unique feature of the natural division, as are many southern animals such as bird-voiced treefrog and cottonmouth. The floodplain at the confluence of the Mississippi and Ohio rivers and Cache and Ohio rivers host rich bottomland forests, while the "Cretaceous Hills" section is a steep to rolling area of unconsolidated sand, gravel and clay hosting Cretaceous period fossil beds.

Major Habitats & Challenges

Forests - Suppression of fire and subsequent alteration of fire-related species guilds and pre-disturbance natural character; alteration of basin hydrology and hydraulics as it relates to the natural flood regime (timing, depth and duration); controlling the spread of exotic and invasive species (especially Japanese honeysuckle, bush honeysuckle, autumn and Russian olive, garlic mustard, kudzu); and changes in woody species composition associated lack of forest management.

Open Woodland/Savanna/Barren - Reversing the effects of the suppression of natural disturbance, especially periodic burning, and controlling the spread of early successional woody species and the spread of woody and herbaceous invasive species (i.e., tall fescue, autumn olive).

Land Use of the Coastal Plain Natural Division



Wetlands - Protecting existing wetlands from drainage and clearing for conversion to agriculture or urban use; widespread implementation of Best Management Practices throughout the watershed to improve water quality entering existing wetlands; restoring and maintaining the flood regime responsible for the character and sustainability of individual wetlands; establishing wetland complexes intensively managed to provide habitat for migratory waterfowl and shorebirds.

Lakes and Ponds - Establishing and maintaining a flood regime that will restore and sustain the natural character and productivity of backwater areas (natural ponds, oxbows, sloughs) associated with major rivers and tributaries while minimizing conflicts with private landowners (agriculture, industry, private home/property damage); maintaining and improving the natural character and public values assigned/determined for aquatic resources.

Streams - Restoring and maintaining stream/river aquatic and terrestrial natural communities with minimal affects to private lands; eliminating stream bed and bank instability to improve water quality and aquatic habitat, and subsequently the health of receiving waters.

Primary Communities - Identifying and monitoring river sandbars utilized by Least Terns and protecting these sites from development and disturbance; monitoring known mussel beds and conducting additional monitoring to locate new beds (Ohio and Cache Rivers).

Opportunities

Cache River Joint Venture Partnership: Landscape-scale management and the restoration of ecological processes that will restore and sustain high quality aquatic and terrestrial natural communities is possible within land owned and managed by the Cache River Joint Venture Partnership (Illinois Department of Natural Resources, U.S. Fish and Wildlife Service, The Nature Conservancy, Ducks Unlimited).

Wetland Reserve Program, Wildlife Habitat Incentive Program, Best Management Practices: U.S. Department of Agriculture-Natural Resources Conservation Service programs can assist

greatly with improving aquatic and wetland resources and reducing forest fragmentation within the watershed by intensively working to implement these and similar programs on private land, especially land near large tracts of land already in public ownership (Cache River State Natural Area, Cypress Creek National Wildlife Refuge, Grassy Slough Preserve (The Nature Conservancy), Mermet Lake Conservation Area, Ft. Massac State Park, Horseshoe Lake Conservation Area). These programs have become significantly more attractive to private landowners subsequent to the increasing popularity and financial benefits associated with recreational use, especially waterfowl, whitetail deer, and wild turkey hunting.

Restoration of Giant Cane: Ecologists and historical data suggest that giant cane was once a dominant part of the landscape in the Coastal Plain, forming large dense monoculture stands often encompassing several hundred acres. Research has shown giant cane to provide significant water retention and filtration of overland flow. Restoration of giant cane within the riparian zone along rivers and tributaries could significantly improve water quality and provide habitat long absent from the floodplain environment.

Woodlands and Barrens of the Cretaceous Hills Section: With the U.S. Forest Service as a cooperating landowner in the Cretaceous Hills section, open woodlands, barrens, glades and other natural communities can be restored and managed on a large scale. Bachman's sparrows, extirpated in Illinois since about 1980, have been found nesting in western Kentucky, less than 100 miles from Illinois. Restoration of barren and glade habitat may facilitate natural recolonization of Illinois by Bachman's sparrows.

Management Guidelines

Landscapes

Forests - Net increase of 18,000 acres within the Coastal Plain Division; primary emphasis should be given to forested swamps (baldcypress-water tupelo) and floodplain forests within the Bottomlands Section. Massac and Pulaski counties contain the vast majority of the land within the Coastal Plain (384,681 acres), and this area was entirely forested prior to human disturbance. Today, these counties are among the lowest in forested acreage in the state

(Pulaski County-6,700 acres; Massac County-15,000 acres), with the vast majority of this converted to agricultural land (row crops and pasture). Particular attention should be given to the restoration of frequently flooded areas within the first terrace of river/tributary floodplains that have been cleared and are currently being farmed, especially corridors where reforestation can connect existing large forested blocks or other critical habitat. Management of existing forests should emphasize the restoration and sustainability of oak-hickory community types. Assessment of forest ecosystem health should be based on woody species guilds, but incorporate sub-canopy and herbaceous species composition as well.

Open Woodland/Barrens - A goal of increasing this natural community type by 3,730 acres within the Coastal Plain should emphasize open woodland and barrens habitat found within the Cretaceous Hills Section. This work may be accomplished best by identifying large forested tracts (>100 acres) where species composition suggests barrens and open woodland habitats were once present as a dominant component of the landscape, and where sufficient natural character remains to allow for restoration through intensive management (prescribed burning, timber stand improvement, and exotic/invasive species control).

