Appendix B. Compatibility Determinations

Compatibility determinations are included in this appendix. The following uses were found to be appropriate and evaluated to determine their compatibility with the mission of the Refuge System and the purposes of Refuge:

- Environmental Education
- Interpretation
- Wildlife Observation and Photography
- Hunting
- Wood Harvasting

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Compatibility Determination

USE: Environmental Education (EE)

REFUGE NAME: Ozark Plateau National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY:

- Fish and Wildlife Act of 1956
- Endangered Species Act of 1973

REFUGE PURPOSE(S):
"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" ... 16 U.S.C. 1534 (Endangered Species Act of 1973)

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . " 16 U.S.C. 742(a)(4) and " . . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . . " 16 U.S.C. 742(b)(1) (Fish and Wildlife Act of 1956).

Ozark Plateau National Wildlife Refuge was established to:

- Prevent the extinction and aid in recovery of federally-listed threatened and endangered Ozark cave species;
- Reduce the need for future listing of species of concern in the Ozarks;
- Protect large continuous stands of Ozark forest essential to interior forest nesting migratory birds;
- Provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:
The mission of the System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:

(a) What is the use?

In accordance with 605 FW 6, environmental education (EE) is a process designed to teach citizens and visitors the history and importance of conservation and the biological and the scientific knowledge of our Nation's natural resources and incorporates on-site, off-site and distance learning materials, activities, programs and products that address the audience's course of study, refuge purposes, physical attributes, ecosystem dynamics, conservation strategies, and the Refuge System mission (605 FW 6.6.D). EE involves courses of study, curriculum, and educational assistance (605 FW 6.6. A through C).

The Refuge staff collaborates with multiple organizations to provide "place-based" and "nature-based" experiential mentoring techniques, training, and educational support including EE topics of geology, biology, ecology, or Native American cultural and environmental studies, for schools, youth groups, nongovernmental organizations (NGOs), universities, and tribes, conducting workshops, classes and other curriculum-based courses of study.

While adhering to a properly outlined curriculum, these programs are predominantly weekend, overnight classes or workshops with the primary goal to connect people to the natural world around them, especially the Ozark cave, karst, and forest resources. Participants experience first-hand the wildlife and habitat representative of the Ozark Highlands ecoregion.

(b) Where is the use conducted?

The Refuge hosts most of their EE programs on the 95-acre, Mary and Murray Looney Unit (Looney Unit), as per deed restrictions. Unlike the typical classroom setting, the Refuge's EE programs and workshops are conducted primarily in the outdoors. The Looney Unit's diverse habitats include Spavinaw Creek and its tributaries, riparian zones, losing streams (a stream that has a permeable bed through which water can seep to the water-table), natural springs, caves, hardwood bottomland floodplains and oak-hickory-pine upland forests offer great spaces for place-based learning of Ozark Highlands ecoregion and karst resources (encyclopedia.com).

The Mary & Murray Looney Education & Research Center (MMLERC), a renovated cabin located on the Looney Unit, is utilized as the initial gathering place, for registration, some lectures, and preparing food for participants. The Refuge also proposes to use the associated pavilion and deck, adjacent to the January-Stansberry cave creek, for an outdoor facility for EE workshops, once it is renovated.

The Refuge also will consider future EE programs to be held on appropriate newly acquired lands in the future, by special use permit only.

Participants access Ozark Plateau NWR representative habitats utilizing approximately 0.6 miles of primitive nature trails. The Refuge proposes to establish an additional 2 miles of primitive trails (without mechanical clearing or removing trees) around the perimeter of the Looney Unit and improve the trail from MMLERC to Pavilion and Spavinaw Creek. The Refuge also proposes to improve the trail (0.25-mile) from the Looney maintenance shop, located at the Guess House (where there is an overflow parking area) to the MMLERC as well as improve the 0.1 mile primitive trail from the parking/camping area on top of the hill down to the MMLERC to ensure safety.

As part of an overnight EE program, participants camp on approximately 3 acres of designated primitive campsites (no vegetation is removed) with one centralized fire ring, located on top of the hill of the Looney Unit, adjacent to the power line right-of-way cutover, (0.25-mile west of the MMLERC). This primitive camping area does not offer amenities such as water, electricity, sewage, or camping platforms. The fire ring is an important centralized place for team-building interactions, as well as reflection and discussion of EE topics.

Cave entry for EE programs is prohibited due to concerns about white-nose syndrome (WNS), a new disease affecting hibernating bats. The fungus believed to be the causative agent of WNS, *Geomyces desctructans,* is transmitted primarily through bat-to-bat contact. However, evidence suggests that inadvertent human-assisted movement of fungal spores on clothing, footwear, or gear could play a role in the spread of WNS. Therefore, the Refuge will maintain a controlled cave entry policy (closed to the public) as a necessary management action to help prevent the spread of this disease. Therefore, cave EE programs are limited to the exterior of the cave entrance to conduct EE classes pertaining to karst ecology. Should future Service guidance indicate that refuge caves may be reopened to public entry, the Refuge will consider limited use of caves for EE programs.

(c) When is the use conducted?

Currently, EE programs on the Looney Unit are limited to 10-20 people, 2 or 3 times per month in the spring and fall, 1 or 2 times per month in the summer, and approximately once per month in the winter depending on staff time and availability. However, the Refuge proposes to increase EE visitation within the lifetime of this Comprehensive Conservation Plan (CCP) to 50-100 people per week, with 3-4 visits per week in spring, fall, and summer, and approximately 10-20 people per week with 1-2 visits per week in winter, if increased staff and funding becomes available.

A special use permit will be required for EE programs held on appropriate future acquired lands. The remaining units will continue to be closed to public use.

(d) How is the use conducted?

EE programs are conducted in cooperation with local residents, NGOs, schools, universities, State agencies, Tribal Nations, and Federal agencies (for a full list of partners and subsequent acronyms, see Chapter 5: Table 5-1 of the Final CCP).

The Refuge and its partners have somewhat of a symbiotic relationship in the fact that its partners have the constituents to be able to bring people to the Refuge for these programs (public outreach methods/resources) and to lead the programs (teachers, expertise, curriculum), while the Refuge provides the land-base and logistical support that these agencies need to use for the EE programs.

Currently, the Refuge partners with NGO, Ozark Tracker Society to provide monthly EE programs at MMLERC, following curriculum on ethno-botanical knowledge, edible/medicinal identification/properties, tincture-making, bird language, primitive fire-making, "coyote mentoring" programs, increasing comfort in the wild (nature journaling, hazards identification), tracking (scat, tracks identification), tanning deer-hides, bow drill/hand drill-making, primitive shelter-making, and wilderness survival skills. The Refuge also partners with tribal entities to conduct EE programs for tribal youth to improve communication in native language and promote cultural resources, including healthy living and cooking using native/natural edible plants. The Refuge proposes to construct and maintain an ethno-botanical showcase area to enhance these programs. There are also many more partner-sponsored and partner-led EE programs including BSA (eagle scout projects, badges), GSA (badges), the Missouri Chimney Safety Council (continuing education credits), TNC (wildlife identification, native seed collection education programs), Land Legacy and NRCS (conservation easement education and resources of Spavinaw Creek), ODWC (game wardens provide hunting education for licensure program), Blue Thumb (water quality education monitoring program), and NSS/BCI (cave gate construction education). The Refuge proposes to collaborate and partner with many more NGOs and other agencies in the future in order to offer additional EE programs.

Collegiate-level classes and field trips, by participating universities (such as OSU, OU, RSU, NSU, UCO, SEOSU, UA, University of Southern Mississippi, University of Missouri, Missouri State University, and John Brown University) are conducted on-site by using Refuge resources or in cooperation with adjacent landowners who allow the classes on private lands. The Refuge encourages collaboration with any willing university to create additional EE programs and opportunities in the future. Furthermore, the Refuge proposes to provide a Teacher Continuing Education and General Education Credits Program on the Refuge.

The Refuge encourages local public and private K-12 school classes to utilize the Refuge and MMLERC for Ozark Highland ecoregion, cave and karst lessons, and bat studies. The Refuge would also like to offer after- and home-school student EE programs.

In conjunction with their EE partners, Refuge staff would like to develop curriculum and workbook documents for current and future EE programs. In order to improve EE on the Refuge, it proposes to conduct program evaluation in order to determine effectiveness of current EE programs and better design future programs.

(e) Why is this use being proposed?

The Refuge was established to "…provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks". In addition, during scoping, many local members of the public and tribes expressed interest in having more EE programs on the Refuge.

Increased urbanization in northwest Arkansas and in northeast Oklahoma is having detrimental effects on the Ozark ecoregion. Most people are not conscious of their direct impacts to the environment, and how those, in turn, affect their own lands, water, and resources that they depend on. Many people from these areas are also unaware of the large and delicate cave (subterranean) ecosystems and native wildlife species that lie underneath their feet. EE programs on Ozark Plateau NWR are crucial in order for both urban and rural people of this region to have an opportunity to experience a connection to and understand the importance of their local ecosystems, and be able to pass on that knowledge to future generations.

AVAILABILITY OF RESOURCES:

EE programs are being held at the recently renovated MMLERC, a 1,200 square feet, renovated cabin with one meeting room, one office, 2 bathrooms, one sleeping room, a kitchen, and a large front porch. The MMLERC is accessible by wheelchair from the parking lot to the cabin; however, the bathrooms are currently inaccessible. In order to improve the quality of the interpretation programs at the MMLERC, the Refuge proposes to renovate the roof, add insulation in the roof attic ($15K install + maintenance), renovate the cabin exterior (replace logs and grout, seal the exterior, paint exterior trim, and repair the retaining wall behind the cabin) ($45K labor + maintenance), add monitored alarm system ($10K install + maintenance), renovate the front door and one accessible bathroom/shower for wheelchairs ($10K install + maintenance), renovate flooring of porch ($5K install + maintenance), replace plumbing system ($5K install + maintenance), and finally, install energy-efficient exterior storm windows ($5K install + maintenance). In addition, the outdoor pavilion (300 square feet enclosed studio space and 200 square feet outdoor patio) needs to be renovated, including expansion of the outdoor patio space to 500 sq. feet that would also bridge the stream in a previously-disturbed site ($50K labor + maintenance).

To get to the MMLERC, there is a Looney Unit public access drive, which is currently 0.25-miles, unpaved and unimproved (dirt/rock), with a gate. There is an unpaved parking area

(power cut easement), between the entry gate and MMLERC, for approximately 10 vehicles. Excess parking is available at the Guess Unit (150 yards). With the anticipation of an increase in visitation to the Refuge, it proposes to widen the Looney Unit access drive by 2 feet and improve road and parking area surfaces with gravel ($20K capital).

There are 0.5-1.0 miles of primitive trails currently used by EE participants on the Refuge. In order to create more hiking/walking opportunities for large groups to participate in place-based education programs, the Refuge proposes to establish a 0.25-mile mostly primitive trail to connect Spavinaw Creek trail to the Guess house trail ($5K capital for repavement/rakes/shovels/gloves), build a new 2-mile primitive trail (no clearing or removing of trees or large shrubs) around the perimeter of the Looney Unit ($10K labor + capital), improve the 0.1-mile trail from MMLERC to pavilion ($5K capital), the 0.25-mile trail from the Looney maintenance shop to the MMLERC ($5K capital) and improve the 0.1 mile primitive trail from the parking/camping area on top of the hill down to the MMLERC to ensure safety ($5K capital). The Refuge would also like to install 3 primitive overlook areas on the Looney Unit perimeter trail, which may be used as stopping points during an EE lesson ($15K capital).

The Refuge owns a limited amount of specialized safety equipment and equipment for caving ($10K) for visitors, but would like to acquire more, especially if safety protocols for prevention of WNS deem necessary.

Staff oversight is required for implementing and monitoring EE programming and activities. However, currently the Refuge has no funding in their Visitor Services budget for EE programs, therefore, the Refuge has to write grants, oversee contracting, and do all that is necessary to provide funding to its partnering NGOs in order to provide all current EE programming and staffing needs. Refuge staff is available for all on-site EE programs to provide logistical support and assist partners in program instruction. The Refuge also provides material support, including field guides and other Ozark resource references, audio-visual equipment, and ensuring the proper functioning of the MMLERC. The Refuge's funding to support NGO-led EE programs varies year to year. In 2011, the Refuge spent approximately $12K for the OTS-led programs, which comes from either Challenge Cost Share or other grants (none comes from Refuge budget). The Refuge attempts to get more grant funding for other NGO-led EE programs such as Missouri Chimney Safety Council, and Blue Skywater, when available. In conjunction with these EE programs, approximately 1,000 volunteer hours are recorded each year. In order to guarantee consistency annually in Refuge EE programs for local participants, the Refuge would need dedicated annual funding for its EE programs. An Outdoor Recreation Planner (GS-7/9/11) would be a necessary addition to Refuge staff in order to improve the quality of current EE programs and to plan, develop, lead, and evaluate future programs.

Public outreach needs improvement to increase participation of EE programs. No pamphlets or fliers about the Refuge are currently available however the Refuge proposes to create a flier/brochure to advertise visitor services opportunities, including EE opportunities, at the MMLERC. The Refuge also plans to update their websites (http://www.fws.gov/southwest/refuges/oklahoma/Ozark/ and http://www.fws.gov/refuges/profiles/recEdMore.cfm?ID=21645) to inform the public of current and upcoming EE program opportunities, including contact and location information (while cave locations continue to remain confidential).

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

EE activities occurring on surface habitats may have only temporary or negligible adverse impacts on Refuge trust resources.

EE participants remaining on- or off-trail, will have some short-term direct impacts to the environment including: trampling of native vegetation on the bottomland and/or upland forest; disturbance to wildlife (including noise from large groups of people and light pollution due to headlamps used for overnight camping); shifting of rocks on trails; and compaction of soils.

Renovation plans at the MMLERC (widening of the Looney Unit public access road by 2-feet for 0.25-mile, and establishing a gravel parking lot) will cause short-term impacts only during the construction including: loud levels of noise pollution due to use of mechanical equipment, a temporary increase in CO_2 emissions, and fugitive dust.

Long-Term Impacts:

Widening of the Looney Unit public access road by 2-feet for 0.25-mile will require the removal of vegetation, rocks, top soil, and possibly trees. Establishing a gravel parking lot will allow for a better established parking area, which will prevent visitors from parking in the grass on the side of the road, and will help control soil erosion. In order to establish a primitive trail to connect Spavinaw Creek trail to Guess House trail, some boulders and old concrete will be removed (200 ft.), affecting the physical area.

Increasing visitation permits for future EE programs on the Looney Unit and additional appropriate acquired units, is going to increase human traffic to those areas, which will expose many cave locations to the public. Exposure to cave locations could increase the potential of cave vandalism or break-ins. An increase in human traffic could also increase the amount of trash found on the Refuge. However, these are both unlikely scenarios for this wildlife-dependent use since EE programs aim to encourage people to participate in Leave No Trace (LNT) ethics and to leave participants with an enduring understanding of the importance of cave and karst ecosystems within the Ozarks ecoregion.

Cumulative Impacts:
Cumulatively, current and future EE programs will have beneficial impacts on surrounding communities by increasing community partnerships, increasing environmental knowledge, and especially, for giving present and future generations an opportunity to connect with nature. EE programs at Ozark Plateau NWR are meant to leave visitors with a life-long appreciation and respect for the environmental communities surrounding them and to gain support for U.S. Fish & Wildlife Service conservation efforts. These programs could lead to future conservation easement programs, acquisition of important areas from willing sellers, and instill the value of our environment in future leaders.

PUBLIC REVIEW AND COMMENT:
This compatibility determination for Ozark Plateau NWR was made available for public review and comment in conjunction with the public comment period for the Refuge's Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA). Public comments on this compatibility determination were invited and due by March 8, 2013.

DETERMINATION (CHECK ONE BELOW):
_____Use is not compatible
_X____Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
In order to ensure that environmental education remains a compatible use on Ozark Plateau National Wildlife Refuge, the following stipulations are necessary:

- The Looney Unit and the MMLERC is used for EE programs by permit only, issued by Refuge staff
- Vehicle and/or all-terrain vehicle use off-road is restricted to prevent damage to Refuge resources
- Cave entry will remain closed due to the potential of spreading WNS to bat species
- If deemed appropriate, EE activities may not require Refuge staff supervision
- Primitive camping is allowed only in a designated area on the MMLERC, in conjunction with EE programs, by permit only, issued by Refuge staff
- The designated centralized fire pit at the MMLERC is the only outdoor fire area in conjunction with EE programs, by permit only (permits only given on low-fire hazard days), issued by Refuge staff
- Campers are responsible for their campfires and shall not leave them unattended
- The Refuge must provide firewood for the fire pit in order to prevent invasive species, pests, and diseases from spreading to the Refuge
- No man-made objects are allowed in fire pit
- Collection of plants or animals, or feeding or disturbing wildlife, is prohibited

- Public use trends and associated impacts from human activity will continue to be monitored. If significant increases in use occur, and/or if impacts to resources are determined significant, the program will be reevaluated and modified as necessary to ensure compatibility.

JUSTIFICATION: These programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. Environmental education is a wildlife-dependent, priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The USFWS strives to provide priority public uses when compatible with the purposes of the Refuge and the mission of the System. Facilities and activities related to environmental education occur in designated areas of the Refuge, leaving large areas of undisturbed habitat available for wildlife. The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The Refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The awareness, enjoyment and education gained from these activities are expected to outweigh their associated impacts. Ozark Plateau National Wildlife Refuge has determined that environmental education, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for environmental education has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

SIGNATURE: **Refuge Manager** Richard Stark 04/24/13
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION DATE: 2028

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Compatibility Determination

USE: Interpretation

REFUGE NAME: Ozark Plateau National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY:

- Fish and Wildlife Act of 1956
- Endangered Species Act of 1973

REFUGE PURPOSE(S):
"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" ... 16 U.S.C. 1534 (Endangered Species Act of 1973)

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . " 16 U.S.C. 742(a)(4) and " . . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . . " 16 U.S.C. 742(b)(1) (Fish and Wildlife Act of 1956).

Ozark Plateau National Wildlife Refuge was established to:

- Prevent the extinction and aid in recovery of federally-listed threatened and endangered Ozark cave species;
- Reduce the need for future listing of species of concern in the Ozarks;
- Protect large continuous stands of Ozark forest essential to interior forest nesting migratory birds;
- Provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:
The mission of the System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:

(a) What is the use?

In accordance with 605 FW 7, interpretation programs are activities, talks, publications, audio-visual media, signs and exhibits that convey key natural and cultural resource messages to visitors (605 FW 7.5.C). Interpretation provides opportunities for visitors to make their own connections to the resource (605 FW 7.7).

The Refuge provides interpretation programs that are primarily discussions and/or hikes interpreting natural and cultural information regarding the Ozark ecoregion, karst ecosystem, water resources, Native American cultural resources, ethnobotanical plants, federally listed threatened and endangered species, species of concern, game and nongame species, and migratory birds (including bird language). Programs may also include cave technology demonstrations.

(b) Where is the use conducted?

On-site, the Refuge hosts most of their interpretation programs on the 95-acre, Mary and Murray Looney Unit (Looney Unit), as per deed restrictions. Unlike the typical classroom setting, the Refuge's interpretive programs and workshops are conducted primarily in the outdoors. The Looney Unit's diverse habitats include Spavinaw Creek and its tributaries, riparian zones, losing streams (a stream that has a permeable bed through which water can seep to the water-table), natural springs, caves, hardwood bottomland floodplains and oak-hickory-pine upland forests offer great spaces for place-based learning of Ozark Highlands ecoregion and karst resources (encyclopedia.com).

The Mary & Murray Looney Education & Research Center (MMLERC), a renovated cabin located on the Looney Unit, is utilized as the initial gathering place, for registration, some lectures, and preparing food for participants. The Refuge also proposes to use the associated pavilion and deck, adjacent to the January-Stansberry cave creek, for an outdoor facility for interpretation workshops, once it is renovated.

The Refuge also will consider future interpretation programs to be held on appropriate newly acquired lands in the future, by special use permit only.

Participants access Ozark Plateau NWR representative habitats utilizing approximately 0.6 miles of primitive nature trails. The Refuge proposes to establish an additional 2 miles of primitive trails (without mechanical clearing or removing trees) around the perimeter of the Looney Unit and improve the trail from MMLERC to Pavilion and Spavinaw Creek. The Refuge also proposes to improve the trail (0.25-mile) from the Looney maintenance shop, located at the Guess House (where there is an overflow parking area) to the MMLERC as well as improve the

0.1 mile primitive trail from the parking/camping area on top of the hill down to the MMLERC to ensure safety.

Cave entry for interpretation programs is prohibited due to concerns about white-nose syndrome (WNS), a new disease affecting hibernating bats. The fungus believed to be the causative agent of WNS, *Geomyces desctructans*, is transmitted primarily through bat-to-bat contact. However, evidence suggests that inadvertent human-assisted movement of fungal spores on clothing, footwear, or gear could play a role in the spread of WNS. Therefore, the Refuge will maintain a controlled cave entry policy (closed to the public) as a necessary management action to help prevent the spread of this disease. Therefore, cave interpretive programs are limited to the exterior of the cave entrance to conduct interpretation programs pertaining to karst ecology. Should future Service guidance indicate that refuge caves may be reopened to public entry, the Refuge will consider limited use of caves for interpretation programs.

Off-site, Refuge staff provides approximately one interpretive talk (delivering same on-site messages) per month at schools, civic centers, organizational meetings, state park events, festivals/fairs, wildlife expos, and tribal pow-wows, using power point presentations with many visual photographs of Refuge resources.

(c) When is the use conducted?

On-site, the Refuge provides approximately one interpretive program per month (highest visitation occurs in the summer and fall) to approximately 25 people per event at the Looney Unit/MMLERC.

Off-site, Refuge staff also provides approximately one interpretive talk per month, to a varying audience size from five to several hundred people. The Refuge wants to improve current interpretive programs and considers increasing a limited number of interpretive programs in the future.

In addition, a special use permit will be required for interpretation programs that are held on appropriate future acquired lands. The remaining units will continue to be closed to public use.

(d) How is the use conducted?

These programs are mostly interpretive talks, with the use of technology focusing on bats (thermal imaging, night vision, infrared, anabat acoustic detectors), and short interpretive hikes that primarily interpret natural and cultural information regarding the Ozark ecoregion, cave and karst ecosystem, water resources, Native American cultural resources, federally listed species, species of concern, game and nongame species, and migratory birds.

The Refuge and its partners have somewhat of a symbiotic relationship in the fact that its partners have the constituents to be able to bring people out (public outreach methods/resources) and to perform the programs (leaders, hosts), while the Refuge provides the lands and logistical support that these agencies need to use for interpretation programs. For a full list of partners and associated acronyms, see Chapter 5, Table 5-1 of the Final CCP.

Local NGOs participate and host on-site interpretive talks or programs. Audubon Society hosts some interpretive presentations on birds and bird identification, while Campfire USA hosts interpretive talks about cave resources and cave rescue. In addition to their extensive EE programming, the Refuge also offers many interpretive talks to connect visitors with positive emotions and experiences regarding the Ozark ecoregion, karst ecosystem, water resources, Native American cultural resources, ethnobotanical plants, federally-listed species, species of concern, game and nongame species, and migratory birds (including bird language). Most of these programs or talks are conducted in cooperation with local residents, TNC (The Nature Conservancy), Ozark Tracker Society, NSS (National Speleological Society), Campfire USA, Bat Conservation International (BCI), Becoming an Outdoors Woman (BOW), Boy Scouts of America (BSA), Girl Scouts of America (GSA), Tulsa Audubon Society, Land Legacy, Blue Thumb, Oklahoma Academy of Science, the Wildlife Society, American Fisheries Society, homeschoolers, local public and private schools, Wilderness Awareness School, Rogers State University, Northeastern State University, University of Arkansas, OSU, John Brown University, University of Oklahoma, Oklahoma Department of Wildlife Conservation (ODWC), the tribes, Natural Resource Conservation Service (NRCS), and other agencies/organizations.

On-site, The Refuge proposes to conduct resource interpretation programs to local public, private, and homeschool, K-12 school classes at the MMLERC and Refuge units stated above, in cooperation with local school teachers and interpretive volunteers.

The Refuge also proposes to promote sustainability on-site by showcasing green technologies and sustainable-living methods. The Refuge will demonstrate the use of solar power, which is planned to be installed on the Looney Unit, and discuss the importance of renewable energy in its interpretive programs. In addition, the Refuge would like to demonstrate the practical use of a rainwater collection system and the use of native fruiting and flowering plants and shrubs that can be utilized for landscaping, while also having edible and/or medicinal properties, as well as benefit native wildlife.

Off-site, Refuge staff hosts information booths and makes presentations at public shows, such as at the *Bat-o-Rama* at Devil's Den State Park (Arkansas), the Illinois River Festival and the Wildlife Expo in central Oklahoma. In addition, Refuge staff conducts visits to local K-12 schools, especially in October, to make presentations on bats during the Halloween season. Most of these off-site talks regard the same presentations as on-site.

In conjunction with their partners, Refuge staff would like to develop handouts or fliers for public outreach, advertising of the MMLERC, and general information about the Refuge's cave and karst resources.

(e) Why is this use being proposed?

Increased urbanization in northwest Arkansas and in northeast Oklahoma is having detrimental effects on the Ozark ecoregion. Most people are not conscious of their direct impacts to the environment, and how those, in turn, affect their own lands, water, and resources that they depend on. Many people from these areas are also unaware of the large and delicate cave (subterranean) ecosystems and native wildlife species that lie underneath their feet. Interpretation programs on Ozark Plateau NWR are crucial in order for both urban and rural people of this region to have an opportunity to experience a connection to and understand the importance of their local ecosystems, and be able to pass on that knowledge to future generations.

AVAILABILITY OF RESOURCES:

Interpretation programs are being held at the recently renovated MMLERC, a 1,200 square feet, renovated cabin with one meeting room, one office, 2 bathrooms, one sleeping room, a kitchen, and a large front porch. The MMLERC is accessible by wheelchair from the parking lot to the cabin; however, the bathrooms are currently inaccessible. In order to improve the quality of the interpretation programs at the MMLERC, the Refuge proposes to renovate the roof, add insulation in the roof attic ($15K install + maintenance), renovate the cabin exterior (replace logs and grout, seal the exterior, paint exterior trim, and repair the retaining wall behind the cabin) ($45K labor + maintenance), add monitored alarm system ($10K install + maintenance), renovate the front door and one accessible bathroom/shower for wheelchairs ($10K install + maintenance), renovate flooring of porch ($5K install + maintenance), replace plumbing system ($5K install + maintenance), and finally, install energy-efficient exterior storm windows ($5K install + maintenance). In addition, the outdoor pavilion (300 square feet enclosed studio space and 200 square feet outdoor patio) needs to be renovated, including expansion of the outdoor patio space to 500 sq. feet that would also bridge the stream in a previously-disturbed site ($50K labor + maintenance).