Wetlands - The Bottomlands Section of the Coastal Plain Division includes bottomland hardwood forests, meander scars, oxbow lakes, sloughs, marshes, baldcypress-tupelo gum swamps, rivers and streams. These wetlands include aquatic habitat associated with each community type. A primary goal for protection of wetland habitat within this Ecoregion would include restoration, preservation and enhancement of an additional 20,000 acres of wetland habitat within the project boundary of the Cache River Joint Venture Partnership (Illinois Department of Natural Resources, U.S. Fish & Wildlife Service, The Nature Conservancy, Ducks Unlimited). A considerable part of the protection and enhancement will be accomplished with implementation of Best Management Practices on private land. Emphasis should be given to wetland restoration, water retention basins and stream bank/bed stabilization. Resource managers should target 20,000 acres for wetland restoration (including water retention basins) on private land within the Coastal Plain Division. Modification of existing impoundments to increase storage capacity should be included as part of this effort to reduce overland flow, water quality, and delivery of runoff to area rivers, streams and wetlands.

Lakes and Ponds - Intensive management/modification of lakes and ponds throughout the Coastal Plain Division offers perhaps the most significant opportunity for watershed improvements. They are very popular with private landowners, and recent innovations in design increase storage capacity to such an extent that they function hydrologically as a wetland, dramatically improving effluent water quality, reducing/slowing runoff, and in association with sufficient watershed coverage, reducing peak flows in tributary drainages, streams and rivers. Design and placement should emphasize these goals, with emphasis given to those watersheds containing high quality natural resources in public ownership or private land enrolled in land protection programs. These impoundments also provide valuable habitat for fish and wildlife, tremendous recreational and educational opportunities, and bring resource professionals and the general public together for a mutually beneficial cause.

Streams - Streams within the Bottomlands Section of the Coastal Plain Division were once sluggishly flowing systems meandering within broad flat floodplains. These floodplains were dominated by bottomland hardwood forests and baldcypress-tupelo gum swamps. Most of these waterways receive runoff from cropland and pasture containing excessive sediment, nitrogen and phosphate. Priority should be given to effluent water quality, particularly when receiving waters contain high quality natural communities or support uses valued by the public. Stream bank and bed stabilization should be implemented within stream/river systems where degradation is severe, especially where subsequent water quality and flooding issues threaten high quality natural communities, threatened/endangered or rare species or habitat important for migratory waterfowl, shorebirds or Neotropical migratory songbirds.

Natural Communities

Dry-mesic Acid Oak Upland Forest

Interior Highlands Oak Barrens

Backswamp/Slough Floodplain Forests

Midwestern Wet Flatwoods

Forested Acid Seeps - These acid seeps/springs are all found within the boundaries of Cretaceous Hills, on Shawnee National Forest and Illinois Department of Natural Resources property. The part owned by the Department of Natural Resources is a

designated Nature Preserve, and is managed to preserve and restore the forest community, with emphasis on the barrens and seep spring components.

Open Ponds and Emergent Marshes - This community type occurs infrequently throughout the floodplain of the Cache River. Occurrences are small (often less than 1 acre), and created and maintained by natural disturbance (scouring during flood flows, beaver, wind, lightning). Permanent water greater than 18" but less than 48" also supports this community type.

Thin Soil Oak Savannas/Barrens

Shaded Rock Outcrops

Canebrakes - Canebrakes occur frequently throughout these macrosites. Although most are small in size (<1 acre), historic data suggests there were extensive areas (>10 acres) of this distinctive community type. Because of the abundance of existing stands within large tracts of public land, the restoration potential of canebrakes is very good. Canebrakes support diversity of dependent insect species, and provide habitat for the Swainson's warbler, and the canebrake rattlesnake (a subspecies of the timber rattlesnake).

Mesophytic Slope Forest

Critical Species

dusky salamander, Illinois chorus frog, northern crawfish frog, cerulean warbler, Swainson's warbler, Bachman's sparrow, Henslow's sparrow, Oxbow crayfish, southeastern myotis, gray bat, northern myotis, Rafinesque's big-eared bat, Indiana bat, river otter, green water snake, timber rattlesnake, hellbender, alligator snapping turtle, Price's potato bean (*Apios priceana*), cypress knee sedge (*Carex decomposita*), giant cane (*Arundinaria gigantea*), butternut (*Juglans cinerea*), willow oak (*Quercus phellos*), riverbank lichen (*Phaeophyscia leana*), heart-leaved plantain (*Plantago cordata*), ovate catchfly (*Silene ovata*), powdery thalia (*Thalia dealbata*)

Emphasis Game Species

Bottomlands Section: wood duck, mallard, Canada goose, whitetail deer, swamp rabbit, wild turkey, largemouth bass, white crappie, white bass, channel catfish

Cretaceous Hills Section: whitetail deer, wild turkey, bobwhite quail, gray squirrel

Non-game Indicator Species

Bottomlands Section: prothonotary warbler, Kentucky warbler, eastern wood pewee, Louisiana waterthrush, Acadian flycatcher, hooded warbler, summer tanager, yellow throated vireo, wood thrush, rusty blackbird, great blue heron, green heron

Cretaceous Hills Section: broad-winged hawk, chuck-will's-widow, worm-eating warbler, great-crested flycatcher, blue-winged warbler, prairie warbler

Recreational Opportunities

Hunting (whitetail deer, wild turkey, waterfowl, cottontail rabbit, bobwhite quail, squirrel, furbearer), wildlife viewing/bird watching, fishing, hiking, bicycle riding

Educational/Interpretive Resources

Cache River Henry Barkhausen Wetland Center, Fort Massac State Park, Mermet Lake Fish and Wildlife Area, Ohio River Recreation Area, Southern Illinois Spring Bird Count, Cypress Creek Christmas Bird Count

Natural Resource Commodities

Forest products, commercial fisheries, commercial hunting (waterfowl, eastern wild turkey, whitetail deer), row crop agriculture

Conservation Opportunity Areas

Cache River Joint Venture Partnership Project

Protected Lands - Cache River State Natural Area, Cypress Creek National Wildlife

Cretaceous Hills Section: whitetail deer, wild turkey, bobwhite quail, gray squirrel

Non-game Indicator Species

Bottomlands Section: prothonotary warbler, Kentucky warbler, eastern wood pewee, Louisiana waterthrush, Acadian flycatcher, hooded warbler, summer tanager, yellow throated vireo, wood thrush, rusty blackbird, great blue heron, green heron

Cretaceous Hills Section: broad-winged hawk, chuck-will's-widow, worm-eating warbler, great-crested flycatcher, blue-winged warbler, prairie warbler

Recreational Opportunities

Hunting (whitetail deer, wild turkey, waterfowl, cottontail rabbit, bobwhite quail, squirrel, furbearer), wildlife viewing/bird watching, fishing, hiking, bicycle riding

Educational/Interpretive Resources

Cache River Henry Barkhausen Wetland Center, Fort Massac State Park, Mermet Lake Fish and Wildlife Area, Ohio River Recreation Area, Southern Illinois Spring Bird Count, Cypress Creek Christmas Bird Count

Natural Resource Commodities

Forest products, commercial fisheries, commercial hunting (waterfowl, eastern wild turkey, whitetail deer), row crop agriculture

Conservation Opportunity Areas

Cache River Joint Venture Partnership Project

Protected Lands - Cache River State Natural Area, Cypress Creek National Wildlife

Refuge, Grassy Slough Preserve, Cypress Pond State Natural Area, Heron Pond-Little Black Slough Natural Area

Priority Resources - Bottomland Hardwood forest, swamp forest, migratory waterfowl and shorebirds, Neotropical migratory songbirds

Conservation Philosophy - Restoration, preservation, and management of bottomland hardwood forests, swamp forests, and riparian aquatic habitat. Resource management will be guided by conditions that were present prior to human disturbance, and emphasis will be placed on restoration of ecological processes that will provide sustainability of all natural communities within the river continuum.

Wildlife Habitat Objectives - By 2020 increase land in public ownership within the project area to 60,000 acres; achieve partial reconnection of the Upper and Lower Segments of the Cache River by 2010; reduce peak flows in Big Creek by 25%

Key Actions - Land acquisition, partial reconnection of the Upper and Lower Segments of the Cache River, reforestation and wetland restoration

Partners - Illinois Department of Natural Resources, U.S. Fish & Wildlife Service, The Nature Conservancy, Ducks Unlimited, U.S. Department of Agriculture-Natural Resources Conservation Service and local Soil and Water Conservation Districts

Implementation Resources - C2000, State Wildlife Grants, Wildlife Habitat Incentives Program, Wetland Reserve Program, Natural Areas Acquisition Fund

Research, Monitoring and Evaluation - Southern Illinois University at Carbondale, Illinois Natural History Survey, Illinois State Water Survey, Little River Research, Inc.

Contributor: Mark Guetersloh

APPENDIX V

Figure 11 from WAP (priority conservation areas identified)