In order to use renewable resources to power the Refuge and conduct interpretive programs regarding sustainability, the Refuge proposes to install solar panels on the Looney Unit ($40K installation + maintenance). The Refuge also proposes to install a rainwater collection system up by the Looney maintenance shop and construct a 35'x35' circular area, containing 8 individual raised beds garden of native edible/medicinal herbs and plants.

To get to the MMLERC, there is a Looney Unit public access drive, which is currently 0.25-miles, unpaved and unimproved (dirt/rock), with a gate. There is an unpaved parking area (power cut easement), between the entry gate and MMLERC, for approximately 10 vehicles. Excess parking is available at the Guess unit (150 yards). With the anticipation of an increase in visitation to the Refuge, it proposes to widen the Looney Unit access drive by 2 feet and improve road and parking area surfaces with gravel ($20K capital).

There are 0.5-1.0 miles of primitive trails currently used by interpretation participants on the Refuge. In order to create more hiking/walking opportunities for large groups to participate in place-based education programs, the Refuge proposes to establish a 0.25-mile mostly primitive trail to connect Spavinaw Creek trail to the Guess house trail ($5K capital for repavement/rakes/shovels/gloves), build a new 2-mile primitive trail (no clearing or removing of trees or large shrubs) around the perimeter of the Looney Unit ($10K labor + capital), improve the 0.1-mile trail from MMLERC to pavilion ($5K capital), the 0.25-mile trail from the Looney maintenance shop to the MMLERC ($5K capital) and improve the 0.1 mile primitive trail from the parking/camping area on top of the hill down to the MMLERC to ensure safety ($5K capital). The Refuge would also like to install 3 primitive overlook areas on the Looney Unit perimeter trail, which may be used as stopping points during an interpretive talk ($15K capital).

The Refuge plans to install and improve interpretation signs and displays ($25K capital; 0.1 FTE ORP (GS-9/11). The Refuge plans to construct a new sign at the MMLERC cabin to say “Mary & Murray Looney Education & Research Center”. The Refuge proposes to create limited interpretive signage on the new perimeter nature trail at the Looney Unit. The Refuge also wants to create displays regarding historical caving equipment and materials, a Refuge survey map of the AD-14 cave interior, and other interpretive and educational information for inside the MMLERC. The Refuge would continue to maintain resources confidentiality by not posting public use signs at unit entrances and/or on public access roadways, except for a small sign marking the “Refuge Headquarters”, where appropriate.

The Refuge owns a limited amount of specialized safety equipment and equipment for caving ($10K) for visitors, but would like to acquire more, especially if safety protocols for prevention of WNS deem necessary.

Staff oversight is required for implementing and monitoring interpretation programming and activities. However, currently the Refuge has no funding in their Visitor Services budget for interpretive programs, therefore, the Refuge has to write grants, oversee contracting, and do all that is necessary to provide funding to its partnering NGOs in order to provide all current interpretation opportunities on the Refuge. Refuge staff is available for all on-site interpretive programs to provide logistical support and assist partners in program instruction. The Refuge also provides material support, including field guides and other Ozark resource references,

audio-visual equipment, and ensuring the proper functioning of the MMLERC. Currently, the Refuge's funding to support NGO-led interpretation programs varies year to year. In conjunction with interpretation and EE programs, approximately 1,000 volunteer hours are recorded each year. In order to guarantee consistency annually in Refuge interpretation programs for visitors, the Refuge would need dedicated annual funding for its interpretive programs. An Outdoor Recreation Planner (GS-7/9/11) would be a necessary addition to Refuge staff in order to improve the quality of current interpretation programs and to plan, develop, coordinate, and evaluate future programs.

Public outreach needs improvement to increase participation of interpretive programs ($5K per year; Outdoor Recreation Planner GS-7/9/11). No pamphlets or fliers about the Refuge are currently available however the Refuge proposes to create a flier/brochure to advertise visitor services opportunities, including interpretation opportunities, at the MMLERC. The Refuge also plans to update their website (http://www.fws.gov/southwest/refuges/oklahoma/Ozark/ and http://www.fws.gov/refuges/profiles/recEdMore.cfm?ID=21645) to inform the public of current and upcoming interpretation program opportunities, including contact and location information (while cave locations continue to remain confidential). In addition, the Refuge would stream an online live video of bats within a cave, for interpretation purposes.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

Interpretation activities occurring only on surface habitats may have negligible or short-term adverse impacts on Refuge trust resources. On the other hand, the programs would have beneficial impacts to visitors and local communities.

Interpretation participants remaining on- or off-trail, will have some short-term direct impacts to the environment including: trampling of native vegetation on the bottomland and/or upland forest; disturbance to wildlife (including noise from large groups of people and light pollution due to headlamps used for overnight camping); shifting of rocks on trails; and compaction of soils.

Renovation plans at the MMLERC (widening of the Looney Unit public access road by 2-feet for 0.25-mile, and establishing a gravel parking lot) will cause short-term, temporary impacts only during the construction including: loud levels of noise pollution due to use of mechanical equipment; increase in CO_2 emissions; and fugitive dust.

Long-Term Impacts:

Widening of the Looney Unit public access road by 2-feet for 0.25-mile will require the removal of vegetation, rocks, top soil, and possibly trees. Establishing a gravel parking lot will allow for a better established parking area, which will prevent visitors from parking in the grass on the side

of the road, and will help control soil erosion. In order to establish a primitive trail to connect Spavinaw Creek trail to Guess House trail, some boulders and old concrete will be removed (200 ft.), affecting the physical area.

Increasing visitation permits for future interpretation programs on the Looney Unit and additional appropriate acquired units, is going to increase human traffic to those areas, which will expose many cave locations to the public. Exposure to cave locations could increase the potential of cave vandalism or break-ins. An increase in human traffic could also increase the amount of trash found on the Refuge. However, these are both unlikely scenarios for this wildlife-dependent use since interpretive programs aim to encourage people to participate in Leave No Trace (LNT) ethics and to leave participants with an enduring understanding of the importance of cave and karst ecosystems within the Ozarks ecoregion.

Cumulative Impacts:
Cumulatively, current and future interpretation programs will have a beneficial impact on surrounding communities by increasing community partnerships, increasing environmental knowledge, and especially, for giving present and future generations an opportunity to connect with nature. Interpretation programs are meant to leave visitors with a life-long appreciation of the outdoors and of U.S. Fish & Wildlife Service conservation efforts. These programs could lead to future conservation easement programs, acquisition of important areas from willing sellers, and instill the value of our environment in future leaders.

PUBLIC REVIEW AND COMMENT:
This compatibility determination for Ozark Plateau NWR was made available for public review and comment in conjunction with the public comment period for the Refuge's Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA). Public comments on this compatibility determination were invited and due by March 8, 2013.

DETERMINATION (CHECK ONE BELOW):
_____Use is not compatible
_X____Use is compatible with the following stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
In order to ensure that Environmental Education remains a compatible use on Ozark Plateau National Wildlife Refuge, the following stipulations are necessary:

- The Looney Unit and the MMLERC is used for interpretive programs by permit only, issued by Refuge staff
- Vehicle and/or all-terrain vehicle use off-road is restricted to prevent damage to Refuge resources
- Cave entry will remain closed due to the potential of spreading WNS to bat species

- If deemed appropriate, interpretation activities may not require Refuge staff supervision
- Primitive camping is allowed only in a designated area on the MMLERC, in conjunction with EE or interpretation programs, by permit only, issued by Refuge staff
- The designated centralized fire pit at the MMLERC is the only outdoor fire area in conjunction with EE/interpretation programs, by permit only (permits only given on low-fire hazard days), issued by Refuge staff
- Campers are responsible for their campfires and shall not leave them unattended
- The Refuge must provide firewood for the fire pit in order to prevent invasive species, pests, and diseases from spreading to the Refuge
- No man-made objects are allowed in fire pit
- Collection of plants or animals, or feeding or disturbing wildlife, is prohibited
- Public use trends and associated impacts from human activity will continue to be monitored. If significant increases in use occur, and/or if impacts to resources are determined significant, the program will be reevaluated and modified as necessary to ensure compatibility

JUSTIFICATION: These programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. Interpretation is a wildlife-dependent, priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The USFWS strives to provide priority public uses when compatible with the purposes of the Refuge and the mission of the System. Facilities and activities related to interpretation occur in designated areas of the Refuge, leaving large areas of undisturbed habitat available for wildlife. The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The Refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The awareness, enjoyment and education gained from these activities are expected to outweigh their associated impacts. Ozark Plateau National Wildlife Refuge has determined that interpretation, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for interpretation has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

SIGNATURE: **Refuge Manager** Richard Stark 04/24/13
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION DATE: 2028

Compatibility Determination

USE: Wildlife Observation and Wildlife Photography

REFUGE NAME: Ozark Plateau National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY:

- Fish and Wildlife Act of 1956
- Endangered Species Act of 1973

REFUGE PURPOSE(S):
"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" ... 16 U.S.C. 1534 (Endangered Species Act of 1973)

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . " 16 U.S.C. 742(a)(4) and " . . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . . " 16 U.S.C. 742(b)(1) (Fish and Wildlife Act of 1956).

Ozark Plateau National Wildlife Refuge was established to:

- Prevent the extinction and aid in recovery of federally-listed threatened and endangered Ozark cave species;
- Reduce the need for future listing of species of concern in the Ozarks;
- Protect large continuous stands of Ozark forest essential to interior forest nesting migratory birds;
- Provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:
The mission of the System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:

(a) What is the use?

Ozark Plateau National Wildlife Refuge proposes to continue and expand wildlife observation and photography in designated areas of the Refuge that are compatible with Refuge purposes. These activities are wildlife-dependent, priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The continuation and enhancement of these programs will be addressed in this compatibility determination.

Observing wildlife is a public use at Ozark Plateau NWR, with over 3,500 visitors each year participating in the activity. Most visitors come to the Refuge for EE or interpretation, however, many of them also enjoy the opportunity to view and photograph Ozark Plateau NWR's diverse habitats (i.e. forests, streams, and caves) and wildlife (i.e., the migration of multiple bird species to the area, sightings of deer and fish, insects such as butterflies and caterpillars, etc.).

(b) Where is the use conducted?

Wildlife observation and wildlife photography on the Refuge are restricted to the Mary & Murray Looney Unit (Looney Unit), which is on 95 acres of diverse habitats representative of the Ozark Highlands ecoregion, including Spavinaw Creek and its tributaries, riparian zones, losing streams (a stream that has a permeable bed through which water can seep to the water-table), natural springs, caves, hardwood bottomland floodplains and oak-hickory-pine upland forests (encyclopedia.com). Four maintained trails of equal to or less than 0.25-mile each, two of which originate at the Mary & Murray Looney Education & Research Center (MMLERC), are designated areas where wildlife is typically observed and photographed.

Opportunities for increased wildlife observation and photography on other units will be explored as additional land is acquired.

Cave entry for wildlife observation and wildlife photography is currently closed due to concerns about white-nose syndrome (WNS), a new disease affecting hibernating bats. The fungus believed to be the causative agent of WNS, *Geomyces desctructans*, is transmitted primarily through bat-to-bat contact. However, evidence suggests that inadvertent human-assisted movement of fungal spores on clothing, footwear, or gear could play a role in the spread of WNS. Therefore, the Refuge believes that closing caves to public entry at this point in time is a necessary management action to help prevent the spread of this disease. Closure of refuge caves to the public is in accordance with current Service guidance issued in a memorandum dated September 2, 2010, regarding bat management of WNS in the National Wildlife Refuge System. Should future Service guidance indicate that refuge caves may be reopened to public entry, Ozark Plateau NWR will consider limited use of caves for wildlife observation and wildlife photography.

(c) When is the use conducted?
Visitors are welcome to engage in wildlife observation and photography on the Looney Unit during most times of the year; however these uses require prior notification and a special use permit. Currently, visitors who wish to engage solely in wildlife observation/photography come to the Refuge approximately 3-4 times per year. The Refuge proposes to increase visitation permits for wildlife observation and photography, aside from EE programs, to approximately twelve times per year, at the Refuge's discretion.

(d) How is the use conducted?
The public is encouraged to participate in wildlife photography at the Looney unit by special use permit and guided only. There are currently no opportunities for unescorted, unpermitted wildlife observation.

Specific wildlife observation occurs primarily during seasons in which there are specific events occurring such as the migration of multiple bird species to the area, vegetative changes in the native flora, and the natural fluctuation in the activity and number of indigenous wildlife populations, such as deer and fish. Wildlife observation of bats is very popular when bats are not hibernating, and takes place on the exterior of caves, with access to caves strictly controlled by the Service to protect federally listed threatened and endangered cave species and other sensitive cave resources. However, flash photography of bat emergence is not permitted.

Wildlife observation and photography also occurs in conjunction with EE and/or interpretation programs conducted in cooperation with many partners (for a full list, see Chapter 5, Table 5-1 of the CCP).

(e) Why is this use being proposed?
Wildlife observation and wildlife photography are being conducted at Ozark Plateau NWR because they are existing refuge uses and are identified as vital wildlife-dependent priority public uses for the National Wildlife Refuge System.

Increased urbanization in northwest Arkansas and in Tulsa, Oklahoma is having detrimental effects on the Ozark ecoregion. Most people are not conscious of their direct connection to the natural environment around them. Many people are also unaware of the large and delicate cave (subterranean) ecosystems and native wildlife species that lie beneath their feet. Wildlife observation and photography on Ozark Plateau NWR is important in order for both urban and rural people of this region to have an opportunity to connect to nature, relax, and appreciate the beauty and wonder of the local, natural resources of the Ozarks including cave, karst, forests, and streams.

AVAILABILITY OF RESOURCES:

To get to the Looney Unit for wildlife observation and photography, a permit is required, which can be obtained at the MMLERC. There is a Looney Unit public access drive, which is currently 0.25-mile, unpaved and unimproved (dirt/rock), with a gate. There is an unpaved parking area (power cut easement), between the entry gate and MMLERC, for approximately 10 vehicles. Excess parking is available at the Guess House (150 yards). With the anticipation of an increase in visitation to the Refuge, it proposes to widen the Looney Unit access drive by 2 feet and improve road and parking area surfaces with gravel ($20K capital).

There are 0.5-1.0 mile of primitive trails currently used by wildlife observation and photography visitors on the Refuge. In order to create more hiking/walking opportunities for large groups to participate in nature observation, the Refuge proposes to establish a 0.25-mile mostly primitive trail to connect Spavinaw Creek trail to the Guess House trail ($5K capital for repavement/rakes/shovels/gloves), build a new 2-mile primitive trail (no clearing or removing of trees or large shrubs) around the perimeter of the Looney Unit ($10K labor + capital), improve the 0.1-mile trail from the MMLERC to pavilion ($5K capital), and improve the 0.25-mile trail from the Looney maintenance shop to the MMLERC ($5K capital). The Refuge would also like to install 3 primitive overlook areas on the Looney Unit perimeter trail, which may be used as stopping points for great overlooks or photographic shots ($15K capital).

The Refuge owns a limited amount of specialized safety equipment and equipment for caving ($10K) for visitors, but would like to acquire more, especially if safety protocols for prevention of WNS deem necessary.

Staff oversight is required for guiding and monitoring wildlife observation and photography activities. However, currently the Refuge has no funding in their Visitor Services budget for all EE and interpretation programs, therefore, the Refuge has to write grants, oversee contracting, and do all that is necessary to provide funding to its partnering NGOs in order to provide all current EE/interpretation programming and staffing needs, which also supports wildlife observation and photography. Refuge staff is available for all on-site wildlife observation and photography to provide guidance for great observation and viewing areas. In order to guarantee consistency annually in providing opportunities for local participants to engage in wildlife observation and photography, the Refuge would need dedicated annual funding for its programs. An Outdoor Recreation Planner (GS 7/9/11) would be a necessary addition to Refuge staff in order to improve the quality of current wildlife observation and photography opportunities and to plan, guide, and evaluate future opportunities.

Public outreach needs improvement to increase participation of wildlife observation and photography. No pamphlets or fliers about the Refuge are currently available however the Refuge proposes to create a flier/brochure to advertise visitor services opportunities, including

wildlife observation and photography opportunities at the MMLERC. The Refuge also plans to update their websites (http://www.fws.gov/southwest/refuges/oklahoma/Ozark/ and http://www.fws.gov/refuges/profiles/recEdMore.cfm?ID=21645) to inform the public of current and upcoming wildlife observation and photography opportunities, including contact and location information (while cave locations continue to remain confidential).

ANTICIPATED IMPACTS OF THE USE:

Short Impacts:

Wildlife observation and photography occurring only on surface habitats may have negligible or short-term adverse impacts on Refuge trust resources. On the other hand, the programs would have beneficial impacts to visitors and local communities.

Wildlife observers and photographers remaining on- or off-trail, will have some short-term direct impacts to the environment including: trampling of native vegetation on the bottomland and/or upland forest; disturbance to wildlife (including noise from large groups of people and light pollution due to photography flash); shifting of rocks on trails; and mild compaction of soils.

Renovation plans at the MMLERC to improve Visitor Services programs (widening of the Looney Unit public access road by 2-feet for 0.25-mile, and establishing a gravel parking lot) will cause short-term, temporary impacts only during the construction including: loud levels of noise pollution due to use of mechanical equipment; increase in CO_2 emissions; and fugitive dust.

Long-Term Impacts:

Widening of the Looney Unit public access road by 2-feet for 0.25-mile will require the removal of vegetation, rocks, top soil, and possibly trees. Establishing a gravel parking lot will allow for a better established parking area, which will prevent visitors from parking in the grass on the side of the road, and will help control soil erosion. In order to establish a primitive trail to connect Spavinaw Creek trail to Guess House trail, some boulders and old concrete will be removed (200 ft.), affecting the physical area.

Increasing visitation permits for future EE/interpretation programs and/or solely for wildlife observation and photography on the Looney Unit and additional appropriate acquired units, is going to increase human traffic to those areas, which will expose many cave locations to the public. Exposure to cave locations could increase the potential of cave vandalism or break-ins. An increase in human traffic could also increase the amount of trash found on the Refuge. However, these are both unlikely scenarios for this wildlife-dependent use since interpretive programs aim to encourage people to participate in Leave No Trace (LNT) ethics and to leave participants with an enduring understanding of the importance of cave and karst ecosystems within the Ozarks ecoregion.

Cumulative Impacts:
Cumulatively, current and future wildlife observation and photography opportunities will have a beneficial impact on surrounding communities by giving present and future generations an opportunity to connect with nature. Visitor Services programs are meant to leave visitors with a life-long appreciation of the outdoors and of U.S. Fish & Wildlife Service conservation efforts. These programs could lead to future conservation easement programs, acquisition of important areas from willing sellers, and instill the value of our environment in future leaders.

PUBLIC REVIEW AND COMMENT:
This compatibility determination for Ozark Plateau NWR was made available for public review and comment in conjunction with the public comment period for the Refuge's Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA). Public comments on this compatibility determination were invited and due by March 8, 2013.

DETERMINATION (CHECK ONE BELOW):
_____Use is Not Compatible
_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
In order to ensure that wildlife observation and wildlife photography remain a compatible use on Ozark Plateau National Wildlife Refuge, the following stipulations are necessary:

- Wildlife observation and photography is limited to the Looney Unit, year round, by permit only
- Vehicle and/or all-terrain vehicle use off-road is restricted to prevent damage to Refuge resources
- Cave entry is currently closed, due to the potential of spreading WNS to caves
- If deemed appropriate, all visitors entering caves for wildlife observation and/or photography purposes must wear Refuge- provided, decontaminated, caving equipment (clothing and safety devices, including mandatory hard hats, gloves, and lights)
- Disturbance to caves will be avoided during bat maternity and hibernation periods
- Flash photography of bat emergence from cave exteriors is prohibited
- Collection of plants or animals, or feeding or disturbing wildlife, is prohibited
- Wildlife photography may not be used for commercial purposes, unless Refuge determines compatible and issues a permit
- Visitors are responsible for "Leaving No Trace" (picking up trash, not leaving permanent structures such as blinds, avoiding disturbance to habitat, etc.)
- Pets must be leashed at all times at the Looney Unit
- Public use trends and associated impacts from human activity will continue to be monitored. If significant increases in use occur, and/or if impacts to resources are

determined significant, the program will be reevaluated and modified as necessary to ensure compatibility.

JUSTIFICATION: These programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. Wildlife observation and photography are wildlife-dependent, priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The USFWS strives to provide priority public uses when compatible with the purposes of the Refuge and the mission of the System. Facilities and activities related to wildlife observation and photography occur in designated areas of the Refuge, leaving large areas of undisturbed habitat available for wildlife. The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The Refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The awareness, enjoyment and education gained from these activities are expected to outweigh their associated impacts. Ozark Plateau National Wildlife Refuge has determined that wildlife observation and photography, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for wildlife observation and photography has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

SIGNATURE: **Refuge Manager** Richard Stroke 04/24/13
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION DATE: 2028

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Compatibility Determination

USE: Hunting

REFUGE NAME: Ozark Plateau National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY:

- Fish and Wildlife Act of 1956
- Endangered Species Act of 1973

REFUGE PURPOSE(S):
"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" ... 16 U.S.C. 1534 (Endangered Species Act of 1973)

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . " 16 U.S.C. 742(a)(4) and " . . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . . " 16 U.S.C. 742(b)(1) (Fish and Wildlife Act of 1956).

Ozark Plateau National Wildlife Refuge was established to:

- Prevent the extinction and aid in recovery of federally-listed threatened and endangered Ozark cave species;
- Reduce the need for future listing of species of concern in the Ozarks;
- Protect large continuous stands of Ozark forest essential to interior forest nesting migratory birds;
- Provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:
The mission of the System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:

(a) What is the use?

The Refuge does not currently allow hunting, although, if compatible, the Refuge proposes to develop a Hunt Plan in accordance with 605 FW 2.9. Because of the sensitive nature of the federally listed cave species and other cave, spring, stream, and forest resources, public use and recreational opportunities are limited on the Refuge and will need to be monitored to assure protection of these resources.

Hunting, one of the six priority public uses of national wildlife refuges, is an important wildlife management tool used to control populations of some species that may exceed the carrying capacity of their habitat and/or threaten the sustainability of other native wildlife species. Hunting has also been regarded for centuries as an important cultural, recreational, and even spiritual experience for many generations of people, while providing them opportunities to observe nature and enjoy local, natural food.

Therefore, the Refuge proposes to develop a Hunt Plan in coordination with the Oklahoma Department of Wildlife Conservation (ODWC).

(b) Where is the use conducted?

All hunting would be walk-in and on the Sally Bull Hollow Unit only, which lies adjacent to State-managed, Ozark Plateau Wildlife Management Area (WMA). Hunting would take place on surface Refuge tracts of Sally Bull Hollow Unit, at least 100 yards from cave entrances. This will help ensure the protection of T&E cave species and cave species of concern.

Because of the small size of other existing Refuge units and sensitivity of cave resources to human disturbance, the Beck, Boy Scout, Gittin Down Mountain, Lake Eucha, Liver, Looney, Potter and Varmint Units of Ozark Plateau NWR will remain closed to hunting in order to continue to protect other Refuge cave and karst ecosystems and resources.

Additional hunting locations may be considered on additional acquired lands, based on the locality, condition of the local ecosystem, and availability of the natural resources.

(c) When is the use conducted?

Hunting would be conducted during all Oklahoma state hunting seasons, according to updated published regulations (http://www.odwc.state.ok.us/hunting/seasons.htm).

(d) How is the use conducted?

After the Sally Bull Hollow Unit has been surveyed and boundaries marked, a Hunt Plan would be developed to ideally allow hunting according to state hunting seasons and regulations, identical to ODWC's adjacent Ozark Plateau WMA. Deer, turkey, squirrel, rabbit, quail and

other small game are examples of what may be hunted according to state regulations. However, if inventorying and monitoring of federally listed species identifies adverse effects due to the public use, hunting regulations may need to be modified in cooperation with ODWC.

(e) Why is this use being proposed?

During scoping, many members of the public and the ODWC expressed high interest in having the opportunity to hunt on the Refuge. ODWC asked that Ozark Plateau NWR allow hunting of Oklahoma State game species (including deer, turkey, squirrels, quail, and rabbits) in accordance with State regulations. As long as hunting is compatible with the purpose of the Refuge, Ozark Plateau NWR agrees to allow this wildlife-dependent use.

AVAILABILITY OF RESOURCES:

Sally Bull Hollow Unit lies on 2,280 acres in fee of high quality continuous mature Ozark oak-hickory and pine upland forest on steep hill sides with numerous bluff faces. There are also narrow high quality oak-hickory bottomland forest, and intermittent rocky bottom Ozark streams used by nesting and migratory Neotropical birds and foraging endangered bats. Numerous important Ozark big-eared bat and gray bat caves are found on the Unit. It is within the Lee Creek drainage basin, an Oklahoma state scenic river, with high gradient, spring fed tributaries. The cave is geologically isolated from other caves in eastern Oklahoma therefore enhancing the probability for a unique fauna.

In order for hunting to be allowed on the Sally Bull Hollow Unit, the boundaries must first be surveyed and marked. Surveying and marking the boundaries and maintenance of the boundary markers will require contracted surveyors and cost approximately $150,000. No parking is available on Sally Bull Hollow Unit, although there is nearby parking on adjacent county roads.

The Refuge is currently managed as a satellite of the Sequoyah National Wildlife Refuge Complex in Vian, Oklahoma. Ozark Plateau National Wildlife Refuge's staff consists of a Refuge Manager, a Wildlife Refuge Specialist, and a Maintenance Worker, who are assisted by personnel from the Tulsa ES Office and the Sequoyah National Wildlife Refuge for biological, clerical, law enforcement, and maintenance support. Staff oversight is required for implementing and monitoring hunting activities. Hunting on Ozark Plateau NWR will require an increase of law enforcement at Sally Bull Hollow Unit during hunting season to prevent disturbance of caves and enforce Refuge hunting regulations. It will also require a Hunt Plan package, which is a process that takes approximately one year to finish prior to the opening of any hunting grounds on the Refuge.

ANTICIPATED IMPACTS OF THE USE:

Short-Term Impacts:

Hunting practiced only on surface habitats may have negligible or only short-term adverse effects on Service trust resources, as long as human disturbance of the sensitive federally listed T&E cave species and other cave resource does not increase.

Populations of game will be slightly impacted year-to-year as a result of opening this Refuge Unit to hunting, however, as long as hunters are following State regulations, this should not affect animal populations dramatically in the long-term.

In the short-term, the Refuge may have issues controlling access to the Unit on Refuge roads, which could potentially increase illegal vehicle traffic. The Refuge would need to maintain and fix inadequately-designed road gates in order to prevent this from becoming a negative long-term impact. Restricting use to walk-in only access should limit the amount of hunters using the area appropriately. Short-term direct impacts of walking include trampling of native vegetation on the bottomland and upland forest habitats and mild disturbance to rocks and soils. Soil compaction and minor erosion of soil and rocks may occur.

Long-Term Impacts:

By allowing hunting, human traffic to the area is going to increase, which could expose many cave locations to the public thus increasing the potential of cave vandalism or break-ins. In addition, the more people that use the area, the more trash that is likely to be left on the land or to pollute nearby water sources. There is also a potential for people to engage in illegal behavior such as overnight camping or poaching.

If inventorying and monitoring does indicate that increased public use is adversely affecting federally listed T&E cave species populations, hunting regulations will be modified in cooperation with ODWC.

On the other hand, allowing hunting could improve relationships and increase cooperation between nearby landowners, the State, and Tribal Nations in the long-term. It can also give the public and tribes the opportunity to participate and educate its youth in the experience of connecting with nature to hunt one's own food. It could also benefit many species by controlling populations so that long-term sustainability is attainable and so that there is no over-abundance of any one species.

Cumulative Impacts:

Allowing the use of hunting will cumulatively add more hunting opportunities for the State, which the public wants. It should not contribute any adverse cumulative effects on the natural resources of the Ozark Highlands ecoregion.

PUBLIC REVIEW AND COMMENT:
This compatibility determination for Ozark Plateau NWR was made available for public review and comment in conjunction with the public comment period for the Refuge's Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA). Public comments on this compatibility determination were invited and due by March 8, 2013.

DETERMINATION (CHECK ONE BELOW):
_____Use is Not Compatible
_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:
In order to ensure that hunting remain a compatible use on Ozark Plateau National Wildlife Refuge, the following stipulations are necessary:

- Once the Unit has been surveyed and marked, hunting will be restricted to Sally Bull Hollow of Ozark Plateau NWR by walk-in only
- Hunting will not take place within 100 yards of cave entrances
- Hunters must use nontoxic shot and maintain a safe and courteous distance from other parties, according to FWS Policy 605 FW 2 and 50 CFR 32.2(k)
- Hunters are required to carry out their empty shells and trash
- Hunters utilizing temporary blinds are required to remove decoys and portable blinds daily upon cessation of hunting, and according to State regulations
- No permanent stands (nor steel cleats used for stands) are allowed
- Only temporary stands with temporary non-damaging cleats are allowed for a maximum of 14 days
- The Refuge prohibits the use or possession of alcoholic beverages while on Refuge lands or waters
- The Refuge prohibits off-road vehicle travel and ATV use to retrieve game

JUSTIFICATION: These programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. Hunting is a wildlife-dependent, priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Improvement Act of 1997. The USFWS strives to provide priority public uses when compatible with the purposes of the Refuge and the mission of the System. Facilities and activities related to hunting occur in designated areas of the Refuge, leaving large areas of undisturbed habitat available for wildlife. The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The Refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The awareness, enjoyment and education gained from these activities are expected to outweigh their associated impacts. Ozark Plateau National Wildlife Refuge has determined that

hunting, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for hunting has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

SIGNATURE: **Refuge Manager** Richard Stark 04/24/13
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION DATE: 2028

Compatibility Determination

USE: Wood Harvesting

REFUGE NAME: Ozark Plateau National Wildlife Refuge

ESTABLISHING AND ACQUISITION AUTHORITY:

- Fish and Wildlife Act of 1956
- Endangered Species Act of 1973

REFUGE PURPOSE(S):
"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants" ... 16 U.S.C. 1534 (Endangered Species Act of 1973)

"... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act)

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . " 16 U.S.C. 742(a)(4) and " . . . for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude . . . " 16 U.S.C. 742(b)(1) (Fish and Wildlife Act of 1956).

Ozark Plateau National Wildlife Refuge was established to:

- Prevent the extinction and aid in recovery of federally-listed threatened and endangered Ozark cave species;
- Reduce the need for future listing of species of concern in the Ozarks;
- Protect large continuous stands of Ozark forest essential to interior forest nesting migratory birds;
- Provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:
The mission of the System is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee])

DESCRIPTION OF USE:

(a) What is the use?

The Refuge does not currently allow wood harvesting by the public, however, it proposes to allow limited wood harvesting, primarily for firewood, by special permit only, in accordance with Refuge forest management needs and as habitat requirements dictate.

(b) Where is the use conducted?

The Refuge will permit wood harvesting on some or all Refuge Units, depending on forest management needs.

(c) When is the use conducted?

Wood harvesting would only be permitted if Refuge forest and wildlife management needs dictate, such as after ice or wind storms, selective thinning by the Refuge, and for fuel reduction.

(d) How is the use conducted?

The Refuge will contact interested landowners, NGO partners, NRCS, ODWC, and other State and federal agencies, as well as Tribal Nations, and notify the public of wood harvesting opportunities. For interested individuals, a special use permit must be issued. If necessary, the Refuge will contract for the removal and use of excess wood.

The public will not be permitted to cut down any live or dead-standing trees, however, they will be permitted to cut and harvest downed-trees using chain saws, axes, or other handtools, to remove and haul away excessive wood/fuel loads utilizing trucks, trailers and 4WD vehicles on designated Refuge roads.

(e) Why is this use being proposed?

In order for the Refuge to manage for a healthy forest for wildlife needs, some thinning and fuel reduction actions must be conducted, such as after ice or wind storms and for sustainable management of Ozark forests. The Refuge does not have the staffing or funding available to perform all the removal of downed-trees, due to these necessary management activities. Wood harvesting by the public provides economical and efficient means for removal of the Refuge's fuel loads, while also being mutually beneficial for the public.

A**VAILABILITY OF RESOURCES:**

Ozark Plateau NWR manages for the restoration and conservation primarily of old growth hickory-oak forests on all Refuge Units, especially for the benefit of federally listed T&E bat and other cave species. Availability of forest resources vary year to year depending on weather conditions and management activities.

ANTICIPATED IMPACTS OF THE USE:

Short-term Impacts:

An increase in public use in these areas may trample vegetation surrounding wood piles and temporarily compact soils. In addition, loud noise occurring from the use of chainsaws and other mechanical equipment may temporarily disturb or scare away wildlife. There would also be a temporary increase of vehicle traffic on Refuge roads close to wood harvest pile areas, which would cause noise, a short-term increase in CO_2 emissions, and compaction and erosion of soils on access roads.

Long-term Impacts:

Wood harvesting would aid in a reduction of fuel loads, which is important in order to mitigate hot-burning wildfires (which could destroy valuable old-growth trees). Wood harvesting of downed trees and excessive fuel loads assists the Refuge at attaining the forest conditions necessary for restoration such as "moderately stocked mature oak-hickory-pine with an open understory" in order to provide suitable habitat for its bat, resident, and migratory wildlife species.

In addition, allowing for more public use opportunities, such as wood harvesting, will improve relationships with the public and surrounding tribes. Allowing the public to also gain from this forest restoration process is a good way to engage in sustainability with local communities and provide a beneficial use of our natural resources without creating waste.

Cumulative Impacts:

Cumulatively, wood harvesting promotes healthy regenerative practices of old-growth Ozark forest on a landscape-scale and mitigates uncontrollable/hot wildfires.

PUBLIC REVIEW AND COMMENT:

This compatibility determination for Ozark Plateau NWR was made available for public review and comment in conjunction with the public comment period for the Refuge's Draft Comprehensive Conservation Plan and Environmental Assessment (Draft CCP/EA). Public comments on this compatibility determination were invited and due by March 8, 2013.

DETERMINATION (CHECK ONE BELOW):

_____Use is Not Compatible

_X____Use is Compatible with Following Stipulations

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

In order to ensure that wood harvesting remains a compatible use on Ozark Plateau National Wildlife Refuge, the following stipulations are necessary:

- A special use permit is required

- The Refuge will issue permits and days of harvest, based on need and consideration of hunting seasons/activities, sensitive resources, etc.
- Permitee will provide all his/her own wood harvesting materials, equipment, and supplies
- The Refuge may not be available to directly oversee this use activity
- The Refuge is not liable for injuries occurring as a result of this use; safety is the responsibility of the wood harvester
- All trucks, trailers and 4WD vehicles used for wood harvesting must remain on designated Refuge roads

JUSTIFICATION: These programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. The USFWS strives to provide priority public uses when compatible with the purposes of the Refuge and the mission of the System. Facilities and activities related to wood harvesting occur in designated areas of the Refuge, leaving large areas of undisturbed habitat available for wildlife. The stipulations outlined above are specifically designed to and should minimize potential impacts of these activities. The Refuge will continue to monitor uses and adjust programs as necessary to protect Refuge resources. The benefits gained from public opportunities of wood harvesting are expected to outweigh their associated impacts. Ozark Plateau National Wildlife Refuge has determined that wood harvesting, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for wood harvesting has given many people a deeper appreciation of their local natural resources and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System.

SIGNATURE: **Refuge Manager** Richard Stark 04/24/13
(Signature and Date)

CONCURRENCE: **Regional Chief** 9/4/13
(Signature and Date)

MANDATORY 10- OR 15-YEAR RE-EVALUATION DATE: 2023

Appendix C: Species List

Ozark Plateau NWR is in the process of compiling different types of species surveys of those occurring on and/or surrounding the Refuge. So far, a survey titled, "Amphibians and Reptiles of the Ozark Plateau National Wildlife Refuge Adair, Delaware, and Ottawa Counties, Oklahoma [Sally Bull Hollow Unit]" was conducted in 2001 by Janalee P. Caldwell, curator of herpetology as well as professor of zoology, Laurie J. Vitt, of Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma (see Table C-1). We have included an asterisk (*) next to species names or observations that have updated since this 2001 survey.

In addition, we have also included the species of greatest conservation need according to the Oklahoma Department of Wildlife Conservation Comprehensive Wildlife Conservation Strategy (2005) in Appendix C: Species List (see tables C-2 through C-11) since these species occur within the approved acquisition boundary of Ozark Plateau National Wildlife Refuge.

In Table C-1, species found on the Ozark Plateau National Wildlife Refuge are indicated in the column "collected or observed." If suitable habitat was present but a species was not found, we indicated that it is likely to be present. In instances where range maps show the geographical range of a species to include the Ozark Plateau NWR but no suitable habitat was observed, we considered that species not likely to be present.

Table C-1. Amphibians and Reptiles Survey of Ozark Plateau NWR (2001).

FAMILY **SPECIES**	Collected or observed	Likely to be present	Not likely to be present
AMPHIBIANS			
SALAMANDERS			
Family Salamandridae			
Notophthalmus viridescens louisianensis—Central Newt	X		
Family Proteidae			
Necturus maculosus louisianensis—Red River Mudpuppy			X
Family Ambystomatidae			
Ambystoma annulatum—Ringed Salamander	X		
Ambystoma maculatum—Spotted Salamander	X		
Amybstoma tigrinum tigrinum—Eastern Tiger Salamander	X		
Ambystoma texanum—Small-mouthed Salamander	X		
Family Plethodontidae			

FAMILY SPECIES	Collected or observed	Likely to be present	Not likely to be present
Eurycea longicauda melanopleura—Dark-sided Salamander	X		
Eurycea lucifuga—Cave Salamander	X		
Eurycea tynerensis—Oklahoma Salamander*	X*		
Eurycea spelaeus —Grotto Salamander*	X*		
Plethodon angusticlavius—Ozark Salamander	X		
Plethodon albagula—Western Slimy Salamander	X		
FROGS AND TOADS			
Family Bufonidae			
Bufo americanus charlesmithi—Dwarf American Toad	X		
Bufo woodhousii velatus— East Texas Toad	X		
Family Pelobatidae			
Scaphiopus hurterii—Hurter's Spadefoot		X	
Family Microhylidae			
Gastrophryne carolinensis—Eastern Narrow-mouthed Toad	X		
Gastrophryne olivacea—Great Plains Narrow-mouthed Toad			X
Family Hylidae			
Acris crepitans blanchardi—Blanchard's Cricket Frog	X		
Hyla versicolor / chrysoscelis—Gray Treefrog Complex	X		
Pseudacris crucifer crucifer—Northern Spring Peeper	X		
Pseudacris feriarum feriarum—Upland Chorus Frog	X		
Pseudacris streckeri streckeri—Strecker's Chrous Frog		X	
Pseudacris triseriata—Western Chorus Frog	X		
Family Ranidae			
Rana areolata circulosa—Northern Crawfish Frog			X
Rana catesbeiana—American Bullfrog	X		
Rana clamitans melanota—Northern Green Frog			X
Rana palustris—Pickerel Frog	X		
Rana sphenocephala utricularia—Southern Leopard Frog	X		
Rana sylvatica—Wood Frog	X		
REPTILES			
Turtles			
Family Chelydridae			
Chelydra serpentina serpentina—Eastern Snapping Turtle		X	
Macrochelys temminckii—Alligator Snapping Turtle			X
Family Kinosternidae			
Sternotherus odoratus—Stinkpot		X	

FAMILY SPECIES	Collected or observed	Likely to be present	Not likely to be present
Family Emydidae			X
Graptemys pseudogeographica kohnii—Mississippi Map Turtle			X
Graptemys ouachitensis ouachitensis—Ouachita Map Turtle			X
Pseudemys concinna concinna—Eastern River Turtle			X
Trachemys scripta elegans—Red-eared Slider	X		
Terrapene carolina triunguis—Three-toed Box Turtle	X		
Terrapene ornata ornata—Ornate Box Turtle			X
Family Trionychidae			
Apalone mutica mutica—Midland Smooth Softshell			X
Apalone spinifera hartwegi—Western Spiny Softshell			X
LIZARDS			
Family Crotaphytidae			
Crotaphytus collaris—Eastern Collared Lizard		X	
Family Phrynosomatidae			
Sceloporus undulatus hyacinthinus—Northern Fence Lizard	X		
Family Teiidae			
Cnemidophorus sexlineatus viridis—Prairie Racerunner	X		
Family Scincidae			
Scincella lateralis—Little Brown Skink	X		
Eumeces anthracinus pluvialis—Southern Coal Skink		X	
Eumeces septentrionalis obtusirostris—Southern Prairie Skink			X
Eumeces fasciatus—Common Five-lined Skink	X		
Eumeces laticeps—Broaded-headed Skink			X
Family Anguidae			
Ophisaurus attenuatus attenuatus—Western Slender Glass Lizard		X	
SNAKES			
Family Colubridae			
Carphophis vermis—Western Wormsnake	X		
Diadophis punctatus arnyi—Prairie Ring-necked Snake	X		
Virginia striatula—Rough Earthsnake	X		
Virginia valeriae elegans—Western Smooth Earthsnake		X	
Tantilla gracilis—Flat-headed Snake	X		
Sonora semiannulata—Groundsnake			X
Opheodrys aestivus aestivus—Northern Rough Greensnake	X		
Coluber constrictor flaviventris—Eastern Yellow-bellied Racer	X		
Masticophis flagellum flagellum—Eastern Coachwhip		X	

FAMILY **SPECIES**	Collected or observed	Likely to be present	Not likely to be present
Nerodia erythrogaster transversa—Blotched Watersnake	X		
Nerodia sipedon sipedon—Common Watersnake	X		
Nerodia rhombifera—Diamond-backed Watersnake		X	
Heterodon platirhinos—Eastern Hog-nosed Snake	X		
Elaphe guttata emoryi—Great Plains Ratsnake	X		
Elaphe obsoleta obsoleta—Black Ratsnake	X		
Pituophis catenifer sayi—Bullsnake			X
Lampropeltis calligaster calligaster—Prairie Kingsnake	X		
Lampropeltis getula holbrooki—Speckled Kingsnake	X		
Lampropeltis triangulum syspila—Red Milksnake	X		
Cemophora coccinea copei—Northern Scarletsnake		X	
Storeria dekayi texana—Texas Brownsnake	X		
Storeria occipitomaculata occipitomaculata—Northern Red-bellied Snake		X	
Tropidoclonion lineatum—Lined Snake			X
Thamnophis proximus proximus—Orange-striped Ribbonsnake		X	
Thamnophis sirtalis parietalis—Red-sided Gartersnake	X		
Family Viperidae			
Agkistrodon contortrix phaeogaster—Osage Copperhead	X		
Agkistrodon picivorous leucostoma—Western Cottonmouth		X	
Sistrurus miliarius streckeri—Western Pygmy Rattlesnake		X	
Crotalus horridus—Timber Rattlesnake	X		
Crotalus atrox—Western Diamond-backed Rattlesnake			X

The following 10 tables were published in the Oklahoma Department of Wildlife Conservation Comprehensive Wildlife Conservation Strategy in 2005. Each table describes species of greatest conservation need by habitat type within Omernick's Ozark Ecoregion, encompassing most of the Ozark Plateau National Wildlife Refuge (approved) acquisition boundary.

Table C-2. Limestone Cave Species of Greatest Conservation Need (OWDC, 2005)

Species of Greatest Conservation Need		**Status**				**Trend**			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Amph	Grotto Salamander				X				X
Amph	Many-ribbed Salamander				X				X
Amph	Ozark Salamander				X				X
Inve	Bowman's Cave Amphipod	X							X
Inve	Caecidotea acuticarpa	X							X
Inve	Caecidotea ancyla	X							X
Inve	Caecidotea antricola	X							X
Inve	Caecidotea macropoda	X							X
Inve	Caecidotea simulator	X							X
Inve	Caecidotea stiladactyla	X							X
Inve	Cave Crayfish	X					X		
Inve	Kansas Well Amphipod	X							X
Inve	Oklahoma Cave Amphipod	X				X			
Inve	Oklahoma Cave Crayfish	X					X		
Inve	Ozark Cave Amphipod	X							X
Inve	Ozark Cavefish	X					X		
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		

Table C-3. White Oak/Hickory Mesic Forest Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Amph	Many-ribbed Salamander				X				X
Amph	Oklahoma Salamander				X				X
Amph	Ozark Salamander				X				X
Amph	Ringed Salamander				X				X
Bird	American Woodcock	X							X
Bird	Cerulean Warbler	X				X			
Bird	Hooded Warbler	X							X
Bird	Kentucky Warbler		X						X
Bird	Red-headed Woodpecker		X			X			
Bird	Whip-poor-will		X						X
Bird	Wood Thrush	X							X
Bird	Worm-eating Warbler	X							X
Inve	American Burying Beetle		X						X
Mamm	Eastern Small-footed Myotis				X				X
Mamm	Eastern Spotted Skunk				X				X
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		
Mamm	Southeastern Myotis				X				X
Rept	Northern Scarletsnake				X				X

Table C-4. Shortleaf Pine-Oak-Hickory Woodlands Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Bird	American Woodcock	X							X
Bird	Bachman's Sparrow	X							X
Bird	Blue-winged Warbler	X							X
Bird	Brown-headed Nuthatch	X							X
Bird	Kentucky Warbler		X						X
Bird	Northern Bobwhite		X			X			
Bird	Prairie Warbler		X						X
Bird	Red-headed Woodpecker		X			X			
Bird	Whip-poor-will		X						X
Inve	American Burying Beetle		X						X
Inve	Diana Fritillary	X							X
Mamm	Eastern Spotted Skunk				X				X
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Long-tailed Weasel				X				X
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		
Rept	Western Diamond-backed Rattlesnake				X				X

Table C-5. Post Oak/Blackjack Oak-Hickory Woodlands and Forests Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Bird	American Woodcock	X							X
Bird	Bachman's Sparrow	X							X
Bird	Blue-winged Warbler	X							X
Bird	Harris's Sparrow		X						X
Bird	Kentucky Warbler		X						X
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Bird	Prairie Warbler		X						X
Bird	Red-headed Woodpecker		X			X			
Bird	Whip-poor-will		X						X
Inve	American Burying Beetle		X						X
Mamm	Eastern Spotted Skunk				X				X
Mamm	Long-tailed Weasel				X				X
Rept	Western Diamond-backed Rattlesnake				X				X

Table C-6. Herbaceous Wetlands Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Amph	Crawfish Frog				X				X
Bird	American Golden Plover		X						X
Bird	American Woodcock	X							X
Bird	Buff-breasted Sandpiper	X				X			
Bird	Canvasback	X							X
Bird	Hudsonian Godwit				X				X
Bird	King Rail				X				X
Bird	LeConte's Sparrow		X						X
Bird	Lesser Scaup		X			X			
Bird	Little Blue Heron		X						X
Bird	Nelson's Sharp-tailed Sparrow	X							X
Bird	Northern Pintail		X			X			
Bird	Peregrine Falcon	X							X
Bird	Prothonotary Warbler		X						X
Bird	Snowy Egret								
Bird	Solitary Sandpiper	X							X
Bird	Trumpeter Swan	X							X
Bird	Upland Sandpiper				X		X		
Bird	Willow Flycatcher	X							X
Bird	Yellow Rail				X				X
Inve	Ozark Clubtail	X							X
Inve	Ozark Emerald	X							X
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Marsh Rice Rat				X				X
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		
Mamm	River Otter		X					X	
Mamm	Swamp Rabbit				X				X
Rept	Midland Smooth Softshell				X				X

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Rept	Spiny Softshell Turtle				X				X

Table C-7. Prairie Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Amph	Crawfish Frog				X				X
Bird	American Golden Plover		X						X
Bird	Bell's Vireo		X			X			
Bird	Buff-breasted Sandpiper	X				X			
Bird	Harris's Sparrow		X						X
Bird	Henslow's Sparrow	X							X
Bird	LeConte's Sparrow		X						X
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Red-headed Woodpecker		X			X			
Bird	Short-eared Owl				X				X
Bird	Smith's Longspur	X							X
Bird	Sprague's Pipit				X				X
Bird	Upland Sandpiper				X		X		
Inve	Byssus Skipper	X							X
Inve	Prairie Mole Cricket	X				X			
Inve	Rattlesnake Master Borer	X							X
Mamm	Eastern Harvest Mouse				X				X
Mamm	Eastern Spotted Skunk				X				X
Mamm	Long-tailed Weasel				X				X

Table C-8. Spring Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Amph	Grotto Salamander				X				X
Amph	Many-ribbed Salamander				X				X
Amph	Oklahoma Salamander				X				X
Amph	Ozark Salamander				X				X
Amph	Ringed Salamander				X				X
Bird	Louisiana Waterthrush		X						X
Fish	Arkansas Darter	X							X
Fish	Cardinal Shiner			X			X		
Fish	Ozark Minnow			X			X		
Fish	Plains Topminnow	X				X			
Fish	Redspot Chub		X				X		
Fish	Southern Brook Lamprey		X						X
Fish	Sunburst (Stippled) Darter		X				X		
Inve	Bowman's Cave Amphipod	X							X
Inve	Caecidotea acuticarpa	X							X
Inve	Caecidotea macropoda	X							X
Inve	Caecidotea simulator	X							X
Inve	Cave Crayfish	X					X		
Mamm	Eastern Small-footed Myotis				X				X
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		
Mamm	River Otter		X					X	

Table C-9. Gravel-bottom Streams and Associated Riparian Forests Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need	Status	Trend

Group	*Common Name*	*Low*	*Medium*	*Abundant*	*Unknown*	*Declining*	*Stable*	*Increasing*	*Unknown*
Amph	Grotto Salamander				X				X
Amph	Many-ribbed Salamander				X				X
Amph	Oklahoma Salamander				X				X
Amph	Ringed Salamander				X				X
Bird	American Woodcock	X							X
Bird	Bell's Vireo		X			X			
Bird	Kentucky Warbler		X						X
Bird	Little Blue Heron		X						X
Bird	Louisiana Waterthrush		X						X
Bird	Prothonotary Warbler		X						X
Bird	Red-headed Woodpecker		X			X			
Fish	Arkansas Darter	X							X
Fish	Blackside Darter		X				X		
Fish	Bluntface Shiner	X							X
Fish	Cardinal Shiner			X			X		
Fish	Longnose Darter	X							X
Fish	Ozark Minnow			X			X		
Fish	Plains Topminnow	X				X			
Fish	Redspot Chub		X				X		
Fish	River Darter	X					X		
Fish	Shorthead Redhorse	X							X
Fish	Southern Brook Lamprey		X						X
Fish	Sunburst (Stippled) Darter		X				X		
Fish	Wedgespot Shiner	X							X
Inve	Linda's Roadside Skipper	X							X
Inve	Little Spectaclecase			X			X		
Inve	Louisiana Fatmucket	X				X			
Inve	Ohio River Pigtoe	X				X			
Inve	Orconectes nana				X				X
Inve	Ouachita Creekshell	X				X			
Inve	Ouachita Kidneyshell		X			X			
Inve	Procambarus tenuis	X				X			

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Inve	Threeridge Mussel			X			X		
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		
Mamm	River Otter		X					X	
Mamm	Swamp Rabbit				X				X
Rept	Alligator Snapping Turtle				X				X
Rept	Eastern River Cooter				X				X
Rept	Midland Smooth Softshell				X				X
Rept	Mississippi Map Turtle				X				X
Rept	Northern Map Turtle				X				X
Rept	Ouachita Map Turtle				X				X

Table C-10. Small River Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Amph	Many-ribbed Salamander				X				X
Amph	Oklahoma Salamander				X				X
Bird	Bald Eagle	X						X	
Bird	Canvasback	X							X
Bird	Lesser Scaup		X			X			
Bird	Little Blue Heron		X						X
Bird	Louisiana Waterthrush		X						X
Bird	Prothonotary Warbler		X						X
Bird	Snowy Egret								
Bird	Solitary Sandpiper	X							X

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Bird	Trumpeter Swan	X							X
Fish	Alabama Shad	X							X
Fish	Blackside Darter		X				X		
Fish	Blue Sucker	X							X
Fish	Bluntface Shiner	X							X
Fish	Longnose Darter	X							X
Fish	Paddlefish		X				X		
Fish	Pallid Shiner (Chub)	X							X
Fish	Redspot Chub		X				X		
Fish	River Darter	X					X		
Fish	Shorthead Redhorse	X							X
Fish	Southern Brook Lamprey		X						X
Fish	Spotfin Shiner	X							X
Fish	Wedgespot Shiner	X							X
Inve	Bleufer			X			X		
Inve	Butterfly Mussel		X			X			
Inve	Elktoe	X				X			
Inve	Faxonella blairi				X				X
Inve	Little Spectaclecase			X			X		
Inve	Louisiana Fatmucket	X				X			
Inve	Monkeyface Mussel			X			X		
Inve	Neosho Mucket	X				X			
Inve	Ohio River Pigtoe	X				X			
Inve	Ouachita Creekshell	X				X			
Inve	Ouachita Kidneyshell		X			X			
Inve	Plain Pocketbook		X			X			
Inve	Purple Lilliput	X				X			
Inve	Rabbitsfoot	X				X			
Inve	Threeridge Mussel			X			X		
Inve	Wartyback Mussel		X				X		
Inve	Washboard			X			X		

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Inve	Western Fanshell	X				X			
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Northern Long-eared Myotis				X				X
Mamm	Ozark Big-eared Bat	X					X		
Mamm	River Otter		X					X	
Rept	Alligator Snapping Turtle				X				X
Rept	Eastern River Cooter				X				X
Rept	Midland Smooth Softshell				X				X
Rept	Mississippi Map Turtle				X				X
Rept	Ouachita Map Turtle				X				X
Rept	Spiny Softshell Turtle				X				X

Table C-11. Large River Species of Greatest Conservation Need (ODWC, 2005).