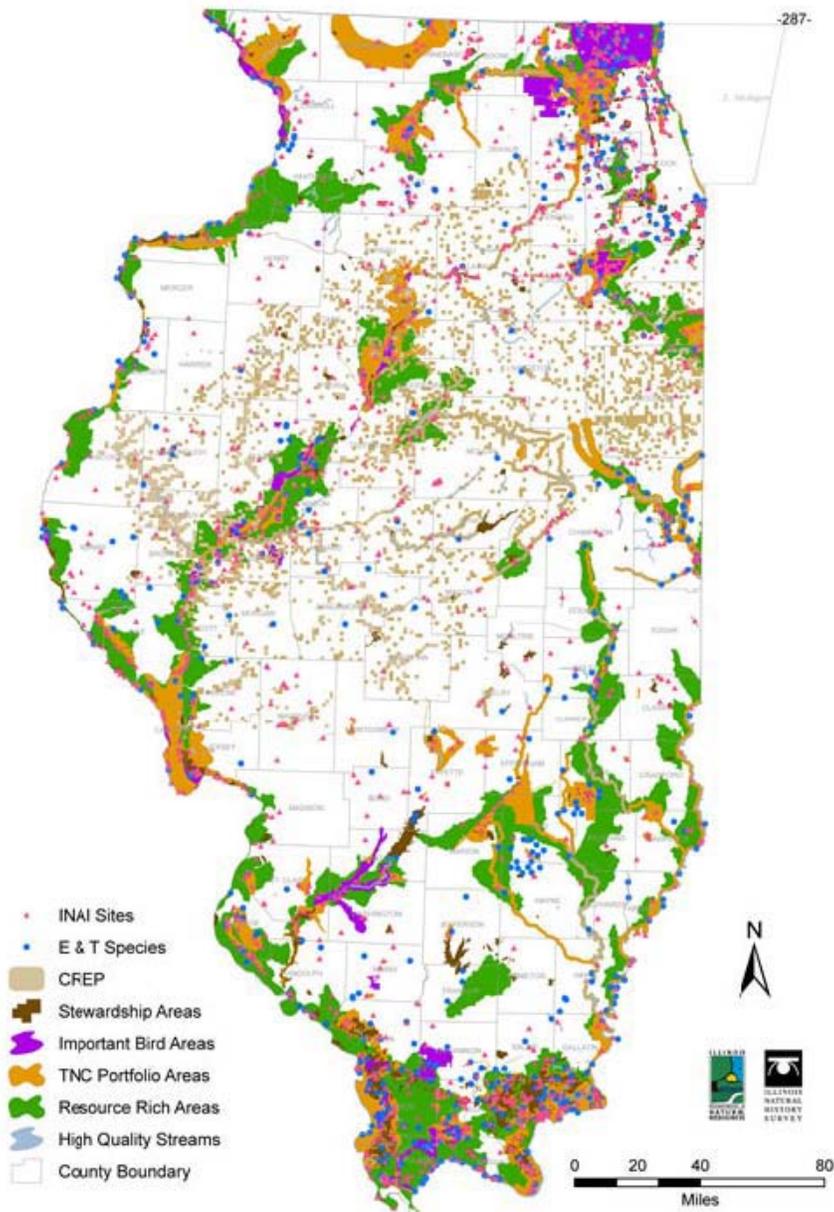


Figure 11. Priority conservation areas identified by other conservation plans and other known resource locations. Information on this map includes Illinois Natural Areas Inventory (INA) sites, locations of Endangered and Threatened Wildlife since 1995 (E & T Species), sections with Conservation Reserve Enhancement Programs (CREP) contracts, conservation lands of federal, state and county agencies (Stewardship Areas), Important Bird Areas, The Nature Conservancy (TNC) Portfolio Areas, Resource Rich Areas (see Suloway et al. 1996), and Biologically Significant Streams and 'A'-quality streams of the Biological Stream Characterization (High Quality Streams).

APPENDIX VI

Figure 12 from WAP (ranking of upland forest habitat for species in greatest need of conservation)