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Bird	American Golden Plover		X						X
Bird	Bald Eagle	X						X	
Bird	Canvasback	X							X
Bird	Lesser Scaup		X			X			
Bird	Little Blue Heron		X						X
Bird	Northern Pintail		X			X			
Bird	Peregrine Falcon	X							X
Bird	Prothonotary Warbler		X						X
Bird	Snowy Egret								
Bird	Solitary Sandpiper	X							X
Bird	Trumpeter Swan	X							X
Fish	Alligator Gar	X				X			
Fish	Blue Sucker	X							X
Fish	Paddlefish		X				X		
Fish	Pallid Shiner (Chub)	X							X
Fish	River Darter	X					X		
Fish	Shorthead Redhorse	X							X
Fish	Shovelnose Sturgeon	X							X
Inve	Black Sandshell	X				X			
Inve	Bleufer			X			X		
Inve	Monkeyface Mussel			X			X		
Inve	Ohio River Pigtoe	X				X			
Inve	Ozark Pigtoe	X							X
Inve	Plain Pocketbook		X			X			
Inve	Threeridge Mussel			X			X		
Inve	Washboard			X			X		
Mamm	Gray Myotis		X					X	
Mamm	Indiana Myotis	X				X			
Mamm	Northern Long-eared Myotis				X				X
Mamm	River Otter		X					X	

Species of Greatest Conservation Need		Status				Trend			
Group	***Common Name***	***Low***	***Medium***	***Abundant***	***Unknown***	***Declining***	***Stable***	***Increasing***	***Unknown***
Rept	Alligator Snapping Turtle				X				X
Rept	Eastern River Cooter				X				X
Rept	Midland Smooth Softshell				X				X
Rept	Mississippi Map Turtle				X				X
Rept	Ouachita Map Turtle				X				X
Rept	Spiny Softshell Turtle				X				X

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Appendix D: Vegetative Alliances

Table D-1. Plants Occurring on Ozark Plateau NWR (Survey by Dr. Ron Tyrl of OSU) (2001-2008).

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Acanthaceae	*Dicliptera brachiata* (Pursh) Spreng.	branched foldwing	occasional	native	DIBR2
Acanthaceae	*Ruellia humilis* Nutt.	fringed wild petunia	occasional	native	RUHU
Acanthaceae	*Ruellia pedunculata* Torr. ex A. Gray	stalked wild petunia	occasional	native	RUPE4
Aceraceae	*Acer negundo* L.	boxelder	occasional	native	ACNE2
Aceraceae	*Acer rubrum* L.	red maple	frequent	native	ACRU
Aceraceae	*Acer saccharum* Marsh.	sugar maple	frequent	native	ACSA3
Amaranthaceae	*Amaranthus hybridus* L.	slim amaranth	infrequent	native	AMHY
Anacardiaceae	*Rhus aromatica* Aiton	fragrant sumac	frequent	native	RHAR4
Anacardiaceae	*Rhus copallinum* L.	winged sumac	frequent	native	RHCO
Anacardiaceae	*Rhus glabra* L.	clustered beaksedge	frequent	native	RHGL3
Anacardiaceae	*Toxicodendron radicans* (L.) Kuntze	eastern poison ivy	frequent	native	TORA2
Annonaceae	*Asimina triloba* (L.) Dunal	pawpaw	occasional	native	ASTR
Apiaceae	*Anthriscus caucalis* M. Bieb.	burchervil	occasional	native	ANCA14
Apiaceae	*Chaerophyllum tainturieri* Hook.	hairyfruit chervil	occasional	native	CHTA
Apiaceae	*Daucus carota* L.	Queen Anne's lace	occasional	introduced	DACA6
Apiaceae	*Eryngium yuccifolium* Michx.	button eryngo	infrequent	native	ERYU
Apiaceae	*Osmorhiza longistylis* (Torr.) DC.	longstyle sweetroot	occasional	native	OSLO
Apiaceae	*Polytaenia nuttallii* DC.	Nutall's prairie parsley	frequent	native	PONU4
Apiaceae	*Sanicula canadensis* L.	Canadian blacksnakeroot	occasional	native	SACA15
Apiaceae	*Sanicula odorata* (Raf.) K.M. Pryer & L.R. Phillippe	clustered blacksnakeroot	occasional	native	SAOD
Apiaceae	*Spermolepis inermis* (Nutt. ex DC.) Mathias & Constance	Red River scaleseed	occasional	native	SPIN
Apiaceae	*Taenidia integerrima* (L.) Drude	yellow pimpernel	frequent	native	TAIN
Apiaceae	*Torilis arvensis* (Huds.) Link	spreading hedgeparsley	occasional	introduced	TORA

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Apiaceae	*Trepocarpus aethusae* Nutt. ex DC.	whitenymph	occasional	native	TRAE2
Apiaceae	*Zizia aurea* (L.) W.D.J. Koch	golden zizia	frequent	native	ZIAU
Apocynaceae	*Amsonia tabernaemontana* Walter	eastern bluestar	occasional	native	AMTA2
Apocynaceae	*Apocynum cannabinum* L.	Indian hemp	occasional	native	APCA
Aquifoliaceae	*Ilex decidua* Walter	possum haw	infrequent	native	ILDE
Araceae	*Arisaema dracontium* (L.) Schott	green dragon	infrequent	native	ARDR3
Araceae	*Arisaema triphyllum* (L.) Schott	Jack in the Pulpit	infrequent	native	ARTR
Aristolochiaceae	*Asarum canadense* L.	Canadian wild ginger	infrequent	native	ASCA11
Asclepiadaceae	*Asclepias quadrifolia* Jacq.	fourleaf milkweed	occasional	native	ASQU
Asclepiadaceae	*Asclepias tuberosa* L.	butterfly milkweed	infrequent	native	ASTU
Asclepiadaceae	*Asclepias variegata* L.	redring milkweed	occasional	native	ASVA
Asclepiadaceae	*Asclepias verticillata* L.	whorled milkweed	occasional	native	ASVE
Asclepiadaceae	*Cynanchum laeve* (Michx.) Pers.	honeyvine	occasional	native	CYLA
Asclepiadaceae	*Matelea baldwyniana* (Sweet) Woodson	Baldwin's milkvine	occasional	native	MABA3
Asclepiadaceae	*Matelea gonocarpos* (Walter) Shinners	angularfruit milkvine	occasional	native	MAGO
Aspleniaceae	*Asplenium platyneuron* (L.) Britton, Sterns & Poggenb.	ebony spleenwort	frequent	native	ASPL
Aspleniaceae	*Asplenium rhizophyllum* L.	walking fern	occasional	native	ASRH2
Asteraceae	*Achillea millefolium* L.	common yarrow	occasional	introduced	ACMI2
Asteraceae	*Ageratina altissima* (L.) King & H. Rob. var. *altissima*	white snakeroot	occasional	native	AGALA
Asteraceae	*Ambrosia artemisiifolia*	annual ragweed	frequent	native	AMAR2
Asteraceae	*Ambrosia bidentata* Michx.	lanceleaf ragweed	occasional	native	AMBI2
Asteraceae	*Ambrosia psilostachya* DC.	cuman ragweed	frequent	native	AMPS
Asteraceae	*Ambrosia trifida* L. [including both forma *trifida*and forma *integrifolia*]	great ragweed	frequent	native	AMTR
Asteraceae	*Amphiachyris dracunculoides* (DC.) Nutt.	prairie broomweed	frequent	native	AMDR
Asteraceae	*Antennaria parlinii* Fernald	Parlin's pussytoes	frequent	native	ANPA9
Asteraceae	*Antennaria parlinii* Fernald ssp. f*allax* (Greene) Bayer & Stebbins	Parlin's pussytoes	frequent	native	ANPAF

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Asteraceae	*Arctium minus* Bernh.	lesser burdock	occasional	introduced	ARMI2
Asteraceae	*Arnoglossum plantagineum* Raf.	groovestem indian plantain	occasional	native	ARPL4
Asteraceae	*Artemisia ludoviciana* Nutt.	white sagebrush	infrequent	native	ARLU
Asteraceae	*Astranthium integrifolium* (Michx.) Nutt.	entireleaf western daisy	infrequent	native	ASIN9
Asteraceae	*Bidens aristosa* (Michx.) Britton	bearded beggarticks	infrequent	native	BIAR
Asteraceae	*Bidens bipinnata* L.	Spanish needles	occasional	native	BIBI7
Asteraceae	*Centaurea americana* Nutt.	American starthistle	infrequent	native	CEAM2
Asteraceae	*Chrysopsis pilosa* Nutt.	soft goldenaster	occasional	native	CHPI8
Asteraceae	*Cirsium altissimum* (L.) Hill	tall thistle	occasional	native	CIAL2
Asteraceae	*Conoclinium coelestinum* (L.) DC.	bluemist flower	infrequent	native	COCO13
Asteraceae	*Conyza canadensis* (L.) Cronquist	Canadian horseweed	occasional	native	COCA5
Asteraceae	*Coreopsis lanceolata* L.	lanceleaf tickseed	occasional	native	COLA5
Asteraceae	*Coreopsis palmata* Nutt.	stiff tickseed	occasional	native	COPA10
Asteraceae	*Coreopsis pubescens* Elliot	startickseed	occasional	native	COPU2
Asteraceae	*Coreopsis tinctoria* Nutt.	golden tickseed	occasional	native	COTI3
Asteraceae	*Echinacea pallida* (Nutt.) Nutt.	pale purple coneflower	occasional	native	ECPA
Asteraceae	*Echinacea purpurea* (L.) Moench	eastern purple coneflower	occasional	native	ECPU
Asteraceae	*Elephantopus carolinianus* Raeusch.	carolina elephantsfoot	occasional	native	ELCA3
Asteraceae	*Erechtites hieraciifolia* (L.) Raf. ex DC.	American burnweed	occasional	native	ERHI2
Asteraceae	*Erigeron pulchellus* Michx.	robin's plantain	frequent	native	ERPU
Asteraceae	*Erigeron strigosus* Muhl. ex Willd.	prairie fleabane	frequent	native	ERST3
Asteraceae	*Eupatorium altissimum* L.	tall thoroughwort	frequent	native	EUAL3
Asteraceae	*Eupatorium serotinum* Michx.	lateflowering thoroughwort	occasional	native	EUSE2
Asteraceae	*Fleischmannia incarnata* (Walter) King & H. Rob.	pink thoroughwort	infrequent	native	FLIN2
Asteraceae	*Gamochaeta purpurea* (L.) Cabrera	spoonleaf purple everlasting	infrequent	native	GAPU3
Asteraceae	*Grindelia papposa* G.L. Nesom & Suh	Spanish gold	occasional	native	GRPA8

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Asteraceae	*Grindelia squarrosa* (Pursh) Dunal	curlycup gumweed	occasional	native	GRSQ
Asteraceae	*Helenium amarum* (Raf.) H. Rock	yellowdicks	occasional	native	HEAM
Asteraceae	*Helenium flexuosum* Raf.	purplehead sneezeweed	occasional	native	HEFL
Asteraceae	*Helianthus ×laetiflorus* Pers.	cheerful sunflower	infrequent	native	HELA
Asteraceae	*Helianthus grosseserratus* M. Martens	sawtooth sunflower	occasional	native	HEGR4
Asteraceae	*Helianthus hirsutus* Raf.	hairy sunflower	occasional	native	HEHI2
Asteraceae	*Helianthus mollis* Lam.	ashy sunflower	occasional	native	HEMO2
Asteraceae	*Heliopsis helianthoides* (L.) Sweet	smooth oxeye	occasional	native	HEHE5
Asteraceae	*Heterotheca subaxillaris* (Lam.) Britton & Rusby	camphorweed	occasional	native	HESU3
Asteraceae	*Heterotheca villosa* (Pursh) Shinners	hairy false goldenaster	occasional	native	HEVI5
Asteraceae	*Hieracium gronovii* L.	queendevil	occasional	native	HIGR3
Asteraceae	*Ionactis linariifolius* (L.) Greene	flaxleaf whitetop aster	rare	native	IOLI2
Asteraceae	*Lactuca canadensis* L.	Canada lettuce	occasional	native	LACA
Asteraceae	*Lactuca ludoviciana* (Nutt.) Riddell	biannual lettude	occasional	native	LALU
Asteraceae	*Leucanthemum vulgare* Lam.	oxeye daisy	occasional	introduced	LEVU
Asteraceae	*Liatris aspera* Michx.	tall blazing star	occasional	native	LIAS
Asteraceae	*Liatris elegans* (Walter) Michx.	pinkscale blazing star	occasional	native	LIEL
Asteraceae	*Liatris squarrosa (L.) Michx.*	scaly blazing star	occasional	native	LISQ
Asteraceae	*Mikania scandens* (L.) Willd.	climbing hempvine	occasional	native	MISC
Asteraceae	*Oligoneuron rigidum* (L.) Small var. rigidum	stiff goldenrod	occasional	native	OLRIR
Asteraceae	*Packera glabella* (Poir.) C. Jeffrey	butterweed	occasional	native	PAGL17
Asteraceae	*Packera obovata* (Muhl. ex Willd.) W.A. Weber & A. Löve	roundleaf ragwort	occasional	native	PAOB6
Asteraceae	*Parthenium integrifolium* L.	wild quinine	infrequent	native	PAIN2
Asteraceae	*Pluchea odorata* (L.) Cass.	sweetscent	occasional	native	PLOD
Asteraceae	*Polymnia canadensis* L.	whiteflower leafcup	occasional	native	POCA11
Asteraceae	*Pseudognaphalium obtusifolium* (L.) Hilliard & B.L. Burtt	rabbit tobacco	occasional	native	PSOB3

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Asteraceae	*Pyrrhopappus carolinianus* (Walt.)DC.	Carolina desert chicory	infrequent	native	PYCA
Asteraceae	*Ratibida pinnata* (Vent.) Barnhart	prairie coneflower	occasional	native	RAPI
Asteraceae	*Rudbeckia hirta* L.	blackeyed susan	occasional	native	RUHI2
Asteraceae	*Rudbeckia triloba* L.	browneyed susan	occasional	native	RUTR2
Asteraceae	*Smallanthus uvedalius* (L.) Mack. ex Small	hairy leafcup	occasional	native	SMUV
Asteraceae	*Solidago canadensis* L.	Canada goldenrod	frequent	native	SOCA6
Asteraceae	*Solidago hispida* Muhl. ex Willd.	hairy goldenrod	frequent	native	SOHI
Asteraceae	*Solidago missouriensis* Nutt.	missouri goldenrod	frequent	native	SOMI2
Asteraceae	*Solidago petiolaris* Aiton	downy ragged goldenrod	frequent	native	SOPE
Asteraceae	*Solidago ulmifolia* Muhl. ex Willd.	elmleaf goldenrod	frequent	native	SOUL2
Asteraceae	*Symphyotrichum anomalum* (Engelm.) G.L. Nesom	manray aster	frequent	native	SYAN2
Asteraceae	*Symphyotrichum drummondii* (Lindl.) G.L. Nesom var. *texanum* (Burgess) G.L. Nesom	Drummond's aster	frequent	native	SYDRT
Asteraceae	*Symphyotrichum oblongifolium* (Nutt.) G.L. Nesom	aromatic aster	frequent	native	SYOB
Asteraceae	*Symphyotrichum patens* (Aiton) G.L. Nesom var. *patens*	late purple aster	frequent	native	SYPAP2
Asteraceae	*Symphyotrichum turbinellum* (Lindl.) G.L. Nesom	smooth violet prairie aster	occasional	native	SYTU2
Asteraceae	*Taraxacum officinale* F.H. Wigg.	common dandelion	occasional	introduced	TAOF
Asteraceae	*Verbesina alternifolia* (L.) Britton ex Kearney	wingstem	occasional	native	VEAL
Asteraceae	*Verbesina helianthoides* Michx.	gravelweed	occasional	native	VEHE
Asteraceae	*Verbesina virginica* L.	white crownbeard	occasional	native	VEVI3
Asteraceae	*Vernonia baldwinii* Torr.	Baldwin's ironweed	occasional	native	VEBA
Asteraceae	*Vernonia gigantea* (Walter) Trel.	giant ironweed	occasional	native	VEGI
Balsaminaceae	*Impatiens capensis* Meerb.	jewelweed	occasional	native	IMCA
Balsaminaceae	*Impatiens pallida* Nutt.	pale touch me not	rare	native	IMPA
Berberidaceae	*Podophyllum peltatum* L.	mayapple	frequent	native	POPE
Betulaceae	*Ostrya virginiana* (Mill.) K. Koch	hophornbeam	occasional	native	OSVI
Bignoniaceae	*Campsis radicans* (L.) Seem. ex Bureau	trumpetcreeper	frequent	native	CARA2

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Bignoniaceae	*Catalpa speciosa* (Warder) Warder ex Engelm.	Northern catalpa	infrequent	native	CASP8
Boraginaceae	*Buglossoides arvensis* (L.) I.M. Johnst.	corn gromwell	infrequent	native	BUAR3
Boraginaceae	*Cynoglossum virginianum* L.	wild comfrey	infrequent	native	CYVI
Boraginaceae	*Hackelia virginiana* (L.) I.M. Johnst.	beggar's lice	occasional	native	HAVI2
Boraginaceae	*Lithospermum canescens* (Michx.) Lehm.	hoary puccoon	infrequent	native	LICA12
Boraginaceae	*Lithospermum multiflorum* Torr. ex A. Gray	manyflowered stoneseed	occasional	native	LIMU
Boraginaceae	*Myosotis verna* Engelm.	spring forget-me-not	occasional	native	MYVE1
Brassicaceae	*Arabis canadensis* L.	sicklepod	infrequent	native	ARCA
Brassicaceae	*Arabis laevigata* (Muhl. ex Willd.) Poir.	smooth rockcress	occasional	native	ARLA
Brassicaceae	*Arabis missouriensis* Greene	green rockcress	occasional	native	ARMI5
Brassicaceae	*Arabis shortii* (Fernald) Gleason	short's rockcress	rare	native	ARSH2
Brassicaceae	*Barbarea vulgaris* W.T. Aiton	garden yellowrocket	occasional	native	BAVU
Brassicaceae	*Cardamine concatenata* (Michx.) Sw.	cutleaf toothwort	infrequent	native	CACO26
Brassicaceae	*Cardamine parviflora* L.	sand bittercress	infrequent	native	CAPA12
Brassicaceae	*Lepidium densiflorum* Schrad.	common pepperweed	infrequent	native	LEDE
Brassicaceae	*Lepidum virginicum* L.	Virginia pepperweed	frequent	native	LEVI13
Brassicaceae	*Nasturtium officinale* W.T. Aiton	watercress	infrequent	introduced	NAOF
Cactaceae	*Opuntia macrorhiza* Engelm.	twistspine pricklypear	infrequent	native	OPMA2
Campanulaceae	*Campanulastrum americanum* (L.) Small	American bellflower	infrequent	native	CAAM18
Campanulaceae	*Lobelia appendiculata* A.DC.	pale lobelia	infrequent	native	LOAP
Campanulaceae	*Lobelia cardinalis* L.	cardinal flower	rare	native	LOCA2
Campanulaceae	*Lobelia inflata* L.	Indian tobacco	infrequent	native	LOIN
Campanulaceae	*Lobelia spicata* Lam.	palespike lobelia	infrequent	native	LOSP
Campanulaceae	*Lobelia siphilitica* L.	great blue lobelia	infrequent	native	LOSI
Campanulaceae	*Triodanis perfoliata* (L.) Nieuwl.	clasping Venus' looking glass	occasional	native	TRPE4
Capparaceae	*Cleome serrulata* Pursh	toothed spiderflower	infrequent	native	CLSE2

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
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Caprifoliaceae	*Sambucus nigra* L.	black elderberry	infrequent	native	SANI4
Caprifoliaceae	*Lonicera japonica Thunb.*	Japanese honeysuckle	infrequent	introduced	LOJA
Caprifoliaceae	*Symphoricarpos orbiculatus* Moench	coralberry	abundant	native	SYOR
Caprifoliaceae	*Viburnum prunifolium* L.	blach haw	frequent	native	VIPR
Caprifoliaceae	*Viburnum rufidulum* Raf.	rusty blackhaw	frequent	native	VIRU
Caryophyllaceae	*Dianthus armeria* L.	deptford pink	occasional	introduced	DIAR
Caryophyllaceae	*Minuartia patula* (Michx.) Mattf.	pitcher's stichwort	occasional	native	MIPA6
Caryophyllaceae	*Saponaria officinalis* L.	bouncing bet	occasional	introduced	SAOF4
Caryophyllaceae	*Silene regia* Sims	royal catchfly	occasional	native	SIRE2
Caryophyllaceae	*Silene stellata* (L.) W.T. Aiton	widiwsfrill	occasional	native	SIST
Caryophyllaceae	*Silene virginica* L.	firepink	occasional	native	SIVI4
Caryophyllaceae	*Stellaria media* (L.) Vill.	common chickweed	occasional	introduced	STME2
Celastraceae	*Euonymus atropurpureus* Jacq.	burningbush	infrequent	native	EUAT5
Chenopodiaceae	*Chenopodium album* L.	lambsquarters	occasional	introduced	CHAL7
Chenopodiaceae	*Chenopodium ambrosioides* L.	Mexican tea	infrequent	introduced	CHAM
Clusiaceae	*Hypericum hypericoides* (L.) Crantz	St Andrew's cross	occasional	native	HYHY
Clusiaceae	*Hypericum punctatum* Lam.	spotted St. John's wort	occasional	native	HYPU
Commelinaceae	*Commelina communis* L.	asiatic dayflower	occasional	introduced	COCO3
Commelinaceae	*Commelina erecta* L.	whitemouth dayflower	occasional	native	COER
Commelinaceae	*Tradescantia ohiensis* Raf.	bluejacket	occasional	native	TROH
Commelinaceae	*Tradescantia ozarkana* E.S. Anderson & Woodson	Ozark spiderwort	rare	native	TROZ
Convolvulaceae	*Ipomoea coccinea* L.	redstar	occasional	introduced	IPCO3
Convolvulaceae	*Ipomoea pandurata* (L.) G. Mey.	man of the earth	occasional	native	IPPA
Cornaceae	*Cornus drummondii* C.A. Mey.	roughleaf dogwood	abundant	native	CODR
Cornaceae	*Cornus florida* L.	flowering dogwood	abundant	native	COFL2
Cornaceae	*Nyssa sylvatica* Marsh.	blackgum	occasional	native	NYSY

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Crassulaceae	*Sedum pulchellum* Michx.	widowscross	infrequent	native	SEPU
Cucurbitaceae	*Melothria pendula* L.	Guadeloupe cucumber	occasional	native	MEPE3
Cupressaceae	*Juniperus virginiana* L.	Eastern redcedar	occasional	native	JUVI
Cuscutaceae	*Cuscuta pentagona* Engelm.	fiveangled dodder	infrequent	native	CUPE3
Cuscutaceae	*Cuscuta* sp.	dodder	occasional	native	CUSCU
Cyperaceae	*Carex albicans* Willd. ex Spreng.	whitetinge sedge	occasional	native	CAAL25
Cyperaceae	*Carex aureolensis* Steudel	goldenfruit sedge	occasional	native	n/a
Cyperaceae	*Carex cephalophora* Muhl. ex Willd.	oval-leaf sedge	infrequent	native	CACE
Cyperaceae	*Carex cherokeensis* Schwein.	Cherokee sedge	occasional	native	CACH3
Cyperaceae	*Carex digitalis* Willd.	slender woodland sedge	occasional	native	CADI5
Cyperaceae	*Carex festucacea* Schkuhr ex Willd.	fescue sedge	occasional	native	CAFE3
Cyperaceae	*Carex gracilescens* Steud.	slender looseflower sedge	rare	native	CAGR8
Cyperaceae	*Carex grisea* Wahlenb.	inflated narrowleaf sedge	occasional	native	CAGR24
Cyperaceae	*Carex hirsutella* Mack.	fuzzy wuzzy sedge	occasional	native	CAHI6
Cyperaceae	*Carex meadii* Dewey	Mead's sedge	occasional	native	CAME2
Cyperaceae	*Carex muehlenbergii* Schkur ex Willd.	Muhlenberg's sedge	infrequent	native	CAMU4
Cyperaceae	*Carex oligocarpa* Schkuhr ex Willd.	richwoods sedge	occasional	native	CAOL2
Cyperaceae	*Carex retroflexa* Muhl. ex Willd.	reflexed sedge	occasional	native	CARE9
Cyperaceae	*Carex socialis* Mohlenbr. & Schwegm.	low woodland sedge	infrequent	native	CASO
Cyperaceae	*Cyperus echinatus* (L.) Wood	globe flatsedge	occasional	native	CYEC2
Cyperaceae	*Cyperus lupulinus* (Spreng.) Marcks	Great Plains flatsedge	occasional	native	CYLU2
Cyperaceae	*Cyperus odorata* L.	fragrant flatsedge	infrequent	native	CYOD
Cyperaceae	*Cyperus strigosus* L.	strawcolored flatsedge	infrequent	native	CYST
Cyperaceae	*Eleocharis lanceolata* Fernald	daggerleaf spikerush	occasional	native	ELLA
Cyperaceae	*Luzula bulbosa* (Alph. Wood) Smyth & Smyth	bulbous woodrush	infrequent	native	LUBU
Cyperaceae	*Rhynchospora glomerata* (L.) Vahl	clustered beaksedge	occasional	native	RHGL3

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Cyperaceae	*Scirpus atrovirens* Willd.	green bulrush	infrequent	native	SCAT2
Cyperaceae	*Scirpus pendulus* Muhl.	rofous bulrush	occasional	native	SCPE4
Cyperaceae	*Scleria oligantha* Michx.	littlehead nutrush	occasional	native	SCOL2
Cyperaceae	*Dryopteris filix-mas* (L.) Schott	male fern	rare	native	DRFI2
Dioscoreaceae	*Dioscorea villosa* L.	wild yam	infrequent	native	DIVI4
Dryopteridaceae	*Cystopteris tennesseensis* Shayer	Tennessee bladder fern	occasional	native	CYTE3
Dryopteridaceae	*Polystichum acrostichoides* (Michx.) Schott	Christmas fern	frequent	native	POAC4
Dryopteridaceae	*Woodsia obtusa* (Spreng.) Torr.	bluntlobe cliff fern	occasional	native	WOOB2
Ebenaceae	*Diospyros virginiana* L.	common persimmon	occasional	native	DIVI5
Elaeagnaceae	*Elaeagnus angustifolia L.*	Russian olive	infrequent	native	ELAN
Ericaceae	*Vaccinium arboreum* Marsh.	farkleberry	abundant	native	VAAR
Euphorbiaceae	*Acalypha gracilens* Gray	slender threeseed mercury	occasional	native	ACGR2
Euphorbiaceae	*Acalypha monococca* (Engelm. ex A.Gray) Lill. W.Mill. & Gandhi	threeseed mercury	frequent	native	ACMO4
Euphorbiaceae	*Acalypha ostryifolia* Riddell	pineland threeseed mercury	occasional	native	ACOS
Euphorbiaceae	*Acalypha rhomboidea* Raf.	common threeseed mercury	occasional	native	ACRH
Euphorbiaceae	*Chamaesyce missurica* (Raf.) Shinners	prairie sandmat	occasional	native	CHMI8
Euphorbiaceae	*Chamaesyce nutans* (Lag.) Small	eyebane	occasional	native	CHNU9
Euphorbiaceae	*Croton glandulosus* L.	vente conmigo	occasional	native	CRGL2
Euphorbiaceae	*Croton lindheimerianus* Scheele	threeseed croton	occasional	native	CRLI2
Euphorbiaceae	*Croton monanthogynus* Michx.	prairie tea	occasional	native	CRMO6
Euphorbiaceae	*Crotonopsis michauxii* G.L. Webster	Michaux's croton	O	native	CRMI8
Euphorbiaceae	*Euphorbia corollata* L.	flowering spurge	occasional	native	EUCO10
Euphorbiaceae	*Euphorbia dentata* Michx.	toothed spurge	occasional	native	EUDE4
Euphorbiaceae	*Euphorbia spathulata* Lam.	warty spurge	occasional	native	EUSP
Euphorbiaceae	*Phyllanthus caroliniensis* Walter	Carolina leafflower	infrequent	native	PHCA9
Euphorbiaceae	*Albizia julibrissin* Durazz.	sliktree	infrequent	introduced	ALJU

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Fabaceae	*Amphicarpaea bracteata* (L.) Fernald	American hogpeanut	infrequent	native	AMBR2
Fabaceae	*Astragalus canadensis* L.	Canadian milkvetch	occasional	native	ASCA11
Fabaceae	*Astragalus racemosus* Pursh	cream milkvetch	infrequent	native	ASRA2
Fabaceae	*Baptisia bracteata* Muhl. ex Elliot var. *leucophaea* (Nutt.) Kartesz & Gandhi	longbract wild indigo	occasional	native	BABRL2
Fabaceae	*Cercis canadensis* L.	eastern redbud	frequent	native	CECA4
Fabaceae	*Chamaecrista fasciculata* (Michx.) Greene	partridge pea	occasional	native	CHFA2
Fabaceae	*Chamaecrista nictitans* (L.) Moench	sensitive partidge pea	occasional	native	CHNI2
Fabaceae	*Clitoria mariana* L.	Atlantic pigeonwings	occasional	native	CLMA4
Fabaceae	*Crotalaria sagitallis* L.	arrowhead rattlebox	occasional	native	CRSA4
Fabaceae	*Dalea candida* Michx. ex Willd.	white prairie clover	occasional	native	DACA7
Fabaceae	*Desmanthus illinoensis* (Michx.) MacMill. ex B.L. Rob. & Fernald	Illinois bundleflower	occasional	native	DEIL
Fabaceae	*Desmodium canescens* (L.) DC.	showy ticktrefoil	occasional	native	DECA8
Fabaceae	*Desmodium glutinosum* (Muhl. ex Willd.) Wood	pointedleaf ticktefoil	frequent	native	DEGL5
Fabaceae	*Desmodium laevigatum* (Nutt.) DC.	smooth ticktrefoil	occasional	native	DELA
Fabaceae	*Desmodium nudiflorum* (L.) DC.	nakedflower ticktrefoil	frequent	native	DENU4
Fabaceae	*Desmodium paniculatum* (L.) DC.	panicledleaf ticktrefoil	occasional	native	DEPA6
Fabaceae	*Desmodium pauciflorum* (Nutt.) DC.	fewflower ticktrefoil	rare	native	DEPA7
Fabaceae	*Desmodium rotundifolium* DC.	prostrate ticktrefoil	occasional	native	DERO3
Fabaceae	*Desmodium sessilifolium* (Torr.) Torr. & A.Gray	sessile ticktrefoil	occasional	native	DESE
Fabaceae	*Galactia regularis* (L.) Britton, Sterns & Poggenb.	eastern milkpea	infrequent	native	GARE2
Fabaceae	*Gleditsia triacanthos* L.	honey locust	infrequent	native	GLTR
Fabaceae	*Glycyrrhiza lepidota* Pursh	American licorice	infrequent	native	GLLE
Fabaceae	*Kummerowia stipulacea* (Maxim.) Makino	Korean clover	occasional	introduced	KUST
Fabaceae	*Lespedeza cuneata* (Dum. Cours.) G. Don	sericia lespedeza	occasional	introduced	LECU
Fabaceae	*Lespedeza frutescens* (L.) Hornem.	shrubby lespedeza	occasional	native	LEFR5
Fabaceae	*Lespedeza hirta* (L.) Hornem.	hairy lespedeza	occasional	native	LEHI2

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Fabaceae	*Lespedeza procumbens* Michx.	trailing lespedeza	occasional	native	LEPR
Fabaceae	*Lespedeza repens* (L.) W.Bart.	creeping lespedeza	infrequent	native	LERE2
Fabaceae	*Lespedeza violacea* (L.) Pers.	violet lespedeza	occasional	native	LEVI6
Fabaceae	*Lespedeza virginica* (L.) Britton	slender lespedeza	occasional	native	LEVI7
Fabaceae	*Melilotus alba* Medikus	white sweetclover	occasional	introduced	MEAL12
Fabaceae	*Melilotus officinalis* (L.) Lam.	yellow sweetclover	occasional	introduced	MEOF
Fabaceae	*Mimosa quadrivalvis* L.	fourvalve mimosa	occasional	native	MIQU2
Fabaceae	*Orbexilum pedunculatum* (Mill.) Rydb.	Sampson's snakeroot	infrequent	native	ORPE
Fabaceae	*Rhynchosia latifolia* Nutt. ex Torr. & A. Gray	prairie snoutbean	infrequent	native	RHLA5
Fabaceae	*Senna marilandica* (L.) Link	Maryland senna	infrequent	native	SEMA11
Fabaceae	*Strophostyles helvola* (L.) Elliott	amberique bean	occasional	native	STHE9
Fabaceae	*Strophostyles leiosperma* (Torr. & A. Gray) Piper	slickseed fuzzybean	occasional	native	STLE6
Fabaceae	*Strophostyles umbellata* (Muhl. ex Willd.) Britt.	pink fuzzybean	infrequent	native	STUM2
Fabaceae	*Stylosanthes biflora* (L.) Britton, Sterns & Poggenb.	Mexican umbrella fern	occasional	native	STBI2
Fabaceae	*Tephrosia virginiana* (L.) Pers.	Virginia tephrosia	occasional	native	TEVI
Fabaceae	*Trifolium campestre* Schreb.	field clover	occasional	introduced	TRCA5
Fabaceae	*Trifolium dubium* Sibth.	suckling clover	infrequent	introduced	TRDU2
Fabaceae	*Trifolium hybridum* L.	alsike clover	occasional	introduced	TRHY
Fabaceae	*Trifolium repens* L.	white clover	infrequent	introduced	TRRE3
Fabaceae	*Vicia minutiflora* F.G. Dietr.	pygmyflower vetch	occasional	native	VIMI
Fagaceae	*Castanea pumila* (L.) P. Mill. var. *ozarkensis* (Ashe) Tucker	Ozark chinkapin	rare	native	CAPUO
Fagaceae	*Quercus alba* L.	white oak	occasional	native	QUAL
Fagaceae	*Quercus falcata* Michx.	southern red oak	abundant	native	QUFA
Fagaceae	*Quercus macrocarpa* Michx.	buroak	abundant	native	QUMA2
Fagaceae	*Quercus marilandica* Münchh.	blackjack oak	abundant	native	QUMA3
Fagaceae	*Quercus muehlenbergii* Engelm.	chinkapin oak	abundant	native	QUMU

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Fagaceae	*Quercus prinoides* Willd.	dwarf chinkapin oak	occasional	native	QUPR
Fagaceae	*Quercus rubra* L.	Northern red oak	abundant	native	QURU
Fagaceae	*Quercus shumardii* Buckley	Shumard's oak	abundant	native	QUSH
Fagaceae	*Quercus stellata* Wangenh.	post oak	abundant	native	QUST
Fagaceae	*Quercus velutina* Lam.	black oak	abundant	native	QUVE
Fumariaceae	*Corydalis flavula* (Raf.) DC.	yellow fumewort	infrequent	native	COFL3
Fumariaceae	*Dicentra cucullaria* (L.) Bernh.	Dutchman's breeches	occasional	native	DICU
Geranianaceae	*Geranium carolinianum* L.	Carolina geranium	infrequent	native	GECA5
Geranianaceae	*Geranium maculatum* L.	spotted geranium	infrequent	native	GEMA
Hippocastanaceae	*Aesculus glabra* Willd.	Ohio buckeye	infrequent	native	AEGL
Hamamelidaceae	*Hamamilis vernalis* Sarg.	Ozark witchhazel	occasional	native	HAVE2
Hamamelidaceae	*Liquidambar styraciflua* L.	sweetgum	occasional	native	LIST2
Hydrangeaceae	*Hydrangea arborescens* L.	wild hydrangea	infrequent	native	HYAR
Iridaceae	*Belamcanda chinensis* (L.) DC.	blackberry lily	infrequent	introduced	BECH
Iridaceae	*Sisyrinchyium campestre* E.P. Bicknell	prairie blue-eyed grass	occasional	native	SICA9
Juglandaceae	*Carya alba* (L.) Nutt.	mockernut hickory	abundant	native	CAAL27
Juglandaceae	*Carya cordiformis* (Wangenh.) K. Koch	bitternut hickory	abundant	native	CACO15
Juglandaceae	*Carya glabra* (Mill.) Sweet	pignut hickory	abundant	native	CAGL8
Juglandaceae	*Carya ovalis* (Wangenh.) Sarg.	red hickory	abundant	native	CAOV3
Juglandaceae	*Carya ovata* (Mill.) K. Koch	shagbark hickory	abundant	native	CAOV2
Juglandaceae	*Carya texana* Buckley	black hickory	abundant	native	CATE9
Juglandaceae	*Juglans nigra* L.	black walnut	abundant	native	JUNI
Juncaceae	*Juncus interior* Wiegand	inland rush	occasional	native	JUIN2
Juncaceae	*Juncus marginatus* Rostk.	grassleaf rush	occasional	native	JUMA4
Juncaceae	*Juncus secundus* P. Beauv. ex Poir.	lopsided rush	occasional	native	JUSE
Juncaceae	*Juncus tenuis* Willd.	poverty rush	occasional	native	JUTE

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Juncaceae	*Luzula bulbosa* (Alph. Wood) Smyth & Smyth	bulbous woodrush	occasional	native	LUBU
Lamiaceae	*Blephilia ciliata* (L.) Benth.	downny pagoda-plant	frequent	native	BLCL
Lamiaceae	*Clinopodium arkansanum* (Nutt.) House	limestone calamint	infrequent	native	CLAR5
Lamiaceae	*Cunila origanoides* (L.) Britton	common dittany	occasional	native	CUOR
Lamiaceae	*Isanthus brachiatus* (L.) Britton, Sterns & Poggenb.	fluxweed	infrequent	native	ISBR3
Lamiaceae	*Lamium purpureum* L.	purple deadnettle	infrequent	introduced	LAPU2
Lamiaceae	*Lycopus americanus* Muhl. ex W.Bartram	American water horehound	occasional	native	LYAM
Lamiaceae	*Monarda bradburiana* Beck	Eastern beebalm	occasional	native	MOBR2
Lamiaceae	*Monarda citriodora* Cerv. ex Lag.	lemon beebalm	occasional	native	MOCI
Lamiaceae	*Monarda fistulosa* L.	wild bergamot	occasional	native	MOFI
Lamiaceae	*Monarda punctata* L.	spotted beebalm	infrequent	native	MOPU
Lamiaceae	*Monarda russeliana* Nutt. ex Sims	redpurple beebalm	occasional	native	MORU
Lamiaceae	*Perilla frutescens* (L.) Britton	beefsteak plant	frequent	introduced	PEFR4
Lamiaceae	*Prunella vulgaris* L.	common selfheal	occasional	native	PRVU
Lamiaceae	*Pycnanthemum albescens* Torr. & A.Gray	whiteleaf mountain mint	infrequent	native	PYAL
Lamiaceae	*Pycnanthemum tenuifolium* Schrad.	narrowleaf mountain mint	occasional	native	PYTE
Lamiaceae	*Salvia azurea* L.	azure bluesage	occasional	native	SAAZ
Lamiaceae	*Salvia lyrata* L.	lyreleaf sage	occasional	native	SALY2
Lamiaceae	*Scutellaria elliptica* Muhl.ex Spreng.	hairy skullcap	occasional	native	SCEL
Lamiaceae	*Scutellaria ovata* Hill.	heartleaf skullcap	occasional	native	SCOV
Lamiaceae	*Teucrium canadense* L.	Canada germander	occasional	native	TECA3
Lauraceae	*Lindera benzoin* (L.) Blume	northern spicebush	frequent	native	LIBE3
Lauraceae	*Sassafras albidum* (Nutt.) Nees	sassafras	frequent	native	SAAL5
Liliaceae	*Allium canadense* L.	meadow garlic	infrequent	native	ALCA3
Liliaceae	*Camassia scilloides* (Raf.) Cory	Atlantic camass	infrequent	native	CACS5
Liliaceae	*Erythronium albidum* Nutt.	white fawnlily	occasional	native	ERAL9

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Liliaceae	*Erythronium americanum* Ker Gawl.	dogtooth violet	occasional	native	ERAM5
Liliaceae	*Erythronium rostratum* W. Wolf	yellow troutlily	occasional	native	ERRO5
Liliaceae	*Maianthemum racemosum* (L.) Link ssp. *racemosum*	feathery false lily of the valley	infrequent	native	MARAR
Liliaceae	*Narcissus tazetta* L.	cream narcissus	infrequent	introduced	NATA2
Liliaceae	*Nothoscordum bivalve* (L.) Britton	crowpoison	occasional	native	NOBI2
Liliaceae	*Polygonatum biflorum* (Walter) Elliot	smooth Solomon's seal	infrequent	native	POBI2
Liliaceae	*Trillium viride* Beck	wood wakerobin	occasional	native	TRVI4
Liliaceae	*Trillium viridescens* Nutt.	tapertip wakerobin	occasional	native	TRVI5
Liliaceae	*Uvularia grandiflora* Sm.	largeflower bellwort	rare	native	UVGR
Lythraceae	*Cuphea viscosissima* Jacq.	blue waxweed	occasional	native	CUVI
Malvaceae	*Callirhoe digitata* Nutt.	winecup	occasional	native	CADI2
Malvaceae	*Sida spinosa* L.	prickly fanpetals	occasional	native	SISP
Menispermaceae	*Cocculus carolinus* (L.) DC.	carolina coralbead	occasional	native	COCA
Monotropaceae	*Monotropa uniflora* L.	Indianpipe	rare	native	MOUN3
Moraceae	*Maclura pomifera* (Raf.) C.K. Schneid.	osage orange	occasional	native	MAPO
Moraceae	*Morus rubra* L.	red mulberry	frequent	native	MORU2
Nyctaginaceae	*Mirabilis albida* (Walter) Heimerl	white four o'clock	occasional	native	MIAL4
Oleaceae	*Fraxinus americana* L.	white ash	frequent	native	FRAM2
Oleaceae	*Fraxinus pennsylvanica* Marsh.	green ash	frequent	native	FRPE
Onagraceae	*Gaura longiflora* Spach.	longflower beeblossom	occasional	native	GALO3
Onagraceae	*Ludwigia decurrens* Walter	wingleaf primrose willow	occasional	native	LUDE4
Onagraceae	*Oenothera biennis* L.	common evening primrose	occasional	native	OEBI
Onagraceae	*Oenothera fruticosa* L.	narrowleaf evening primrose	infrequent	native	OEFR
Onagraceae	*Oenothera macrocarpa* Nutt.	bigfruit evening primrose	infrequent	native	OEMA
Ophioglossaceae	*Botrychium biternatum* (Sav.) Underw.	sparseglobe bitternatum	occasional	native	BOBOI
Ophioglossaceae	*Botrychium virginianum* (L.) Sw.	rattlesnake fern	occasional	native	BOVI

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Orchidaceae	*Corallorhiza odontorhiza* (Willd.) Poir.	autumn coralroot	rare	native	COOD7
Orchidaceae	*Spiranthes cernua* (L.) Rich.	nodding lady's tresses	infrequent	native	SPCE
Orchidaceae	*Spiranthes tuberosa* Raf.	little lady's tresses	infrequent	native	SPTU
Orchidaceae	*Triphora trianthophora* (Sw.) Rydb.	threebirds orchid	infrequent	native	TRTR3
Oxalidaceae	*Oxalis dillenii* Jacq.	slender yellow woodsorrel	infrequent	native	OXDI2
Oxalidaceae	*Oxalis violaceae* L.	violet woodsorrel	infrequent	native	OXVI
Papaveraceae	*Sanguinaria canadensis* L.	bloodroot	occasional	native	SACA13
Passifloraceae	*Passiflora incarnata* L.	purple passionflower	infrequent	native	PAIN6
Passifloraceae	*Passiflora lutea* L.	yellow passionflower	infrequent	native	PALU2
Phytolaccaceae	*Phytolacca americana* L.	American pokeweed	occasional	native	PHAM4
Pinaceae	*Pinus echinata* Mill.	shortleaf pine	infrequent	native	PIEC2
Plantaginaceae	*Plantago aristata* Michx.	largebracted plantain	occasional	native	PLAR3
Plantaginaceae	*Plantago elongata* Pursh	prairie plantain	occasional	native	PLEL
Plantaginaceae	*Plantago lanceolata* L.	narrowleaf plantain	occasional	introduced	PLLA
Plantaginaceae	*Plantago major* L.	common plantain	occasional	native	PLMA2
Plantaginaceae	*Plantago patagonica* Jacq.	wooly plantain	occasional	native	PLPA2
Plantaginaceae	*Plantago rugelii* Decne.	blackseed plantain	occasional	native	PLRU
Plantaginaceae	*Plantago virginica* L.	Virginia plantain	occasional	native	PLVI
Platanaceae	*Platanus occidentalis* L.	American sycamore	occasional	native	PLOC
Poaceae	*Agrostis hyemalis* (Walter) Britton, Sterns & Poggenb.	winter bentgrass	occasional	native	AGHY
Poaceae	*Agrostis perennans* (Walter) Tuck.	upland bentgrass	occasional	native	AGPE
Poaceae	*Aira elegans* Willd. ex Kunth	annual silver hairgrass	occasional	introduced	AIEL4
Poaceae	*Andropogon gerardii* Vitman	big bluestem	occasional	native	ANGE
Poaceae	*Andropogon ternarius* Michx.	splitbeard bluestem	occasional	native	ANTE2
Poaceae	*Andropogon virginicus* L.	broomsedge bluestem	occasional	native	ANVI2
Poaceae	*Aristida dichotoma* Michx.	churchmouse threeawn	occasional	native	ARDI4

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Poaceae	*Aristida purpurea* Nutt.	purple threeawn	occasional	native	ARPU9
Poaceae	*Arundinaria gigantea* (Walt.) Muhl.	giant cane	rare	native	ARGI
Poaceae	*Brachyelytrum erectum* (Schreb. ex Spreng.) P.Beauv	bearded shorthusk	frequent	native	BRER2
Poaceae	*Bromus arvensis* L.	field brome	infrequent	introduced	BRAR5
Poaceae	*Bromus pubescens* Muhl. ex Willd.	hairy woodland brome	occasional	native	BRPU6
Poaceae	*Chasmanthium latifolium* (Michx.) Yates	Indian woodoats	occasional	native	CHLA5
Poaceae	*Cinna arundinacea* L.	sweet woodreed	occasional	native	CIAR2
Poaceae	*Dactylis glomerata* L.	orchard grass	occasional	introduced	DAGL
Poaceae	*Danthonia spicata* (L.) P. Beauv. ex Roem. & Schult.	poverty oat grass	frequent	native	DASP
Poaceae	*Diarrhena americana* P. Beauv.	American beakgrain	rare	native	DIAM
Poaceae	*Diarrhena obovata* (Gleason) Brandenburg	obovate beakgrain	occasional	native	DIOB3
Poaceae	*Dichanthelium acuminatum* (Sw.) Gould & C.A. Clark	tapered rosette grass	occasional	native	DIAC2
Poaceae	*Dichanthelium boscii* (Poir.) Gould & C.A.Clark	Bosc's panicgrass	occasional	native	DIBO
Poaceae	*Dichanthelium laxiflorum* (Lam.) Gould	openflower rosette grass	occasional	native	DILA9
Poaceae	*Dichanthelium linearifolium* (Scribn. ex Nash) Gould	slimleaf panicgrass	infrequent	native	DILI2
Poaceae	*Dichanthelium malacophyllum* (Nash) Gould	softleaf rosette grass	occasional	native	DIMA5
Poaceae	*Dichanthelium oligosanthes* (Schult.) Gould	Heller's rosette grass	occasional	native	DIOL
Poaceae	*Dichanthelium ravenelii* (Scribn. & Merr.) Gould	Ravenel's rosette grass	frequent	native	DIRA
Poaceae	*Dichanthelium sphaerocarpon* (Ell.) Gould	roundseed panicgrass	occasional	native	DISP2
Poaceae	*Digitaria cognata* (Schult.) Pilg.	fall witchgrass	frequent	native	DICO6
Poaceae	*Digitaria sanguinalis* (L.) Scop.	hairy crabgrass	occasional	native	DISA
Poaceae	*Digitaria violascens* Link	violet crabgrass	occasional	introduced	DIVI2
Poaceae	*Echinochloa crus-galli* (L.) P. Beauv.	barnyardgrass	occasional	native	ECCR
Poaceae	*Elymus hystrix* L.	eastern bottlebrush grass	rare	native	ELHY
Poaceae	*Elymus virginicus* L.	Virginia wildrye	frequent	native	ELVI3
Poaceae	*Eragrostis hirsuta* (Michx.) Nees	bigtop lovegrass	frequent	native	ERHI

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Poaceae	*Eragrostis intermedia* Hitchc.	plains lovegrass	frequent	native	ERIN
Poaceae	*Eragrostis spectabilis* (Pursh) Steud.	purple lovegrass	frequent	native	ERSP
Poaceae	*Festuca subverticillata* (Pers.) Alexeev	nodding fescue	frequent	native	FESU3
Poaceae	*Glyceria striata* (Lam.) Hitchc.	fowl mannagrass	occasional	native	GLST
Poaceae	*Leersia virginica* Willd.	white grass	infrequent	native	LEVI2
Poaceae	*Melica nitens* (Scribn.) Nutt. ex Piper	threeflower melic grass	infrequent	native	MENI
Poaceae	*Microstegium vimineum* (Trin.) A. Camus	Nepalese browntop	frequent	introduced	MIVI
Poaceae	*Muhlenbergia sobolifera* (Muhl. ex Willd.) Trin.	rock muhly	occasional	native	MUSO
Poacee	*Panicum anceps* Michx.	beaked panicgradd	occasional	native	PAAN
Poaceae	*Panicum flexile* (Gattinger) Scribn.	wiry panicgrass	occasional	native	PAFL
Poaceae	*Panicum philadelphicum* Bernh. ex Trin.	Philadelphia panicgrass	occasional	native	PAPH
Poaceae	*Poa annua* L.	annual bluegrass	occasional	introduced	POAN
Poaceae	*Poa compressa* L.	canada bluegrass	occasional	introduced	POCO
Poaceae	*Poa sylvestris* A. Gray	woodland bluegrass	occasional	native	POSY
Poaceae	*Schizachyrium scoparium* (Michx.) Nash	little bluestem	frequent	native	SCSC
Poaceae	*Setaria parviflora (Poir.) Kerguélen*	marsh bristlegrass	occasional	native	SEPA10
Poaceae	*Setaria pumila* (Poir.) Roem. & Schult.	yellow foxtail	frequent	native	SEPU8
Poaceae	*Sorghum halepense* (L.) Pers.	Johnsongrass	infrequent	introduced	SOHA
Poaceae	*Sphenopholis obtusata* (Michx.) Scribn.	prairie wedgescale	infrequent	native	SPOB
Poaceae	*Sporobolus compositus* (Poir.) Merr. var. *compositus*	composite dropseed	frequent	native	SPCOC2
Poaceae	*Steinchisma hians* (Elliot) Nash	gaping grass	occasional	native	STHI
Poaceae	*Tridens flavus* (L.) Hitchc.	purpletop tridens	frequent	native	TRFL2
Poaceae	*Vulpia octoflora* (Walter) Rydb.	sixweeks fescue	frequent	native	VUOC
Polemoniaceae	*Phlox divaricata* L.	wild blue phlox	frequent	native	PHDI5
Polemoniaceae	*Phlox pilosa* L.	downy phlox	frequent	native	PHPI
Polygonaceae	*Polygonum convolvulus* L.	black bindweed	occasional	introduced	POCO10

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Polygonaceae	*Polygonum hydropiperoides* Michx.	swamp smartweed	occasional	native	POHY2
Polygonaceae	*Polygonum pensylvanicum* L.	Pennsylvania smartweed	occasional	native	POPE2
Polygonaceae	*Polygonum persicaria* L.	spotted ladysthumb	occasional	native	POPE3
Polygonaceae	*Polygonum punctatum* Elliot	dotted smartweed	occasional	native	POPU5
Polygonaceae	*Polygonum scandens* L.	climbing false buckwheat	occasional	native	POSC3
Polygonaceae	*Polygonum setaceum* Baldw.	bog smartweed	occasional	native	POSE6
Polygonaceae	*Polygonum virginianum* L.	jumpseed	occasional	native	POVI2
Polygonaceae	*Rumex crispus* L.	curly dock	occasional	native	RUCR
Polypodiaceae	*Pleopeltis polypodioides* (L.) Andrews & Windham	ressurection fern	occasional	native	PLPO2
Portulacaceae	*Claytonia virginica* L.	Virginia springbeauty	occasional	native	CLVI3
Portulacaceae	*Phemeranthus parviflora* (Nutt.) Kiger	sunbright	infrequent	native	PHPA29
Primulaceae	*Dodecatheon meadia* L.	pride of Ohio	infrequent	native	DOME
Primulaceae	*Samolus valerandi* L.	seaside brookweed	infrequent	native	SAVA3
Pteridaceae	*Adiantum pedatum* L.	northern maidenhair	occasional	native	ADPE
Pteridaceae	*Cheilanthes alabamensis* (Buckl.) Kunze	Alabama lipfern	occasional	native	CHAL5
Petidaceae	*Cheilanthes lanosa* (Michx.) D.C. Eaton	hairy lipfern	occasional	native	CHLA2
Pteridaceae	*Pellaea atropurpurea* (L.) Link	purple cliffbreak	occasional	native	PEAT2
Ranunculaceae	*Anemone virginiana* L.	tall thimbleweed	occasional	native	ANVI3
Ranunculaceae	*Aquilegia canadensis* L.	red columbine	infrequent	native	AQCA
Ranunculaceae	*Clematis versicolor* Small ex Rydb.	pale leather flower	infrequent	native	AQVE
Ranunculaceae	*Clematis virginiana L.*	devil's darning needles	infrequent	native	CLVI5
Ranunculaceae	*Delphinium carolinianum* Walter	Carolina larkspur	infrequent	native	DECA8
Ranunculaceae	*Delphinium tricorne* Michx.	dwarf larkspur	infrequent	native	DETR
Ranunculaceae	*Enemion biternaturm* Raf.	eastern false rue anemone	occasional	native	ENBI
Ranunculaceae	*Ranunculus fascicularis* Muhl. ex Bigelow	early buttercup	occasional	native	RAFA
Ranunculaceae	*Ranunculus harveyi* (A. Gray) Britton	Harvey's buttercup	occasional	native	RAHA