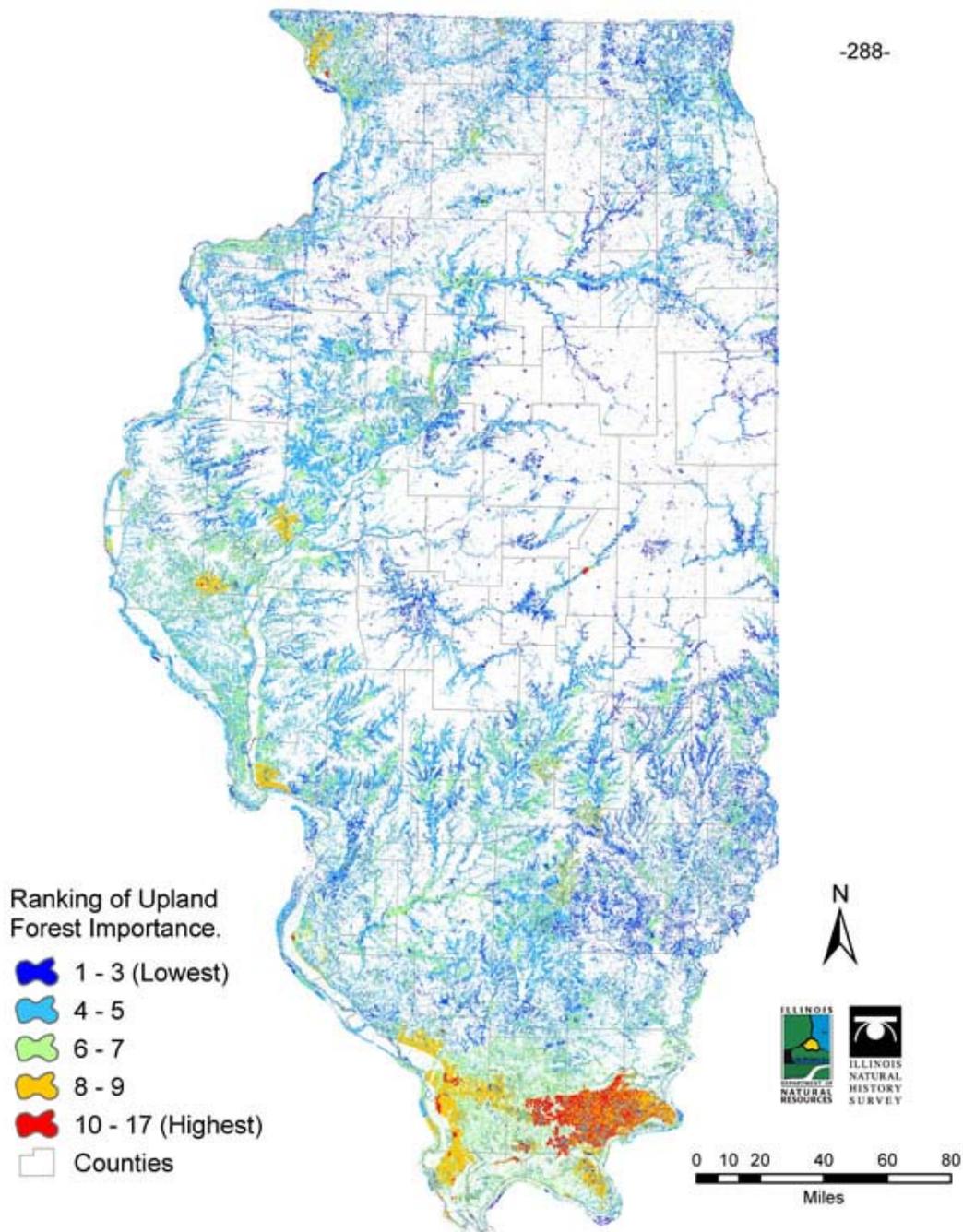


Figure 12. Ranking of upland forest habitat for Illinois' Species in Greatest Need of Conservation, based on forest size, diversity of Species in Greatest Need of Conservation predicted from GAP Analysis, known locations of endangered species, and Illinois Natural Areas Inventory forest communities.

APPENDIX VII

Figure 17 from WAP (partner selected priority areas for conserving species in greatest need)

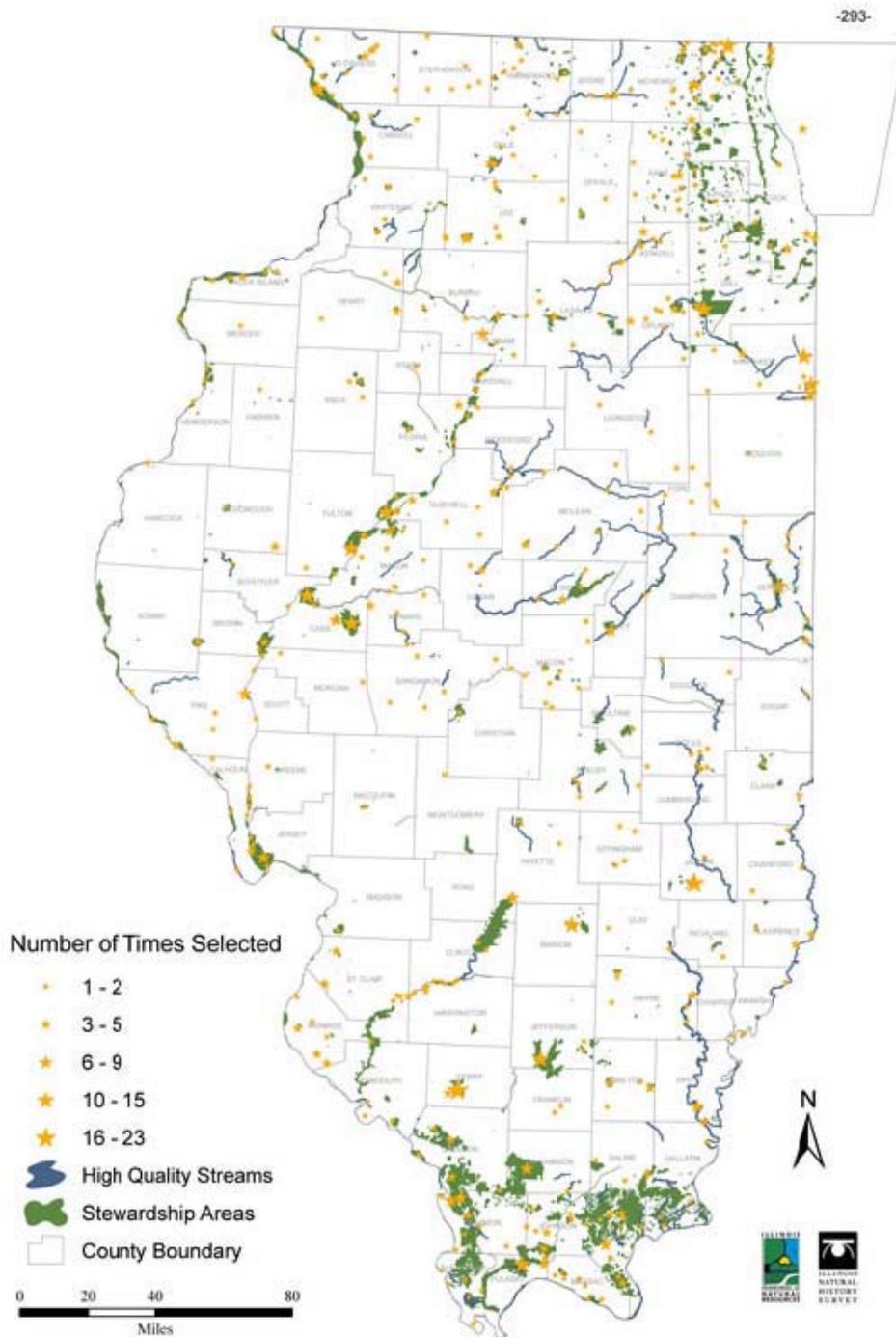


Figure 17. Partner-selected priority areas for conserving Illinois' Species in Greatest Need of Conservation, indicated by participants in planning workshops in 2004. Relative size of stars on the map indicate the number of times an area was marked. High Quality Streams and Stewardship Areas (federal, state and county conservation lands) are shown for reference.

APPENDIX IX

Streams Campaign

Issues

Many problems with Illinois' streams originate on uplands and at headwaters. Waters from agricultural fields and urban areas carry nutrients (from natural sources and fertilizers) and other pollutants, contributing to eutrophication at locations far downstream. Retirement of environmentally-sensitive lands from rowcrop production and conservation tillage practices have greatly reduced the amount of silt that enters streams in recent decades. Tiling and channelization of headwater streams have increased the speed at which waters enter the state's river systems. In developed areas, waters accumulate high loads of nutrients and pollutants, and drain very rapidly from impervious surfaces. Wastewater treatment and reduction in industrial pollutants have significantly improved water quality downstream of urban centers.