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Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Ranunculaceae	*Ranunculus micranthus* Nutt.	rock buttercup	infrequent	native	RAMI2
Ranunculaceae	*Ranunculus sardous* Crantz	hairy buttercup	occasional	introduced	RASA
Raunculaceae	*Ranunculus scleratus* L.	cursed buttercup	infrequent	native	RASC3
Rhamnaceae	*Thalictrum thalictroides* (L.) Eames & B. Boivin	rue anemone	occasional	native	THTH2
Rhamnaceae	*Ceanothus americanus* L.	New Jersey tea	occasional	native	CEAM
Rhamnaceae	*Ceanothus herbaceus* Raf.	Jersey tea	occasional	native	CEHE
Rosaceae	*Frangula caroliniana* (Walter) A. Gray	Carolina buckthorn	occasional	native	FRCA13
Rosaceae	*Agrimonia pubescens* Wallr.	soft agrimony	infrequent	native	AGPU
Rosaceae	*Crataegus crus-galli* L.	cockspur hawthorn	occasional	native	CRCR2
Rosaceae	*Fragaria virginiana* Duchesne	Virginia strawberry	occasional	native	FRVI
Rosaceae	*Galium aparine* L.	stickywilly	occasional	native	GAAP2
Rosaceae	*Geum canadense* Jacq.	white avens	occasional	native	GECA7
Rosaceae	*Geum vernum* (Raf.) Torr. & A. Gray	spring avens	occasional	native	GEVE
Rosaceae	*Gillenia stipulata* (Muhl. ex Willd.) Baill.	American ipecac	occasional	native	GIST5
Rosaceae	*Potentilla recta* L.	sulphur cinquefoil	occasional	introduced	PORE5
Rosaceae	*Prunus americana* Marsh.	American plum	occasional	native	PRAM
Rosaceae	*Prunus mexicana* S.Wats.	Mexican plum	occasional	native	PRME
Rosaceae	*Prunus persica* (L.) Batsch	peach	infrequent	introduced	PRPE3
Rosaceae	*Rosa carolina* L.	Carolina rose	occasional	native	ROCA4
Rosaceae	*Rosa multiflora* Thunb.	multiflora rose	occasional	introduced	ROMU
Rosaceae	*Rosa woodsii* Lindl.	Wood's rose	rare	native	ROWO
Rosaceae	*Rubus aboriginum* Rydb.	garden dewberry	occasional	native	RUAB
Rosaceae	*Rubus allegheniensis* Porter	Allegheny blackberry	occasional	native	RUAL
Rosaceae	*Rubus occidentalis* L.	black raspberry	occasional	native	RUOC
Rosaceae	*Spiraea prunifolia* Sieb. & Zucc.	bridalwreath spirarea	rare	introduced	SPPR
Rubiaceae	*Cephalanthus occidentalis* L.	common buttonush	infrequent	native	CEOC2

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Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Rubiaceae	*Diodia teres* Walter	poorjoe	occasional	native	DITE2
Rubiaceae	*Diodia virginiana* L.	Virginiana buttonweed	infrequent	native	DIVI3
Rubiaceae	*Galium aparine* L.	stickywilly	occasional	native	GAAP2
Rubiaceae	*Galium arkansansum* A.Gray	Arkansas bedstraw	infrequent	native	GAAR4
Rubiaceae	*Galium pilosum* Aiton	hairy bedstraw	occasional	native	GAPI2
Rubiaceae	*Galium triflorum* Michx.	fragrant bedstraw	infrequent	native	GATR3
Rubiaceae	*Houstonia caerulea* L.	azure bluet	occasional	native	HOCA4
Rubiaceae	*Houstonia ouachitana* (E.B. Sm.) Terrell	Ouachita bluet	occasional	native	HOOU
Rubiaceae	*Houstonia purpurea* Schoepf	Venus's pride	infrequent	native	HOPUP3
Rubiaceae	*Houstonia pusilla* Schoepf	tiny bluet	occasional	native	HOPU3
Salicaceae	*Populus deltoides* Bartram ex Marsh.	eastern cottonwood	frequent	native	PODE3
Salicaceae	*Salix caroliniana* Michx.	coastal plains willow	occasional	native	SACA5
Sapotaceae	*Sideroxylon lanuginosum* Michx. ssp. *lanuginosum*	gumbully	frequent	native	SILAL3
Saxifragaceae	*Heuchera americana* L.	American alumroot	occasional	native	HEAM6
Saxifragaceae	*Penthorum sedoides* L.	ditch stonecrop	infrequent	native	PESE6
Saxifragaceae	*Saxifraga virginiensis* Michx.	early saxifrage	occasional	native	SAVI5
Scrophulariaceae	*Agalinis tenuifolia* (Vahl) Raf.	slenderleaf false foxglove	occasional	native	AGTE3
Scrophulariaceae	*Aureolaria grandiflora* (Benth.) Pennell	large yellow foxglove	occasional	native	AUGR
Scrophulariaceae	*Collinsia violacea* Nutt.	violet blue-eyed Mary	occasional	native	COVI2
Scrophulariaceae	*Lindernia dubia* (L.) Pennell	yellowseed false pimpernel	infrequent	native	LIDU
Scrophulariaceae	*Mimulus alatus* Aiton	sharpwing monkey flower	occasional	native	MIAL2
Scrophulariaceae	*Pedicularis canadensis* L.	Canadian lousewort	occasional	native	PECA
Scrophulariaceae	*Penstemon tubiflorus* Nutt.	white wand beardtongue	occasional	native	PETU
Scrophulariaceae	*Scrophularia marilandica* L.	carpenter's square	occasional	native	SCMA2
Scrophulariaceae	*Verbascum blattaria* L.	moth mullein	occasional	introduced	VEBL
Scrophulariaceae	*Verbascum thapsus* L.	common mullien	infrequent	introduced	VETH

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Scrophulariaceae	*Veronica arvensis* L.	corn speedwell	infrequent	introduced	VEAR
Scrophulariaceae	*Veronica polita* Fr.	gray field speedwell	infrequent	introduced	VEPO
Smilacaceae	*Smilax bona-nox* L.	saw greenbrier	occasional	native	SMBO2
Smilacaceae	*Smilax herbacea* L.	smooth carrionflower	occasional	native	SMHE
Smilacaceae	*Smilax rotundiflora* L.	roundleaf greenbrier	occasional	native	SMRO
Solanaceae	*Datura stramonium* L.	jimsonweed	infrequent	introduced	DAST
Solanaceae	*Physalis longifolia* Nutt.	longleaf groundcherry	infrequent	native	PHLO4
Solanaceae	*Physalis pubescens* L.	husk tomato	infrequent	native	PHPU7
Solanaceae	*Solanum carolinense* L.	Carolina horsenettle	infrequent	native	SOCA3
Solanaceae	*Solanum elaeagnifolium* Cav.	silverleaf nightshade	infrequent	native	SOEL
Solanaceae	*Solanum ptychanthum* Dunal	West Indian nightshade	occasional	native	SOPT3
Staphyleaceae	*Staphylea trifolia* L.	American bladdernut	infrequent	native	STTR
Tiliaceae	*Tilia amaricana* L.	American basswood	infrequent	native	TIAM
Ulmaceae	*Celtis laevigata* Willd.	sugarberry	frequent	native	CELA
Ulmaceae	*Celtis occidentalis* L.	common hackberry	frequent	native	CEOC
Ulmaceae	*Ulmus alata* Michx.	winged elm	frequent	native	ULAL
Ulmaceae	*Ulmus americana* L.	American elm	frequent	native	ULAM
Ulmaceae	*Ulmus rubra* Muhl.	slippery elm	frequent	native	ULRU
Urticaceae	*Boehmeria cylindrica* (L.) Sw.	smallspike false nettle	infrequent	native	BOCY
Urticaceae	*Parietaria pensylvanica* Muhl. ex Willd.	Pennsylvania pellitory	occasional	native	PAPE5
Urticaceae	*Pilea pumila* (L.) A.Gray	Canadian clearweed	occasional	native	PIPU2
Urticaceae	*Urtica chamaedryoides* Pursh	heartleaf nettle	rare	native	URCH3
Urticaceae	*Urtica dioica* L.	stinging nettle	frequent	native	URDI
Valerianaceae	*Valerianella radiata* (L.) Dufr.	beaked cornsalad	occasional	native	VARA
Verbenaceae	*Callicarpa americana* L.	American beauty	occasional	native	CAAM2
Verbenaceae	*Glandularia canadensis* (L.) Nutt.	rose mock vervain	occasional	native	GLCA2

LIST OF SPECIES	COLLECTED IN 6 TRACTS OF OPNWR (2001-2008)				
Family	**Species**	**Common name**	**Abundance**	**U.S. Nativity**	**PLANTS symbol**
Verbenaceae	*Phryma leptostachya* L.	American lopseed	occasional	native	PHLE5
Verbenaceae	*Verbena bonariensis* L.	purpletop vervain	occasional	introduced	VEBO
Verbenaceae	*Verbena simplex* Lehm.	narrowleaf vervain	occasional	native	VESI
Verbenaceae	*Verbena stricta* Vent.	hoary verbena	occasional	native	VEST
Verbenaceae	*Verbena urticifolia* L.	white vervain	occasional	native	VEUR
Violaceae	*Viola bicolor* Pursh	field pansy	occasional	native	VIBI
Violaceae	*Viola lanceolata* L.	bog white violet	occasional	native	VILA4
Violaceae	*Viola pedata* L.	birdfoot violet	occasional	native	VIPE
Violaceae	*Viola pubescens* Aiton	downy yellow violet	occasional	native	VIPU3
Violaceae	*Viola sagittata* Aiton	arrowleaf violet	occasional	native	VISA2
Violaceae	*Viola sororia* Willd.	common blue violet	occasional	native	VISO
Vitaceae	*Viola triloba* Schwein.	three lobed violet	occasional	native	VITR2
Vitaceae	*Parthenocissus quinquefolia* (L.) Planch.	Virginia creeper	frequent	native	PAQU2
Vitaceae	*Vitis cinerea* (Engelm.) Engelm. ex Millard	graybark grape	occasional	native	VICI2
Vitaceae	*Vitis mustangensis* Buckley	mustang grape	rare	native	VIMU2
Vitaceae	*Vitis rotundifolia* Michx.	muscadine	occasional	native	VIRO3
Vitaceae	*Vitis vulpina* L.	frost grape	frequent	native	VIVU

Appendix E: Wilderness Review

1.0 Introduction

Wilderness Reviews (Reviews) are a required element of Comprehensive Conservation Plans (CCP), and each refuge must follow the Review process outlined in 602 FW 1-3 and 610 FW 1-4. The process includes interagency and tribal coordination, public involvement, and National Environmental Policy Act (NEPA) compliance (610 FW 4.4 A). The purpose of the Review is to identify lands and waters that merit inclusion in the National Wilderness Preservation System (NWPS) and recommend suitable lands for Congressional designation (610 FW 4.4 A).

There are three phases to the Review process: (1) inventory; (2) study; and (3) recommendation. During the inventory phase, we identify lands and waters that meet the minimum criteria for Wilderness designation (610 FW 4.4 B). Lands and waters that meet the minimum criteria for designation are called Wilderness Study Areas (WSAs). In the study phase, we assess a range of management alternatives to determine if a WSA is suitable for Wilderness designation and corresponding management or if management under an alternate set of goals and objectives is more appropriate (610 FW 4.12 A). The findings of the study phase determine whether we will recommend a WSA for designation in the final CCP. If we determine that the Refuge contains lands and/or waters that are suitable for Wilderness designation, we report the recommendation from the Director through the Secretary and the President to Congress in a subsequent Wilderness Study Report (610 FW 4.4).

The following team was assembled to perform the Ozark Plateau NWR's Wilderness Review:

Table E-1. Wilderness Review Team

Team Member	Title/Affiliation	Email
Steve Hensley	Refuge Manager	Steve_hensley@fws.gov
Shea Hammond	Refuge Operations Specialist	Shea_hammond@fws.gov
Richard Stark	ES Biologist	Richard_stark@fws.gov
Sarah Catchot	Planning Team Leader	Sarah_catchot@fws.gov

2.0 Wilderness Inventory

Section 2 (c) of the Wilderness Act states that Wilderness is an area that is "untrammeled by man, where man himself is a visitor who does not remain." The Act identifies the minimum criteria that an area must meet to be eligible for Wilderness. U.S. Fish and Wildlife Service policy states that we use the Act's minimum criteria to identify potential Wilderness areas. These criteria include size, apparent naturalness, and outstanding opportunities for solitude or primitive recreation. Supplemental values are evaluated and documented but are not required for

a WSA. Ozark Plateau NWR's Wilderness Review Team met on September 21, 2011 to perform the inventory phase of the review.

2.1 Identification of Lands that Meet the Size Criteria

First, the team identified lands that meet the size criteria outlined by 610 FW 4.8 and described below:

- An area with more than 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
- A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features (610 FW 1.5 Z).
- An area of less than 5,000 contiguous acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- An area of less than 5,000 contiguous Federal acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the Forest Service, National Park Service, or Bureau of Land Management.

Lands and waters that meet any of these four size criteria are identified as inventory units during the review process. Ozark Plateau NWR contains (1) inventory unit that meet the size criteria. These lands and waters are identified in the Figure E-1 map and each inventory unit is evaluated for Wilderness criteria in Table E-2.

2.2 Evaluation of the Naturalness Criteria

Section 2 (c) of the Wilderness Act defines Wilderness as an area that "…generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable." In addition to the size criteria, U.S. Fish and Wildlife Service policy states that an inventory unit must meet the naturalness criteria to qualify as a WSA. Although the area must appear natural to the average visitor, policy does not require that the land is in a pristine historic state (610 FW 4.9 A). During the inventory phase, the team evaluated each inventory unit and deemed (0) units to qualify under the naturalness criteria. The findings are noted in Table E-2.

2.3 Evaluation of Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

In addition to meeting the size and naturalness criteria, an inventory unit must provide outstanding opportunities for solitude or primitive recreation to qualify as a WSA. The Wilderness Act does not define what was intended by solitude or a primitive and unconfined

type of recreation. The Service, however, defines solitude as "a state of mind, a mental freedom that emerges from settings where visitors experience nature essentially free of the reminds of society, its inventions, and conventions; privacy and isolation are important components, but solitude is enhanced by the absence of distractions, such as large groups, mechanization, unnatural noise and light, unnecessary managerial presence (such as signs), and other modern artifacts (610 FW 1.5 AA)." The Service defines primitive and unconfined recreation as "activities that provide dispersed, undeveloped recreation and do not generally require permanent facilities (610 FW 1.5 R)." According to 610 FW 4.10, an area does not need to have outstanding opportunities for both solitude and primitive recreation nor does the area need to have outstanding opportunities on every acre.

During the inventory process, the Wilderness Review Team deemed (0) units that qualify for opportunities for solitude or primitive and unconfined recreation. The results of the inventory are also displayed in Table E-2.

3.0 Wilderness Inventory Summary

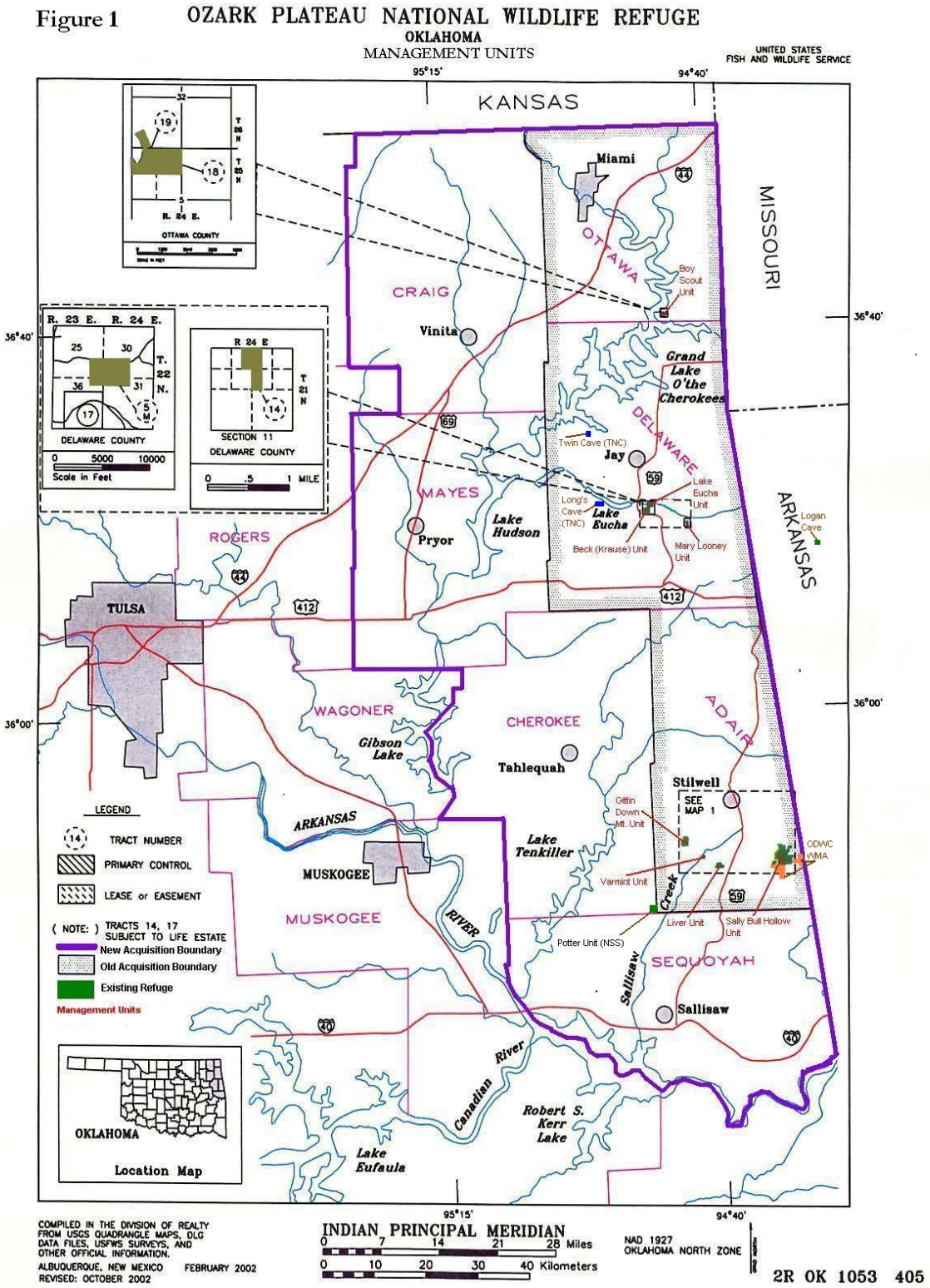
After completing the inventory phase of the Wilderness Review, we have concluded that none of Ozark Plateau NWR's lands and waters meet the minimum criteria for a Wilderness Study Area. Therefore, the Team does not recommend that the Wilderness Study portion of the Review be performed. This concludes the Wilderness Review process at this time. The process will be replicated in accordance with policy at the time of the next CCP revision.

Table E-2. Wilderness Review Inventory Matrix for Ozark Plateau NWR.

Inventory Unit					
Name	**Size**	**(1)** has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unconfined condition or is a roadless island;	**(2)** generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;	**(3)** has outstanding opportunities for solitude or primitive and unconfined recreation;	**Parcel qualifies as a Wilderness Study Area** (meets criteria 1, 2, and 3)**?**
Beck (Krause) Unit	360 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Boy Scout Unit	78 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Gittin Down Mountain Unit	480 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Lake Eucha Unit	130 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Liver Unit	90 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Mary & Murray Looney Unit	95 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Potter Unit	189 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.
Sally Bull Hollow Unit	2,280 acres	Yes, Unit is of sufficient size to make practicable its preservation and use in an unconfined condition, however, management of the area includes the use of mechanized equipment for invasive species, prescribed burns, and the Refuge does not have the appropriate staffing to neither establish Wilderness boundaries nor enforce regulations.	No, the Unit contains 11 visibly noticeable man-made cave gates, which also require frequent maintenance by steel welders and the use of mechanical equipment. Therefore, the average visitor would not perceive the Unit to be in its “natural” state.	N/A	No.

Inventory Unit					
Name	**Size**	**(1)** has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unconfined condition or is a roadless island;	**(2)** generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;	**(3)** has outstanding opportunities for solitude or primitive and unconfined recreation;	**Parcel qualifies as a Wilderness Study Area** (meets criteria 1, 2, and 3)**?**
Varmint Unit	60 acres	No, not of sufficient size to make practicable its preservation and use in an unconfined condition.	N/A	N/A	No.

Figure E-1. Inventory Units of Ozark Plateau National Wildlife Refuge.



INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person:
Steve Hensley, Refuge Manager
Telephone Number:
918-382-4507
Date:
October 31, 2012

I. Region:

Southwest (Region 2)

II. Service Activity (Program):

Implementation of the Comprehensive Conservation Plan (CCP) of Ozark Plateau National Wildlife Refuge (NWRS) (*Estimated to be complete in 2013*).

III. Pertinent Species and Habitat:

The action area is defined as the entire area within the approved acquisition boundary of Ozark Plateau NWR. This is also defined as within the boundaries of the following seven northeastern counties of Oklahoma: Craig, Ottawa, Delaware, Mayes, Cherokee, Adair, and Sequoyah. However, the approved boundary expansion plan limits the amount of potential land acquired to (up to) 15,000 acres, via fee title acquisition, land and conservation easements from willing sellers and/or conservation agreements with private landowners, conservation organizations, state, Tribal Nations, and other federal agencies.

Species listed below with an asterisk (*) are those occurring on current Refuge management units, those occurring on lands that are currently co-managed by the Refuge, and/or those that are most likely to occur on future acquired lands using a Strategic Habitat Conservation (SHC) approach that is based on Refuge purposes and goals (see section VI). These species will be the focus of discussion in sections III – IX.

A. Listed species and/or their critical habitat within the action area:

Federally listed: endangered

- *Ozark big-eared bat (*Corynorhinus townsendii ingens*) [Mammal] (No critical habitat rules have been published)
- *Gray bat (*Myotis grisescens*) [Mammal] (No critical habitat rules have been published)
- Indiana bat (*Myotis sodalis*) [Mammal] (Critical habitat designation [09/24/1976] [41 FR 41914])

- American burying beetle (*Nicrophorus americanus*) [Insect] (No critical habitat rules have been published)
- Winged Mapleleaf (*Quadrula fragosa*) [Clam] (No critical habitat rules have been published)
- Interior least tern (*Sterna antillarum*) [Bird] (No critical habitat rules have been published)

Federally listed: threatened

- *Ozark cavefish (*Amblyopsis rosae*) [Fish] (No critical habitat rules have been published)
- Neosho madtom (*Noturus placidus*) [Fish] (No critical habitat rules have been published)
- Piping plover (*Charadrius melodus*) [Bird] (Designation of critical habitat for the Northern Great Plains breeding population [09/11/2002 67 FR 57638 57717])

B. Proposed species and/or proposed critical habitat within the action area

- Neosho mucket (*Lampsilis rafinesqueana*) [Clam] (Proposed endangered status; Proposed critical habitat designation [10/16/12 77 FR 63439 63536])
- Rabbitsfoot (*Quadrula cylindrica cylindrica*) [Clam] (Proposed threatened status; Proposed critical habitat designation [10/16/12 77 FR 63439 63536])

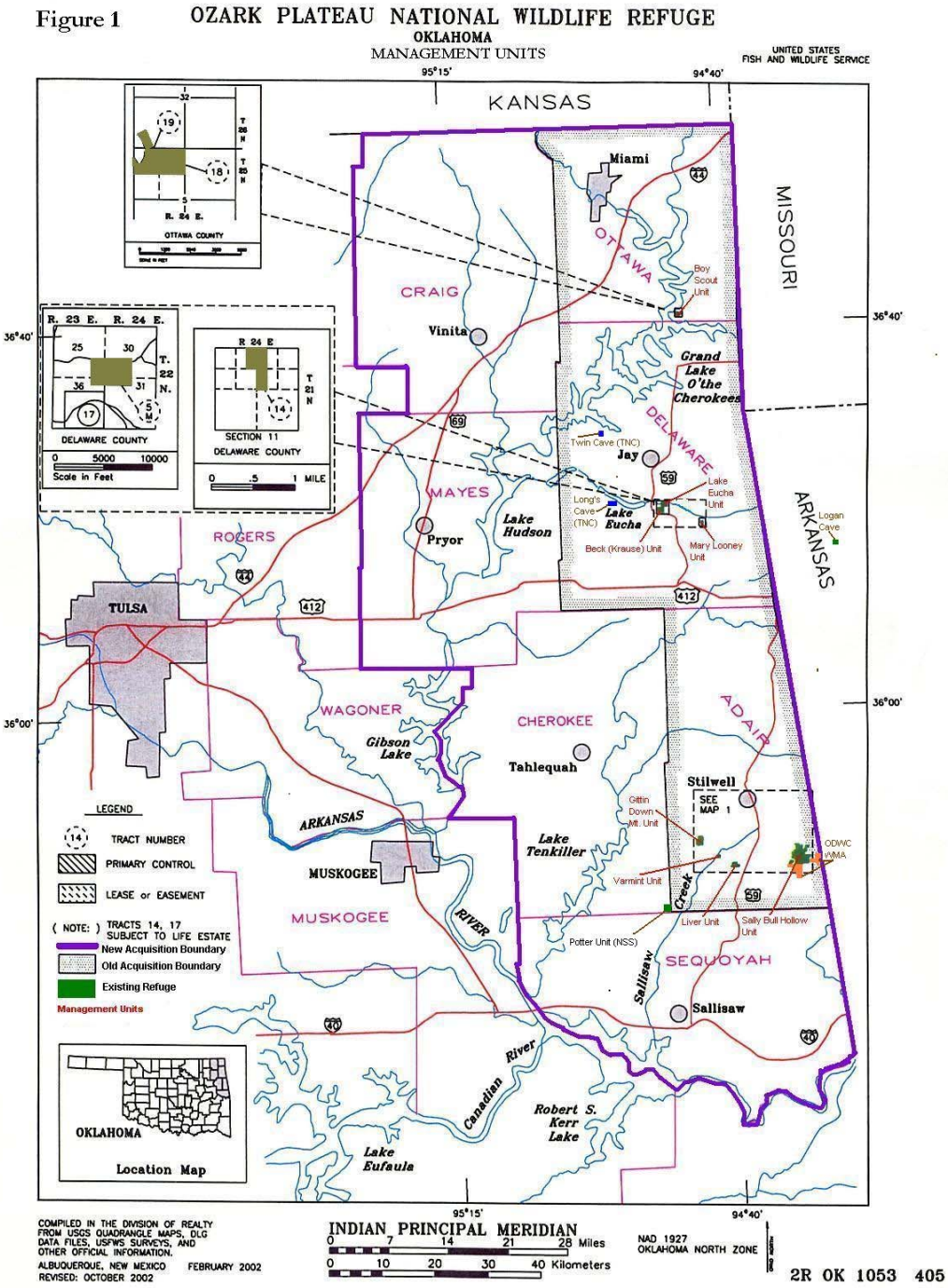
C. Candidate species within the action area:

- Arkansas darter (Etheostoma cragini) [Fish]
- Sprague's pipit (*Anthus spragueii*) [Bird]

IV. Geographic area or station name and action:

Station Name: Ozark Plateau National Wildlife Refuge
Action: Implementation of the Comprehensive Conservation Plan of Ozark Plateau National Wildlife Refuge

V. Location: *Figure F-1. Acquisition boundary and current Refuge management units.*



A. Ecoregion:

Ozark Plateau NWR is located within The Nature Conservancy's, Bailey's, and Omernik's "Ozarks ecoregion", an area encompassing nearly 34 million acres in parts of Missouri, Arkansas, Oklahoma, Illinois, and a small corner of Kansas. Oklahoma's portion of the Ozarks ecoregion constitutes approximately 5.8 million acres, or roughly 17% of the total ecoregion acreage. Along with the Ouachita region to the south, the Ozarks form the only significant highland region in mid-continental North America. Parts of this region have been continually exposed for at least 225 million years. Because of high habitat diversity and antiquity of the landscape, Ozark biota is characterized by an unusually high level of species disjunctions and endemism, with more than 160 endemic species documented from the ecoregion. (TNC, 2003)

B. County and State:

Craig, Ottawa, Mayes, Delaware, Cherokee, Adair, and Sequoyah Counties of Oklahoma

C. Section, township, and range (or latitude and longitude):

Refuge Headquarters, currently located at the Mary & Murray Looney Education & Research Center (MMLERC) at 36°18'54.31"N, 94°42'29.61"W

D. Distance (miles) and direction to nearest town:

The MMLERC/Refuge Headquarters lies 8.8 miles south of Jay, OK

E. Species/habitat occurrence:

<u>*Ozark big-eared bat</u>

Refuge units that occur in Adair and Cherokee Counties provide important cave and foraging habitat for the Ozark big-eared bat species. There are twelve known essential caves, defined as a cave used by a maternity colony or as a hibernaculum, in Oklahoma, six of which occur on the Ozark Plateau National Wildlife Refuge (USFWS and NRCS, 2010). Five of the six are used as maternity caves and three as hibernacula. Approximately one-third of the known Oklahoma maternity colonies roost in caves that occur on the Refuge, while over 50% of the entire known population of Ozark big-eared bats hibernate in caves that occur on the Refuge. In addition, the seven-county acquisition area encompasses the existing known range of the federally endangered Ozark big-eared bat in Oklahoma, which is generally associated with caves, cliffs, and rock ledges in well drained, oak-hickory Ozark forests. Maternity caves and hibernacula occur in a number of different surroundings, from large continuous blocks of forest, to smaller forest tracts interspersed with open areas. Forested habitats are an important source of food for the Ozark big-eared bat. Approximately 97% of Refuge lands are currently forested habitat. A recent study on the diet of the Ozark big-eared bat and prey abundance in Arkansas found that the bats prey on a wide diversity of moth species, and that most of the species are dependent upon woody forest plants as a host (Dodd, 2006). The study also found a positive correlation between woody species richness and moth occurrence. Conservation of the Ozark big-eared bat, therefore,

requires not only protection of important caves but also forested habitat that supports abundant and diverse moth populations (Leslie and Clark, 2002; Dodd, 2006; Dodd and Lacki, 2007). Conservation practices that encourage a diversity of woody forest plant species (e.g., prescribed fire, selective thinning) to provide a rich prey base of moths should benefit Ozark big-eared bat colonies. The Ozark big-eared bat has been shown to selectively forage in both edge and forested habitats and also to use habitats in proportion to their availability.

*Gray bat

Gray bats are one of the few species of bats in North America that inhabit caves year-round, migrating each year between winter and summer caves. Gray bats have been documented to regularly migrate from 17 to 437 km between summer maternity caves and winter hibernacula (Tuttle 1976b; Hall and Wilson 1966). A portion of the gray bat population migrates to northeastern Oklahoma in the summer to raise their young in maternity caves. Ozark Plateau NWR manages or assists with management of approximately 10 important gray bat maternity caves. Gray bats frequently return year after year to use these same caves. Ozark Plateau NWR also protects multiple streams, creeks, and other water bodies important to the gray bat for foraging habitat. Gray bats feed on flying insects over bodies of water including rivers, streams, lakes and reservoirs. Mayflies, caddisflies, and stoneflies make up the major part of their diet, but beetles and moths also are consumed (Harvey, 1994; Tuttle and Kennedy, 2005). Gray bats are known to travel up to 35 kilometers from caves to prime feeding areas (La Val et al., 1977; Tuttle and Kennedy, 2005). However, most caves are within 1-4 km (0.6 – 2.5 miles) of foraging areas (Tuttle, 1976b). The fungus that causes white-nose syndrome (WNS) *Geomyces destructans* was first documented on gray bats in Missouri during the spring of 2010. WNS (i.e., skin infection by the fungus) was then confirmed in gray bats in Tennessee during April 2012. Mortality events attributable to WNS have not occurred in any gray bat populations to date. However, confirmation of WNS in gray bats is cause for concern. Conservation biologists are concerned that gray bat populations may be impacted during future hibernation seasons. Because a large percentage of the gray bat population hibernates in a limited number of caves, disease transmission could occur rapidly and the resulting impacts could be severe.

*Ozark cavefish

The Refuge manages many caves inhabited by Ozark cavefish. It also has management agreements (conservation agreements) with various partners to protect other caves, ground water recharge areas, and aquifers also used by Ozark cavefish. Ozark cavefish are true troglobites (i.e., obligatory cave or aquifer inhabitants). The Ozark cavefish has only rudimentary eyes and no optic nerve since their lives are spent in the darkness of caves. The Ozark cavefish is difficult to distinguish from other cavefish species in the field. Differentiation is based on degrees of cave adaptation. A range wide estimate of countable cavefish using recent population monitoring numbers suggests about 220 individuals (Graening et al., 2009; David Kampwerth, previous USWFS Recovery Lead, pers. comm.). However, it must be noted that the population

size of the Ozark cavefish is difficult to estimate. Biologists can only enter those "portals" (i.e., caves with streams, sink holes, wells) large enough to accommodate our size. Because we are unable to access groundwater conduits that the fish are distributed throughout, we can only count fish in accessible reaches of caves and wells.

Indiana bat

The Indiana bat is primarily found in the eastern and midwestern United States. The species is rare in eastern Oklahoma, which represents the western limit of its range. The Indiana bat is a migratory species that hibernates in cool caves and mines in the winter and spends the spring and summer in wooded areas. Only a small percentage of caves and cave-like structures meet the specific conditions required by Indiana bats, which explains why so much of the known population hibernates in just a few sites. Summer roosting habitat consist of trees (alive or dead) with exfoliating bark, cracks, or crevices or snags that are ≥ 3 inches diameter at breast height. Indiana bats forage for insects along forest edges, in or beneath forest canopy, over ponds, and along streams.

Indiana bats have not been observed or captured within the Ozark Highlands of northeastern Oklahoma or on the Refuge for at least 30 years. Neither summer maternity colonies nor solitary males have been located during summer surveys. Indiana bats also are not observed during winter hibernacula surveys in caves that occur on the Refuge or on private land. While this species is not currently known to occur on the Refuge, there is potential, due to the presence of suitable habitat (forest and caves), for the Indiana bat to occur on current Refuge lands in the future or on future acquired Refuge lands. Refuge staff will continue to monitor for this species.

American burying beetle

The American burying beetle is a large carrion beetle that is active in summer and inactive during winter. American burying beetles bury themselves in the soil to overwinter when temperatures drop below 60°F (15°C). When temperatures are above 60°F (15°C) they emerge from the soil and begin mating and reproduction. American burying beetles are scavengers dependent on carrion for their life cycle. Reproduction involves burying a small vertebrate carcass and laying eggs beside the carcass. Larvae then feed on the carcass until maturity.

The American burying beetle has been found in various habitat types including open fields and grasslands, oak-pine woodlands, oak-hickory forest, and edge habitat (Creighton *et al*., 1993; Lomolino and Creighton, 1996; Lomolino *et al*., 1995; U.S. Fish and Wildlife Service, 1991). Although American burying beetles are known to occupy numerous habitat types, they exhibit close associations with carrion availability and suitable soil. Soil conditions where the species occurs must be conducive to American burying beetle excavation (Anderson, 1982; Lomolino and Creighton, 1996). Soils in the vicinity of captures of this species typically are well drained and include sandy loam and silt loam, with a clay component noted at most sites. Level

topography and a well formed detritus layer at the ground surface are common (USFWS, 1991). Areas with soils not conducive to excavation and burial are likely not suitable for this species. For example, land where greater than 80% of the soil surface is comprised of rock or where greater than 80% of the subsurface soil structure within the top 4 inches is comprised of rock are likely not suitable, and unlikely to be occupied by the species.

Existing Refuge units and the approved acquisition area occurs within the known range of the American burying beetle. Surveys specifically targeting this species on the Refuge have not occurred. However, the results of all presence/absence surveys conducted in close proximity to existing Refuge units (i.e., within 5 miles) have been negative and suggest that occurrence on the Refuge also is unlikely (e.g., survey conducted in Adair County in 2010 less than one mile north of the Sally Bull Hollow Unit; surveys conducted in Adair County in 2005 and 2009 about 2.5 and 1.5 miles, respectively, from the Gittin' Down Mountain Unit; surveys conducted in Delaware County in 2005 and 2007 about 4.5 and 3.5 miles, respectively, from the Beck and Eucha Units; survey conducted in Delaware County in 2005 about 3.5 miles from the Boy Scout Unit). The American burying beetle likely does not occur on Refuge tracts or occurs in very low abundance due to the rocky soils and karst topography (i.e., thin soils over bedrock) of these areas. Lands that contain habitat deemed suitable for the American burying beetle may be acquired in the future. The Refuge anticipates conducting surveys for the American burying beetle on portions of the Refuge that appear to provide suitable habitat for this species.

Winged mapleleaf

The winged mapleleaf is a species of freshwater mussel found in rivers. The winged mapleleaf historically is reported from the Neosho River in Ottawa County. The winged mapleleaf does not occur on current Refuge lands. The Refuge does not anticipate acquiring suitable habitat for this species in the future.

Interior least tern

The interior least tern is a migratory bird that breeds along inland river systems. Interior least terns nest on sandy islands and river sandbars along the Arkansas River in Sequoyah County. The interior least tern does not occur on current Refuge lands nor does the Refuge anticipate acquiring suitable habitat for the interior least tern in the future.

Neosho madtom

The Neosho madtom inhabits gravel riffles and runs in the main channel of rivers. In Oklahoma, it occurs in the Spring and Neosho Rivers in Craig and Ottawa Counties. The species does not occur on current Refuge lands. However, important cave resources occur in close proximity to the Spring River. The river and its tributaries, and associated riparian and upland forests also provide important foraging and commuting habitat for bats. Neotropical migratory birds also use these habitats for foraging, breeding, nesting, and as movement corridors. Therefore, acquisition

of suitable habitat for this species, while not targeted, could occur in the future. Surveys to determine presence of this species on the Refuge will be conducted should areas of suitable habitat be acquired.

Piping plover

The Piping plover is a small migratory shorebird that breeds along the Atlantic Coast, the Northern Great Plains of the United States and Canada, and around the Great Lakes, and winters along the southern Atlantic and Gulf coasts, and in the Bahamas and West Indies. This species migrates through central and eastern Oklahoma each spring and fall. Piping plovers use sand-bottom rivers, mudflats, and reservoir beaches during migration. Piping plovers are known to occur in all seven counties of the potential acquisition area. However, the occurrence of the species within the acquisition area is likely only transitory during the migration season. The piping plover does not occur on current Refuge lands nor does the Refuge anticipate acquiring suitable habitat for the Piping plover in the future.

Neosho mucket

The Neosho mucket is a species of freshwater mussel that historically occurred in the Verdigris, Spring, Neosho, Caney, and Illinois Rivers of northeastern Oklahoma, which lie within Craig, Ottawa, Delaware, Cherokee, and Adair counties. Based on recent survey efforts, the species currently is known only from a portion of the Illinois River in Cherokee and Adair counties. Proposed critical habitat for the Neosho mucket occurs within the approved acquisition area and includes the Illinois River from the Arkansas State line down to the headwaters of Lake Tenkiller, and the Elk River in Delaware County. The Neosho mucket does not occur on current Refuge lands. However, important cave resources occur in close proximity to the Illinois River. The Illinois River and its tributaries, and associated riparian and upland forests also provide important foraging and commuting habitat for bats. Neotropical migratory birds also use these habitats for foraging, breeding, nesting, and as movement corridors. Therefore, acquisition of suitable habitat for this species, while not targeted, could occur in the future. Surveys to determine presence of this species on the Refuge will be conducted should areas of suitable habitat be acquired.

Rabbitsfoot

The rabbitsfoot is a species of freshwater mussel that primarily inhabits small to medium-sized streams and some rivers. Proposed critical habitat for the rabbitsfoot would not be within the approved acquisition area. However, within the acquisition boundary, the species is known to occur in the Illinois River in Adair and Cherokee Counties. The rabbitsfoot does not occur on current Refuge lands. However, important cave resources occur in close proximity to the Illinois River. The Illinois River and its tributaries, and associated riparian and upland forests also provide important foraging and commuting habitat for bats. Neotropical migratory birds also use these habitats for foraging, breeding, nesting, and as movement corridors. Therefore, acquisition

of suitable habitat for this species, while not targeted, could occur in the future. Surveys to determine presence of this species on the Refuge will be conducted should areas of suitable habitat be acquired.

Arkansas darter

The Arkansas darter occurs in Cherokee, Craig, Delaware, Mayes and Ottawa Counties. Arkansas darters are small fish that inhabit spring-fed creeks. They primarily occur in spring-fed streams that have an abundance of watercress and other aquatic plants. The Arkansas darter currently is not known to occur on current Refuge lands. However, springs and spring-fed streams are important karst resources often associated with important cave habitat. The Refuge, therefore, could acquire suitable habitat for the Arkansas darter in the future. Surveys to determine presence of this species on Refuge lands will be conducted should areas of suitable habitat be acquired.

Sprague's pipit

The Sprague's pipit is a migratory grassland bird species that breeds and winters on the North American prairie. The migration route between the breeding and wintering range occurs primarily through the central Great Plains and includes parts of Oklahoma. Within the acquisition boundary, the Sprague's pipit is reported to occur in Mayes County. However, the occurrence of the species within the acquisition boundary is likely only transitory during the migration season. The Sprague's pipit does not occur on current Refuge lands nor does the Refuge anticipate acquiring suitable habitat for the Sprague's pipit in the future.

VI. Description of proposed action:

The proposed action is to implement the Comprehensive Conservation Plan (CCP) for Ozark Plateau National Wildlife Refuge over the next 15 years. The Plan emphasizes: taking a Strategic Habitat Conservation approach to acquire up to 15,000 acres of habitat for federally listed Ozark cave species and Neotropical migratory birds; build and maintain landscape level partnerships to protect and restore mature oak-hickory or oak-hickory-pine forest and cave habitats essential to T&E species and other species of concern; enhance and/or develop new I&M programs; and increase public environmental awareness in order to accomplish CCP goals and the purposes of the Refuge.

The Ozark Plateau NWR purpose(s) of establishment (1986):

- Assure the continuing existence, and aid in recovery of federally listed endangered and threatened Ozark cave species
- Reduce the need for future listing of species of concern in the Ozarks
- Protect large continuous stands of Ozark forest essential to migratory interior forest birds
- Provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks

The CCP is divided into a series of goals, objectives, and strategies that will be implemented throughout the 15-year period of this CCP. Outlined below are the specific goals and subsequent objective descriptions associated with the future management direction in Chapter 4 of the CCP. (Please refer to pages 4-4 through 4-65 for full objectives and action strategies).

Goal 1: Landscape-level Context

Contribute to the implementation of Strategic Habitat Conservation on a landscape-level to prevent extinction and recover federally listed threatened and endangered Ozark cave species as well as prevent the need for listing other species of concern.

- **Objective 1:** Continue Building Landscape-Level Partnerships.
- **Objective 2:** Coordinate Across FWS Regions to Better Manage Federally Listed Ozark Cave Species on a Landscape-Level.
- **Objective 3:** Acquire Lands within Approved Acquisition Area.
- **Objective 4:** Implement Climate Change Monitoring & Mitigation Program.
- **Objective 5:** Implement Water Quantity & Quality Monitoring & Management Program.
- **Objective 6:** Assist with White-nose Syndrome Research, Monitoring, Prevention, and Recovery.
- **Objective 7:** Identify Migration Routes/Habitat Corridors.

Goal 2: Wildlife Habitat & Population Management

Protect, enhance, conserve and restore Ozark natural caves, springs, streams, aquifers, wetlands, watersheds, forests, and groundwater recharge areas to prevent extinction and recover federally listed cave species as well as prevent the need for listing other native species including migratory birds and other species of concern in the Ozarks to promote natural species diversity on a landscape-level.

- **Objective 1:** Protect, Enhance, and/or Restore Forested Habitat.
- **Objective 2:** Protect, Enhance, and/or Restore Aquatic Habitat.
- **Objective 3:** Provide Undisturbed, Safe, and Protected Cave Habitat.
- **Objective 4:** Locate Additional Caves.
- **Objective 5:** Delineate Recharge Area of Cavefish and Crayfish Caves.
- **Objective 6:** Inventory & Monitor to Increase Scientific Knowledge Regarding Federally Listed Cave Species and Species of Concern.
- **Objective 7:** Inventory & Monitor to Increase Scientific Knowledge Regarding Resident Non-T&E Species.
- **Objective 8:** Inventory & Monitor Migratory and Resident Bird Species Utilizing the Refuge and Surrounding Landscape.
- **Objective 9:** Map, Monitor, Research, and Implement Adaptive Management to Control Invasive Non-native Flora.

- **Objective 10:** Map, Monitor, Research, and Implement Adaptive Management to Control Invasive Non-native Fauna.

Goal 3: Visitor Services

Provide safe, high quality, compatible, wildlife dependent use opportunities for visitors, students, and nearby residents, to give them an understanding of the importance and value of Ozark cave, spring, aquifer, stream, wetland, watershed, groundwater recharge areas, and forest, wildlife habitat conservation efforts.

- **Objective 1:** Establish a Friends Group and Increase Volunteers**.**
- **Objective 2:** Increase Public Awareness via Outreach.
- **Objective 3:** Collaborate to Increase Program Opportunities for Environmental Education.
- **Objective 4:** Collaborate to Promote and Conduct Interpretation Programs.
- **Objective 5:** Promote Opportunities for Wildlife Observation & Photography.
- **Objective 6:** Collaborate with ODWC to Provide Hunting Opportunities.
- **Objective 7:** Create More Hiking/Nature-viewing Opportunities.
- **Objective 8:** Design and Display Refuge Signs.
- **Objective 9:** Survey and Mark Refuge Boundaries.

Goal 4: Refuge Infrastructure & Administration

Provide administrative support and appropriate facilities required to ensure that Refuge goals and objectives are met through effective landscape conservation management of Ozark habitats, fish and wildlife, and visitor services and for the primary purpose of preventing extinction and recovering federally listed threatened and endangered Ozark cave species.

- **Objective 1:** Ensure Workforce and Volunteer Training and Safety**.**
- **Objective 2:** Protect and Survey Historical, Archeological, and Paleontological Sites.
- **Objective 3:** Establish a Refuge Headquarters Site.
- **Objective 4:** Renovate and Repair the MMLERC.
- **Objective 5:** Improve and Widen Access Roads and Parking Areas.
- **Objective 6:** Construct Building Facilities Associated with Maintenance.
- **Objective 7:** Provide Housing for Refuge Staff, Interns, Volunteers, Researchers, and Educators.

Implementation actions of the CCP are consistent with the goals of the Refuge, the National Wildlife Refuge System, and the mission of the U.S. Fish & Wildlife Service.

VII. Determination of effects:

A. Explanation of effects of the action on species and critical habitats in items III. A, B, and C:

Effects on federally listed cave species (Ozark big-eared bat, gray bat, Indiana bat, and Ozark cavefish)

Within this CCP, Ozark Plateau NWR proposes actions that will protect, enhance, and/or restore up to 15,000 acres of forest and cave habitats, in addition to important watersheds, aquifers, and/or groundwater recharge areas in order to achieve its purpose of assuring the continuing existence and/or recovery of federally listed endangered and threatened Ozark cave species. This responsibility encompasses recovery activities beyond the borders of the Refuge. For this reason, the Refuge highlights working at a landscape level - by building landscape level partnerships and working with various landowners, NGOs, cities, universities, state agencies, Tribal Nations, and other federal agencies - to achieve its goals.

Protection, restoration and maintenance of forest habitat includes using the following management tools: taking a Strategic Habitat Conservation (SHC) approach to prioritizing land acquisition of up to 15,000 acres via fee title acquisition and conservation easements from willing sellers within the approved acquisition boundary and/or conservation agreements; monitoring invasive species and if necessary, developing a step-down Integrated Pest Management Plan which would outline control actions; developing a Fire Management Plan for all Units of the Refuge to mimic the naturally-occurring, historic, fire-regime (burn up to 1/3 of Refuge lands in a 3-5 year rotation); and implementing multiple I&M programs to best inform an adaptive management approach. For as long as management activities are carried out and the resulting habitat improvements persist for forest, cave and groundwater recharge areas, targeted species (Ozark big-eared bat, gray bat, Indiana bat and Ozark cavefish) will benefit from long-term conservation efforts.

Prescribed fire in forest habitat would have long-term beneficial impacts to federally listed Ozark cave species. Upland oak-hickory forests historically had a fire regime and fires have played a significant role in their composition and structure (Lorimer, 2001; Abrams, 2005; Hutchinson et al., 2008). Most ecologists believe that, prior to European settlement, the Ozarks supported a lower-density forest, and that tree density generally has increased while the cover of herbaceous understory vegetation has been reduced due to fire suppression (Sauer, 1920; Howell and Kucera, 1956; Heikens, 1999). Ozark Plateau NWR would adopt objectives to attain an open canopy, moderately stocked, mature oak-hickory forest with an herbaceous understory.

The immediate effect of prescribed fire on bats in general is not well understood due to a lack of scientific research on the subject (Clark et al., 2002; Lacki et al., 2009). However, converting a forest that has become overcrowded due to fire suppression to a moderately stocked condition is anticipated to benefit the Ozark big-eared bat by creating an enhanced foraging environment and

by creating a more open movement corridor for the gray bat to travel to its foraging habitat (streams, springs, etc.). During a recent study on the response of northern long-eared bats (*M. septentrionalis*) to prescribed fire, Lacki et al. (2009) found the bats to be tolerant of prescribed fires. The bats responded to habitat alterations by shifting foraging areas to track insect abundance. We believe that the Ozark big-eared and gray bat also would be tolerant of prescribed fire while burns are being implemented. Because bats are mobile, the bats should be able to avoid areas during the burn to avoid any possible direct effects of smoke and heat. Bats also may selectively forage in or near the area due to increased dispersal of insects from the burn site. Should foraging bats avoid the area, suitable foraging habitat should not be significantly limited due to the temporary nature of the fire. Lacki et al. (2009) also found that the abundance of all insects combined was shown to increase following the prescribed burns. An increase in insects would benefit the Ozark big-eared and gray bat by providing more prey items in the environment. Gray bats are adapted at foraging in open areas, such as over a stream, or gaps in a forest, and are a relatively less maneuverable flier than the Ozark big-eared bat. However, they utilize forested areas for protection from predators such as screech owls as they travel between caves and foraging sites. Converting a forest that has become overcrowded due to fire suppression to a moderately stocked condition would be anticipated to benefit the gray bat by creating a more open environment through which it should be easier to navigate and avoid predation.

On the other hand, prescribed fire used for forest restoration has the potential to cause short-term adverse effects to federally listed cave species due to smoke entering caves and/or temporary cave temperature changes. For this reason, the Refuge proposes to implement conservation measures that would prevent adverse impacts to federally listed cave species (see section VII, B). Activities implemented to protect, enhance, and restore upland forests and riparian areas (*e.g.,* prescribed fire, plantings, and selective thinning) within the recharge zone of caves used by the Ozark cavefish would have long-term beneficial effects to the Ozark cavefish. Upland forests provide valuable canopy cover for ground temperature regulation and soil moisture retention. Vegetated riparian buffers help improve and protect water quality by filtering and reducing the amount of sediment, organic material, nutrients and pesticides that enter water bodies from surface runoff (Naiman and Decamps, 1997). Restoring, enhancing and/or maintaining a healthy, wooded riparian zone along water bodies that occur within the recharge areas of caves used by this species would help protect and improve surface and ground water quality.

Monitoring invasive species should not adversely affect federally-listed, proposed and/or candidate species on the Refuge. Should non-native flora species be identified as a threat to the habitat value and function of the Refuge, an Integrated Pest Management Plan would be developed. Within the Integrated Management Plan, the Refuge would propose to use control methods such as prescribed fire (described above), and mechanical removal (including hand tools, chainsaws, and mowing with a tractor). The Refuge also would use, if necessary,

herbicides to spot-treat invasive flora species such as: Japanese honeysuckle; sericea lespedeza; Chinese privet; shrubby lespedeza; tall fescue; yellow sweetclover; puncturevine; stinkgrass; shepherd's-purse; watercress; fivestamen tamarisk; barnyardgrass; curly dock; field bindweed; Johnson grass; mimosa; tall fescue; Russian-olive; ground ivy; red clover; hairy vetch, among others. The Refuge would employ best management practices (see section VII, B) during planning and application of all herbicide use to avert any adverse impacts to federally listed species and other species of concern. In addition, restoring an invasive species area with native plant species will provide long-term benefits for the foraging habitat of the Ozark big-eared bat, gray bat, and Indiana bat, as well as provide a healthier riparian forest habitat (which filters water and improves quality) for the Ozark cavefish (see benefits above).