Improved drainage on agricultural and developed lands, coupled with levee systems that disconnect rivers from floodplains, have altered the hydrologic patterns in Illinois' streams, with flooding becoming more frequent and more severe. High-energy drainage waters are contributing to gully, stream bank erosion and channel incision—important sources of sediment that add to the “legacy” sediments from uplands that are currently moving through Illinois' streams. The lack of riparian forests along many streams contributes to banks becoming unstable and for allowing direct sunlight to warm waters. In some locations, ground water supplies have become contaminated by pollutants, and water tables are being drawn down as a result of municipal, industrial and irrigation usage.

Dams on many of Illinois' rivers have created “silt traps” in impoundments and reservoirs. Lakes and ponds with connections to streams have lost significant volume to sediments. The lock-and-dam system on the Illinois, Mississippi and Ohio Rivers has created a series of lakes in place of a continuous stream, changing habitat conditions and substrate composition to the detriment of many species. Dams fragment stream reaches for many species of aquatic wildlife, and levees isolate important spawning habitats.

Invasive species, including zebra mussels and Asian carp, are particularly problematic in larger rivers in Illinois. Common carp have destroyed submersed and emergent aquatic vegetation in many rivers and backwaters. Several fishes and freshwater mussels have become extirpated within the past 200 years, and many more are endangered in the state. Only 200 acres of streams in Illinois are recognized as high-quality natural communities.

Actions

1. Develop and promote upland agricultural practices that decrease the energy, sediment load, temperature, and pollutant load of drainage waters
 - a. establishment of native perennial vegetation on highly erodible soils
 - b. use of buffer vegetation at land-water transitions
 - c. wetland enhancement and restoration
 - d. conservation tillage or no-tillage practices
 - e. precision nutrient applications
 - f. limiting livestock access to streams
 - g. water control structures on subsurface tile drains for seasonal use
 - h. continued protection of stream waters and groundwater from nitrates, bacteria and other contaminants derived from livestock waste

2. Develop and promote practices that decrease the energy, sediment load, temperature, and pollutant load of drainage waters from developed (urban, suburban) lands
 - a. wetland enhancement and restoration, and other tools for flood water retention; use retention facilities to hold floodwaters for an adequate length of time
 - b. minimizing impervious surfaces
 - c. zoning guidelines to promote smart growth and minimize effects on environmentally-sensitive lands (e.g., highly erodible soils)
 - d. maintenance and improvement of wastewater treatment facilities
 - e. appropriate nutrient applications on landscaped vegetation

3. Protect, restore and enhance near-stream and in-stream habitats and processes
 - a. restore and manage grassy buffers, wetlands, riparian forests, and flood plains

- b. restore tributary streams to reduce head-cutting and sediment transmission to large rivers
 - 1. buffer and restore channels of the Vermilion (Wabash), Embarras, and Little Wabash rivers and their tributaries to benefit the high diversity of aquatic Species in Greatest Need of Conservation in the Wabash River Natural Division
 - 2. restore and manage the Wabash River, the largest unchannelized and unimpounded river in Illinois
 - 3. buffer and restore channels in 8-10 small headwater stream segments >5 miles to support listed fishes and mussels in each the Northeastern Morainal, Grand Prairie, Rock River Hill Country, Wisconsin Driftless, and Illinois River and Mississippi River Sand Areas natural divisions
- c. re-meander channelized streams; provide technical assistance, publish and market to drainage districts best practices that reduce erosion and improve habitat while lowering costs
- d. re-establish and maintain connectivity of the main stem, main stem-tributary, channel-floodplain, and channel-backwater on rivers and streams where appropriate
- e. restore normal flood-pulse and hydrologic patterns
 - 1. remove the dramatic water level changes associated with operation of wicket dams
 - 2. reduce low-water fluctuations where possible, concentrating on the months of May through October
 - 3. reduce peak flows by 2 to 3 percent for 2- to 5-year recurrence storm events—this will help to reduce peak flood stages and reduce high-water fluctuations along the river
- f. dredge sediments where necessary
- g. compact sediments to improve substrate conditions for aquatic plants, fish, and wildlife
- h. restore and rehabilitate backwaters to a diversity of depths (5% >9 feet, 10% 6-9 feet, 25% 3-6 feet, and 60% <3 feet)
- i. remove unnecessary dams and fit necessary dams with effective fish passage structures

- j. restore and maintain side channel habitats
- k. regulate reservoir releases to assure seasonal inundation of oxbows and backwaters and to maintain the integrity of floodplain forests

4. Restore populations of imperiled and extirpated aquatic animals

a. maintain populations at all currently-occupied locations and re-establish populations at 50% or more of historic locations where suitable habitat persists or can be restored. The recovery of aquatic endangered and threatened animals will depend on restoration and enhancement of existing aquatic habitats, such as pools, riffles, and lateral wetlands. It will be necessary to re-create wetland habitats for amphibians and dragonflies.

1. protect and enhance Round Pond for the river cooter and other reptile species
2. protect the Vermilion River (Illinois), lower Fox River and tributaries for benefit of listed redhorse species
3. restore the Saline River and its tributaries to benefit Ohio River drainage mussels and crayfish in the Shawnee Hills natural division
4. restore and protect Crane Creek (Sangamon River) and other groundwater fed, well-vegetated streams supporting unique fish communities
5. restore coolwater streams, particularly within the Apple and Rock River watersheds

b. reintroduce native species into stream habitat where decimating factors have been eliminated and natural recovery is unlikely

c. collaboration among the Illinois Endangered Species Protection Board, Illinois Department of Natural Resources, U.S. Fish & Wildlife Service and other agencies, organizations and institutions on recovery plans and actions for rare and declining species

5. Prevent and control invasions of detrimental exotic species

a. implement Rapid Response plans for the Great Lakes basin and Mississippi River basin, covering all of Illinois

1. Prevent invasion by black carp in the Upper Mississippi River and Illinois River watersheds
 - b. install an aquatic nuisance species barrier that protects the Great Lakes and Illinois River basin from biological invasions
 - c. continue removal and control (chemical, mechanical and biological) of invasive exotic species, especially within high quality natural areas

6. Restore and manage high-quality examples of all river, stream, lake, and pond communities, including all Grade A and B Illinois Natural Areas Inventory sites, in all natural divisions within which they occur

7. Fill information gaps and develop conservation actions to address stresses
 - a. understand baseline conditions of system functioning and sustainability, against which change can be measured
 - b. identify and address system-wide limiting factors for representative native species or communities, including, but not limited to, altered natural disturbance regimes (hydrology, connectivity, etc.), excessive sedimentation, reduction and fragmentation of aquatic and riparian habitat (habitat patch size, habitat spacing, lateral and longitudinal connectivity), water and sediment quality problems, and invasive species
 - c. develop flow standards for all rivers
 - d. evaluate drainage maintenance procedures in Illinois' rivers to protect important remnant habitats and avoid stream bed erosion
 - e. identify and quantify land alterations that contribute to unnatural fluctuations and flow regimes in rivers and streams.
 - f. identify local opportunities (isolated backwaters, potential moist-soil floodplain areas) and implement projects to provide basis for larger restoration projects.
 - g. identify areas in the Green River and Rock River drainages that can be conserved to sustain populations of weed shiner and blacknose shiner
 - h. identify beneficial uses of sediments
 - i. develop and implement guidelines for sustainable use of surface and ground waters for residential, commercial, agricultural and recreational uses by all of Illinois' citizens

8. Coordinate stream and watershed conservation actions with other agencies, organizations and upstream and downstream states to meet system-wide objectives

9. Increase water quality education efforts in areas under high development pressure and/or within fragile geographic zones (i.e. karst terrain)

10. Marketing and technical assistance will be required for adoption and appropriate implementation of the streams campaign.

APPENDIX X

Detail from Forests Campaign in WAP

Forests Campaign

Issues

The quality of Illinois' wooded habitats—forest, open woodlands, savannas, barrens, and shrublands—is a major concern. Alteration of natural disturbance processes, including flooding regimes and suppression of fire, but also inappropriate timber harvest done without professional forestry assistance, are contributing to changing composition of forested habitats, notably the increase in maples, other mesophytic trees and closed forests types, and decrease in oak-hickory dominance and open forest types.

A general decline in management of wooded habitats (prescribed fire and lack of professional forestry staff to assist private forest owners), has led to stark transition areas between open agricultural fields or grasslands and closed forest. Drainage waters leaving agricultural and urban areas at high velocity and entering the sparsely-vegetated floors of closed forests leads to gully erosion, delivering sediment and high energy waters to streams.

The rate at which invasive exotic species degrade forested habitats is increasing. Chestnut blight and Dutch elm disease have reduced the diversity of canopy species, whereas Osage orange and black locust dominate canopies of former pastures and reclaimed mine lands, respectively. Oak decline is a local, poorly-understood problem. Gypsy moths, Asian long-horned beetles and emerald ash borers have the potential to devastate urban and rural forests. Shrubs, including honeysuckles and buckthorns, degrade forest communities by reducing the abundance and diversity of native shrubs and herbaceous plants, increasing bare soils and erosion potential, reducing wildlife diversity, and inhibiting recruitment of desirable tree species. Vines (e.g., kudzu) and herbaceous plants (e.g., garlic mustard) further reduce biodiversity. Each invasion tends to reduce stability of forest systems, increasing the probability and severity of the next invasion.

Illinois' forests were naturally dissected along riparian areas, but have been further fragmented by clearing for agriculture and development. Fragmentation contributes to the invasion of nonnative species, and exacerbates natural wildlife interactions such as high rates

of predation by generalist predators and parasitism of songbird nests by brown-headed cowbirds to undesirable levels. Fragmentation of forests continues from a variety of sources, with exurban development a noteworthy challenge.

Available information suggests populations of Neotropical migratory birds in most, if not all, of Illinois forests are “sinks” with low recruitment and sustained by immigration from forests beyond Illinois (Robinson et al. 1995). However, whether a specific forest patch is a “source” or “sink” is difficult to quantify with available methods, and likely varies among species and years. While value as nesting areas is debatable, isolated woodlots and forests along rivers and streams are important during spring and fall migration, though these benefits are also difficult to measure.

The white-tailed deer herd is very large in Illinois, as deer have proven highly adaptable to fragmented forests and tolerant of proximity to people, resulting in increasing deer-human conflicts (including automobile accidents and crop damage) and damage to natural community composition through intensive browsing. Hunter access to forests to control the deer herd is a growing concern, as an increasingly urbanized public has fewer ties to rural and agricultural landowners, landowners face increased demand for access and changing liability risks, and suburban and exurban development restricts the proportion of wooded habitats that can be hunted.

To aid private forest owners, the Illinois Department of Natural Resources administers the Illinois Forestry Development Act, a program for managing forests for wood products. Illinois Forestry Development Act offers reduced property tax liabilities, technical assistance, and state cost-sharing to achieve improved wildlife habitat, soil stabilization, and improved water quality.

Actions

1. Maintain and enhance the composition of Illinois’ forested habitats
 - a. reintroduce natural disturbances or suitable substitutes on a large scale
 1. prescribed fire should be applied, where appropriate, to maintain or restore

open woodland habitats (e.g., savanna, barren), promote oak-hickory regeneration, stimulate the germination and production of native ground-layer plants and control invasive species

2. sustainable forestry practices will be necessary to restore and manage open forest habitat types in locations that have matured to closed forest or been invaded by undesirable woody species, to mimic natural processes in areas where fire is not an appropriate management tool, to supplement fire where undesirable trees have grown too large to be controlled safely with fire, and create diverse age classes of forest necessary to sustain wildlife species requiring various successional forest stages. The economic benefits of sustainable forestry practices provides an incentive for landowners to improve the quality of their forests.

b. edges of forested habitats should be widened to create broader transition areas from grassland, shrub/successional, savanna/open woodland, to closed forest, thus providing more and better habitat for most wildlife species in greatest need of conservation and slowing drainage waters from agricultural or developed lands prior to entering streams

c. in regions of Illinois where upland forests are highly fragmented, management for shrub/successional, savanna/barren and open woodlands should be emphasized. While "interior" forest conditions are fully achieved for many species only in compact forests exceeding 50,000 acres (e.g., low brood parasitism rates of nests of Neotropical migratory songbirds), management of area-sensitive species is a high priority in forests >1,000 acres. In all cases, care should be taken to conserve and enhance high-quality Illinois Natural Areas Inventory communities.

d. continued removal and control (chemical, mechanical and biological) of invasive exotic plants, especially within high quality natural areas

e. reintroduce native species into forest habitat where decimating factors have been eliminated and natural recovery is unlikely

f. collaboration among the Illinois Endangered Species Protection Board, Illinois Department of Natural Resources, U.S. Fish & Wildlife Service and other agencies, organizations and institutions on recovery plans and actions for rare and declining species

- g. reduce, then maintain a white-tailed deer herd of about 700,000 animals by increasing hunter opportunity (permits, season framework, incentives-based access to private lands). It is expected that forest habitat conditions will improve as the deer herd is reduced through harvest.
 - h. address deer populations in locations where browse is degrading habitat quality and/or preventing recovery of vegetation
- 2. Expected increases in statewide forest acreage (the continuation of an 80-year trend) should emphasize:
 - a. restoring floodplains and riparian corridors
 - b. ecological connectivity among forests and other habitat patches
 - c. reducing fragmentation of forests >5,000 acres (Shawnee Hills, Ozarks, lower Kaskaskia River corridor, Pere Marquette State Park, Lowden Miller State Forest/Castle Rock State Park, and Mississippi Palisades State Park/Hanover Bluff/Witowski/Winston Tunnel areas)
 - d. reducing fragmentation of forests 500 acres and larger
- 3. Develop and expand programs to assist private forest owners in managing forest resources
 - a. incentives or tax benefits and technical assistance should be provided (and expanded, as under the Illinois Forestry Development Act) to encourage the conservation and wise management of forest habitat. Riparian forests are especially critical for delivering environmental benefits (wildlife habitat, flood control, stream protection, water quality improvement)
 - b. programs to promote access to private wooded habitats, including liability reform and financial incentives, need to be developed to provide hunter access for managing populations of deer and other wildlife, and for meeting increasing demands for outdoor recreation
- 4. Promoting the increased use of prescribed fire and sustainable forestry practices will require a campaign of marketing, demonstration areas on public and private forests, technical

assistance, professional training, access to fire equipment, cooperation with fire protection districts, and reform or clarification of liability issues.

5. Local and state authorities, citizens and stakeholders need to cooperate to develop zoning criteria and local greenway plans that protect important habitats and ensure “smart growth.”

6. Fill information gaps and develop conservation actions to address stresses.

- a. a comprehensive program for preventing, eliminating and controlling invasive species is essential
- b. determine the extent and condition of open woodland, savanna, and barrens habitats
- c. determine the extent and condition of shrub/successional habitats
- d. degraded savannas and barrens are identified for restoration with cutting of undesirable plants, prescribed fire and invasive species control

7. Restore and manage high-quality examples of all forest, savanna and barrens communities, including all Grade A and B Illinois Natural Areas Inventory sites, in all natural divisions within which they occur.

APPENDIX XI

EEO Statement

To comply with standards established by the federal government, it is imperative that all publications of the Department of Natural Resources include the correct version of the EEO statement in its entirety as shown below:

Equal opportunity to participate in programs of the Illinois Department of Natural Resources (IDNR) and those funded by the U.S. Fish and Wildlife Service and other agencies is available to all individuals regardless of race, sex, national origin, disability, age, religion or other non-merit factors. If you believe you have been discriminated against, contact the funding source's civil rights office and/or the Equal Employment Opportunity Officer, IDNR, One Natural Resources Way, Springfield, Ill. 62702-1271; 217/785-0067; TTY 217/782-9175.

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