The Refuge proposes to provide undisturbed, safe, and protected cave habitat suitable for Ozark big-eared bats, gray bats, Indiana bats, Ozark cavefish and other cave species. This will be accomplished by:

- acquiring lands or entering into agreements with willing sellers for conservation easements (up to 15,000 acres) to protect and/or restore cave habitat and habitat surrounding caves (i.e. riparian habitat, recharge areas, oak-hickory forest, grasslands, etc.)
- working with and educating landowners in implementing programs such as the Service's Partners for Fish & Wildlife Program (see http://www.fws.gov/partners/), the NRCS Healthy Forests Reserve Program, and National Speleological Society (NSS) cave management projects to encourage a controlled entry policy to avoid disturbance to cave habitat and its respective species
- working with local cavers, NSS, universities, and other partners to map known caves on- and off-Refuge in order to inform the Refuge staff of overlying landowners and to help identify outreach needs
- coordinating with volunteers, cave and geological experts, NSS, universities, Tribal Nations, and other willing partners to locate additional caves within the Ozark Highlands ecoregion by "ridge walking," which includes walking along faults, contacts, depressions, springs, sinking streams and/or other appropriate geological areas which may lead to potential cave locations
- maintaining confidential information regarding cave locations
- controlling access to Refuge caves susceptible to disturbance by constructing appropriately designed gates that allow air flow and bat-friendly passage

Enhancing opportunities for compatible wildlife-dependent uses including allowing hunting on the Sally Bull Hollow Unit and increasing environmental education programs on the Looney Unit is not anticipated to have any adverse impacts to federally species on the Refuge. In fact, all compatible wildlife-dependent uses should increase public appreciation and awareness of

U.S. Fish & Wildlife Service conservation efforts, including protection and recovery of these threatened and endangered species. For example, all environmental education and interpretation programs highlight the important role of bat species in supporting cave ecosystems. These discussions may influence people to appreciate rather than fear bats as well as understand the need to protect fragile and unique cave ecosystems. In addition, public cave entry will remain prohibited throughout the life of the CCP (according to current guidance in the WNS National Plan); therefore, disturbance to federally-listed cave species as a result of unauthorized human entry into Refuge caves is not anticipated.

Hunting regulations would be coordinated with the Oklahoma Department of Wildlife Conservation (ODWC) to allow walk-in only, open access hunting of species according to State regulations. Once the Unit is surveyed and marked, hunting will take place on the Sally Bull Hollow Unit of the Refuge, located adjacent to the ODWC-managed Ozark Plateau Wildlife Management Area (WMA). Steel cave gates and grills have been constructed at the entrances of caves used by federally-listed species that occur on the Sally Bull Hollow unit to prevent unauthorized human entry and disturbance except for those caves that are remotely located and have no evidence of previous or ongoing unauthorized human entry and vandalism. As an added precautionary measure, hunting would not be allowed within 100 yards from cave entrances. This extra measure will help to ensure the protection of federally-listed cave species and other sensitive and rare fauna. No adverse effects to listed species as a result of this public use is expected; however, the Refuge would continue to inventory and monitor federally listed cave species on the Sally Bull Hollow Unit and inspect caves and their protective features (e.g., cave grills and gates) to identify whether this public use is causing any adverse effects to listed species or adverse impacts to caves. Coordination with the ODWC to modify hunting regulations and the construction of additional cave protection measures would be pursued as deemed necessary to prevent needless impacts to caves and federally-listed cave species.

The Indiana bat currently is not known to occur on the Refuge. This species, therefore, is not anticipated to be affected by any proposed Refuge activities. However, suitable habitat for this species (caves and forested areas) occurs on current Refuge tracts and likely also will occur on many tracts acquired in the future as the Refuge expands. Should this species be discovered on current Refuge lands or on lands acquired in the future, Refuge staff will implement conservation measures to ensure that adverse effects to this species could be avoided, as described below in section VII, B.

<u>Effects on the American burying beetle</u>

Certain activities described in the CCP could adversely affect the American burying beetle should these activities be implemented in an area of suitable habitat and the species occur in the area at the time of implementation. These activities generally include those that would require significant ground disturbance such as the construction of a new headquarters building, other

buildings, roads, and parking areas; the clearing of vegetation; and the grading of land. However, the results of surveys conducted for this species in close proximity to existing Refuge units (i.e., within 5 miles) indicate that occurrence of this species on the Refuge is unlikely. The results of all such presence/absence surveys have been negative (see Section V., 5 – Species habitat occurrence). The American burying beetle likely does not occur on Refuge units or occurs only in very low abundance due to the rocky soils and karst topography (i.e., thin soils over bedrock) of these areas. Therefore, considering that 1) the species is likely absent from most Refuge units or, if present, occurs at only a very low population density, and 2) the likelihood that activities that otherwise may adversely affect this species would be implemented in an area of suitable habitat on the Refuge occupied by American burying beetles is very low, we conclude that implementing the CCP is not likely to adversely affect the American burying beetle. However, to ensure significant adverse affects do not occur to this species on current or future acquired tracts, the Refuge will consider the habitat suitability of areas prior to the implementation of any activities that would result in significant ground disturbance (greater than 1.2 acres) or otherwise have the potential to negatively impact this species, and, if necessary, implement certain conservation measures as described below in Section VII, B.

Effects on the winged mapleleaf, interior least tern, piping plover, and Sprague's pipit
CCP implementation will have no effects on the winged mapleleaf, interior least tern, piping plover, or Sprague's pipit. These species do not occur on current Refuge units and the Refuge does not anticipate acquiring land with suitable habitat for these species.

Effects on the Neosho madtom, Neosho mucket, rabbitsfoot, and Arkansas darter
CCP implementation is not likely to adversely affect the Neosho madtom, Neosho mucket, rabbitsfoot, or Arkansas darter. These species do not occur on current Refuge units. Due to the close association of the habitat types used by these species (Ozark streams and rivers) and habitat types utilized by species the Refuge targets for conservation and recovery efforts of federally-listed cave species and Neotropical migratory birds, it is possible that future Refuge acquisitions may contain areas in which one or more of these species occur. However, there is no certainty regarding whether acquiring lands used by these species would occur. Nonetheless, the goal of Refuge management actions that would impact springs, rivers, streams and associated riparian and upland forests would be to protect, enhance, and/or restore these areas. Therefore, should the Refuge acquire areas used by these species, any effects of Refuge activities as described in the CCP would be expected to be discountable, insignificant, or entirely beneficial.

Overall, no significant adverse effects are expected to occur to any federally-listed species or species that are candidates for federal listing as a result of the management direction proposed in the CCP.

B. Explanation of actions to be implemented to reduce adverse effects:

Prescribed Fire Conservation Measures:

Prescribed burns would be planned so that factors such as location of caves in relation to prescribed burns, wind direction, and temperature would be considered during the design of the burn plan to prevent smoke from entering caves.

Caves experience minimal air movement when temperatures are around 60˚F. To eliminate impact on federally listed cave species, the prescription will call for daytime high temperatures between 45˚ and 70˚ in order to time the burn with minimal air movement conditions. Additionally, excess fuel (e.g., leaf litter, debris, etc.) will be removed from near the cave entrance with leaf blowers or by hand. Ignition will begin by ring firing at least 50 feet from the cave entrance to minimize fire behavior and smoke near the entrance. Excellent mixing heights ≥3 <650ft. will be included as a prescription parameter so that smoke will move up and out of the area. Once the fire is established around the cave entrance, the perimeter will be fired quickly to take advantage of peak burn period lifting. With proper ignition, perimeter fire should draw the interior fire away from the cave entrance. In addition, a fire truck will be kept by important caves, where possible, and where caves are inaccessible for a truck, a fire crew will monitor the fire as it passes the entrance in case the fire gets within close proximity of the cave.

As an additional precautionary measure, burning around maternity caves utilized by federally listed bat species during the early maternity season (*e.g.,* May 1- June 30) would not occur so that the potential for smoke to enter a cave that contains non-volant young would be completely avoided. Similarly, burning around hibernacula utilized by federally listed bat species would not occur during the typical winter hibernation period (e.g., November 1 – March 15) to avoid disturbance to hibernating bats.

Invasive Species Removal Conservation Measures

The Refuge would employ best management practices during planning and application of all herbicide use including: application at wind speeds less than 10 mph (but not inversion conditions) - must follow label; calibrate application equipment; field scouting/monitoring before pesticide application; pesticide application buffers around sensitive areas; use lowest effective application rate; and vegetative buffers. The Refuge would not apply chemical herbicides in sensitive groundwater recharge areas or above karst topography that is conducive to filtrating into fragile cave habitat utilized by federally listed cave species.

<u>Indiana bat</u>

Should this species be discovered on current Refuge lands or on lands acquired in the future, Refuge staff will conduct habitat assessments and, if necessary, acoustic bat and mist-netting surveys prior to the implementation of any activity that could adversely affect this species to determine whether Indiana bats are present in the vicinity of the proposed activity. Conservation

measures also would be developed and implemented should Indiana bats be detected/captured during acoustic and/or mist-netting surveys to ensure unnecessary impacts to this species do not occur. If the Refuge discovers an Indiana bat maternity roost site within the forest (they tend to roost in trees), the Refuge would avoid prescribed fire in that particular area during the maternity season. In cases where adverse effects could not be completely avoided, the Refuge would initiate formal intra-Service Section 7 consultation with the Oklahoma Ecological Services Field Office.

American burying beetle

The Refuge will conduct presence/absence surveys for American burying beetles prior to the implementation of any activity that would require significant ground disturbance (greater than 1.2 acres) or otherwise have the potential to negatively affect this species when it is determined, based upon a habitat assessment, that the activity would occur in areas of suitable habitat (a level of detail not currently available). If the species is found during survey efforts, the Refuge will coordinate with the Oklahoma Ecological Services Field Office to develop and incorporate appropriate conservation measures into project plans so that adverse effects could be avoided. In cases where adverse effects could not be completely avoided, the Refuge would initiate formal intra-Service Section 7 consultation with the Oklahoma Ecological Services Field Office (ESFO).

General Conservation Measures

Overall, surveys will be undertaken to determine the presence of listed species potentially occurring on the Refuge in areas planned for prescribed burns, vegetation disturbance, or other wildlife disturbance activities related to actions proposed in this CCP. If listed species are found, the Refuge will change or alter management activities so as not to adversely impact the species, or consult with the Oklahoma ESFO prior to undertaking such actions to determine the appropriate course of action in order to adequately address any listed species concerns. Public use activities, such as hunting, environmental education, interpretation, wood harvesting, and wildlife observation and photography will only be allowed in established pre-designated areas, seasons, and times.

The Refuge is working to develop a thorough updated database of the flora and fauna of the Refuge's biotic communities through baseline surveys. These updates should augment the Refuge's sensitive species mandates to provide timely management and protections if, in the future, additional listed species are documented on the Refuge.

As a working document, modifications to the objectives and strategies are anticipated. If modifications result in changes to the effects analysis, or include actions that are not considered in this document, the Refuge will re-initiate consultation or consult with the Oklahoma ESFO

over a particular action that may affect federally listed species and/or critical habitat.

VIII. Effect determination and response requested:

A. Listed species/designated critical habitat:

Determination	**Response Requested**
No effect on species/critical habitat (*Winged mapleleaf, interior least tern, piping plover*)	__X__ Concurrence
May affect, but is not likely to adversely affect species /critical habitat (*Ozark big-eared bat, gray bat, Indiana bat, American burying beetle, Ozark cavefish, Neosho madtom*)	__X__ Concurrence
May affect, is likely to adversely affect species /critical habitat	_____ Concurrence

B. Proposed species/proposed critical habitat:

Determination	**Response Requested**
No effect on species/critical habitat (*rabbitsfoot* [critical habitat only])	__X__ Concurrence
May affect, but is not likely to adversely affect species /critical habitat (*Neosho mucket* [species and critical habitat], *rabbitsfoot* [species only])	__X__ Concurrence
May affect, is likely to adversely affect species /critical habitat	_____ Concurrence

C. Candidate species:

Determination	**Response Requested**
No effect on species/critical habitat (*Sprague's pipit*)	__X__ Concurrence
May affect, is likely to adversely affect species /critical habitat	_____ Concurrence

(*Sprague's pipit*)

May affect, but is not likely to adversely affect species /critical habitat __X__ Concurrence
(Arkansas darter)

May affect, is likely to adversely affect species /critical habitat _____ Concurrence

11-14-12

Signature **Date**
Refuge Manager, Ozark Plateau National Wildlife Refuge

IX. Reviewing ESO Evaluation:

A. Concurrence ✓ Nonconcurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

Jeff Porter 11-15-12

Signature **Date**

[*Title/office of reviewing official*]

X. References:

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Appendix G: Key Legislation and Service Policies

Management of Ozark Plateau National Wildlife Refuge (Refuge, OPNWR) is dictated, in large part, by the legislation that created the unit and the purposes and goals described in Chapter 1 of this CCP. However, other laws, regulations, and policies also guide the management of the Refuge. This Appendix identifies the acts and policy guidance that are integral in the development of this Comprehensive Conservation Plan (CCP).

Administrative Procedure Act (1966; 5 U.S.C. 551-559, 701-706 and 801-808, as amended): Contains procedures that Federal agencies must follow, including public information, open meetings, and privacy of information requirements, and provisions for hearings, adjudications, rule making, and judicial and congressional review of Federal agency actions.

Agricultural Credit Act of 1987 (7 U.S.C. 5104; P.L. 100-233): Authorizes the Farmer's Home Administration (FmHA) to transfer land to any Federal or State agency for conservation purposes (e.g., the FmHA can transfer fee-title or assign interests in real estate to the U.S. Fish and Wildlife Service for the protection of floodplains, wetlands, and surrounding uplands).

Americans with Disabilities Act (1992): The Americans with Disabilities Act is the most comprehensive Federal civil-rights statute that prohibits discrimination on the basis of disability in employment, state and local government, public accommodations, commercial facilities, transportation, and telecommunications.

Antiquities Act of 1906 (16 U.S.C. 431-433): First United States law to provide general protection of cultural or natural resources. This act authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Archaeological and Historic Preservation Act (1974): Requires that Federal agencies provide for *"...the preservation of historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of...any alteration of the terrain caused as a result of any Federal construction project of federally licensed activity or program."*

Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470aa-470mm): The Archaeological Resources Protection Act (ARPA) was enacted *"...to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals."* The main focus of ARPA is on regulation of legitimate archeological investigation on public lands and the enforcement of penalties against looting or vandalism of

these resources. Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources.

Appropriate Uses Policy (2006) 603 FW1: Describes procedures for refuge managers to follow when deciding if uses are appropriate on a refuge. Appropriate uses are either proposed or existing uses on a refuge that meet at least one of the following four conditions: 1) the use is a wildlife-dependent recreational use as identified in the 1997 Improvement Act; 2) the use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law; 3) the use involves the take of fish and wildlife under State regulations; or 4) the use has been found to be appropriate as described further in the Appropriate Refuge Uses policy. This policy applies to all proposed and existing uses in the National Wildlife Refuge System only where the Service has jurisdiction over the use. The policy does not apply in: 1) situations where reserved rights or legal mandates provide that the Service must allow the use, and 2) refuge management activities (e.g., fish and wildlife population or habitat management actions including, but not limited to: prescribed burns, water level management, invasive species control, routine scientific monitoring, law enforcement activities, and maintenance of existing refuge facilities).

Architectural Barriers Act (1968): Requires Federally-owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Bald and Golden Eagles Protection of 1940 (16 U.S.C. 668-668d; 54 Statute 250), as amended: Provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds..

Biological Integrity, Diversity, and Environmental Health (2001) 601 FW 3: As part of the comprehensive conservation planning process, this policy provides for the consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges and associated ecosystems. It provides refuge managers with an evaluation process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate and in concert with refuge purposes and Refuge System mission, restore lost or severely degraded components.

Clean Air Act (1970; 42 U.S.C. 7401 et seq.), as amended: A comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards to protect public health and the environment.

Clean Water Act (1977); Federal Water Pollution Control Act: This is the principal law that governs pollution of the Nation's surface waters. The Clean Water Act employs several regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. Section 404 of the Clean Water Act requires permits (issued by the U.S. Army Corps of Engineers) for the discharge of dredged or fill material into waters of the United States, including wetlands.

Compatibility Policy (2000) 603 FW 2: Incorporates the compatibility provisions of the National Wildlife Refuge System Improvement Act of 1997, that amends the National Wildlife Refuge System Administration Act of 1966. The Compatibility Policy is for determining whether proposed and existing uses, which the Service has jurisdiction over and are occurring on national wildlife refuges, are compatible (i.e., will not detract from or materially interfere) with the purpose(s) of the refuge or with the Refuge System's mission. The policy is to ensure that we (the Service) administer proposed and existing national wildlife refuge uses according to laws, regulations, and policies concerning compatibility, and provides procedures for documentation and periodic review of existing refuge uses.

Comprehensive Conservation Plans (2000) 602 FW 3: As required by the National Wildlife Refuge System Improvement Act of 1997, Comprehensive Conservation Plans (CCPs) describe the desired future conditions of a refuge and provide long-range guidance and management direction to achieve refuge purposes; help fulfill the Refuge System mission; maintain and, where appropriate, restore the ecological integrity; as well as to meet other mandates. The purpose of developing the CCP is to provide the refuge manager with a 15-year management plan for the conservation of fish, wildlife, and plant resources and their related habitats, while providing opportunities for compatible wildlife-dependent recreational uses.

Convention Between the United States of America and the Mexican States for the Protection of Migratory Birds and Game Mammals, 1936 (50 Statute 1311).

Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940 (56 Statute 1354).

Convention Between the United States and Great Britain (for Canada for the Protection of Migratory Birds). (39 Statute 1702; TS 628), as amended.
Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (I.L.M. 11:963-976, September 1972, Ramsar Convention).

Cooperative Research and Training Units Act (1960; 16 U.S.C. 753a-753b), as amended: Authorizes the Secretary of the Interior to enter into cooperative agreements with colleges and universities, State fish and game agencies, and nonprofit organizations for the purpose of

developing adequate, coordinated, cooperative research and training programs for fish and wildlife resources.

Criminal Code Provisions of 1940 (18 U.S.C. 41), as amended: Provides for fines and penalties for the unlawful taking, disturbing, hunting, trapping, capturing of *"...any bird, fish, or wild animal of any kind whatever, or takes or destroys the eggs or nest of any such bird or fish, on any lands or waters which are set apart or reserved as sanctuaries, refuges or breeding grounds for such birds, fish, or animals under any law of the United States or willfully injures, molests, or destroys any property of the United States on any such lands or waters..."*

Disaster Relief Act of 1974 (42 U.S.C. 5121 et seq.), as amended: Provides authority for Federal agencies to assist State and local governments during Presidentially-declared emergencies.

Economy Act (1932; 31 U.S.C. 1535): Provides authority for Federal agencies to order goods and services from other Federal agencies and to pay the actual costs of those goods and services. The Act was passed to obtain economies of scale and eliminate overlapping activities of the Federal government.

Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901-3932, as amended): The purpose of this act is to promote wetlands conservation for the public benefit and to help fulfill international obligations in various migratory bird treaties and conventions. The Act authorizes the purchase of wetlands from Land and Water Conservation Fund monies. The Act also requires the Secretary of the Interior to establish a National Wetlands Priority Conservation Plan, requires the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers funds from import duties on arms and ammunition to the Migratory Bird Conservation Fund.

Endangered Species Act of 1973, as amended: The main purposes of the Endangered Species Act are to: 1) provide a means whereby ecosystems of threatened and endangered species may be conserved; and 2) provide a program for the conservation of threatened and endangered species. The provisions of the Endangered Species Act include, but are limited to, land acquisition, cooperative programs with the States, and interagency cooperation (Section 7). Section 7(a)(1) directs Federal agencies to carry out programs for the conservation of threatened and endangered species.

Environmental Education Act of 1990 (20 U.S.C. 5501-5510): Established the Office of Environmental Education within the Environmental Protection Agency, to develop and administer a Federal environmental education program. The Office is required to develop and support environmental programs in consultation with other Federal natural resource management agencies, including the Fish and Wildlife Service.

Executive Order 11514; Protection and Enhancement of Environmental Quality (1970): This directs that the *"...Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals..."*

Executive Order 11644; Use of off-road vehicles on the public lands (1972): Requires that the Service designate areas as open or closed to off-highway vehicles in order to protect refuge resources, promote safety, and minimize conflict among the various refuge users; monitor the effects of these uses once they are allowed; and amend or rescind any area designation as necessary based on the information gathered.

Executive Order 11987; Exotic organisms (1977): Executive agencies shall, to the extent permitted by law, restrict the introduction of exotic species into the natural ecosystems on lands and waters which they own, lease, or hold for purposes of administration; and, shall encourage the States, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.

Executive Order 11988; Floodplain Management (1977): This directs that each Federal agency *"...shall provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains...,"* in carrying out its responsibilities.

Executive Order 11989; Off-Road Vehicles on Public Lands (1977): Requires the Service to close areas to off-highway vehicles when we determine that the use cause or will cause considerable adverse effects on the soil, vegetation, wildlife, habitat, or cultural or historic resources.

Executive Order 11990; Protection of Wetlands (1977): This directs that each Federal agency *"...shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities..."*

Executive Order 12996; Management and General Public Use of the National Wildlife Refuge System (1996): This spells out the mission of the National Wildlife Refuge System along with establishing guiding principles to help insure the long-term enjoyment of the Refuge System for present and future generations. The order directs the Secretary of the Interior to recognize compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as priority general public uses on the Refuge System (i.e., the big six).

Executive Order 13007; Indian Sacred Sites (1996): Directs Federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites and where appropriate, maintain the confidentiality of sacred sites.

Executive Order 13112; Invasive Species (1999): This order was established to address the growing ecological and economic damage caused by invasive species. Executive Order 13112 requires Federal agencies to: 1) identify actions that might impact the status of invasive species and prevent introductions of invasive species; 2) not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species; 3) detect and respond rapidly to control invasive species populations; 4) monitor and conduct research on invasive species; 5) restore native species and habitat conditions in ecosystems that have been invaded; and 6) promote public education on invasive species.

Executive Order 13186; Responsibilities of Federal agencies to protect migratory birds (2001): Provides guidance for Service programs relative to the management and conservation of migratory birds. Its purpose is to minimize the potential adverse effects of migratory bird take, with the goal of striving to eliminate take, while implementing our mission. This guidance includes, but is not limited to: 1) integrating migratory bird conservation measures into our activities; 2) restoring and enhancing the habitat of migratory birds; 3) ensuring our actions/plans promote migratory bird conservation; 4) promoting inventory, monitoring, research, management studies and information exchange related to migratory birds; 5) promoting education and outreach related to migratory birds; 6) identifying special migratory bird habitats; and 7) strengthening non-Federal partnerships to further bird conservation.

Executive Order 13514; Federal Leadership in Environmental, Energy, and Economic Performance (2009): Provides guidance for federal agencies to increase energy efficiency; reduce greenhouse gas emissions; design, construct, maintain, and operate high performance sustainable buildings, etc.

Farmland Protection Policy Act (7 U.S.C. 4201 et seq.): Requires Federal agencies to identify and take into account the adverse effects of their programs on the preservation of farmlands.

Federal Aid in Wildlife Restoration Act (1937; 16 U.S.C. 669-669i), as amended: Commonly called the "Pittman-Robertson Act," this provides Federal aid to States for management and restoration of wildlife. Funds from an 11-percent excise tax on sporting arms and ammunition are appropriated to the Secretary of the Interior and apportioned to States on a formula basis for paying up to 75% of the cost-approved projects. Project activities include acquisition and improvement of wildlife habitat, introduction of wildlife into suitable habitat, research into wildlife problems, surveys and inventories of wildlife problems, acquisition and development of

access facilities for public use, and hunter education programs, including construction and operation of public target ranges.

Federal Environmental Pesticide Control Act of 1972 (7 USC 136-136y), as amended: This established, under the Administrator of the EPA, a program for controlling the sale, distribution, and application of pesticides through an administrative registration process. The amendments provided for classifying pesticides for "general" or "restricted" use. "Restricted" pesticides may only be applied by or under the direct supervision of a certified applicator. Amendments to this Act also authorized experimental use permits and provided for administrative review of registered pesticides and for penalties for violations of the statute. States were authorized to regulate the sale or use of any pesticide within a state, provided that such regulation does not permit any sale or use prohibited by the Act. The Federal Environmental Pesticide Control Act of 1972 amended the **1947 Federal Insecticide, Fungicide, and Rodenticide Act** (FIFRA). The 1947 statute (FIFRA), prohibited the sale or distribution of "*economic poisons*," provided for the registration of such materials, and authorized penalties for violation of the Act. The Endangered Species Act later amended FIFRA to define imminent hazard to include situations involving *unreasonable hazard to the survival of a species declared by the Secretary of the Interior to be endangered or threatened*.

Federal Fire Prevention and Control Act of 1974 (15 U.S.C. 2201 et seq.), as amended: This authorizes reimbursement to State and local fire services for costs incurred in firefighting on Federal property.

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species, and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471-535), as amended: Sets forth requirements for the management and disposal of government property, including excess property (property under the control of any Federal agency, but which it no longer needs) and surplus property (excess property not required for the needs of any Federal agency).

Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l), as amended: This established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges. The policy emphasizes the commercial fishing industry but also with a direction to administer the Act with regard to the inherent right of every citizen and resident to fish for pleasure, enjoyment, and betterment, and to maintain and increase public opportunities for recreational use of fish and wildlife resources. Among other things, the Act directs a program of continuing research, extension, and information services on fish and wildlife matters, both domestically and internationally. A 1974 amendment to the Fish and Wildlife Act of 1956 abolished the "Bureau of Sport Fisheries and Wildlife" and re-designated it as the "United States Fish and Wildlife Service"(Public Law 93-271). In 1978, the Fish and Wildlife Act was amended to allow the Service to accept donations of both real and personal property. In 1998, the Fish and Wildlife Act of 1956 was further amended to promote volunteer programs and community partnerships for the benefit of national wildlife refuges. This also required the Secretary of the Interior to develop refuge education programs to provide outdoor classroom opportunities for students to promote understanding of the National Wildlife Refuge System and to improve scientific literacy in conjunction with both formal and informal education programs.

Fish and Wildlife Conservation Act of 1980 ("Nongame Act")(16 U.S.C. 2901-2911), as amended: Authorizes financial and technical assistance to the States for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. A 1988 amendment requires the Service to monitor and assess migratory nongame birds, determine the effects of environmental changes and human activities, identify those likely to be candidates for endangered species listing, identify appropriate actions, and report to Congress one year from enactment. It also requires the Service to report at 5 year intervals on actions taken.

Fish and Wildlife Coordination Act (1934), as amended: Authorizes the Secretary of the Interior to assist Federal, State, and other agencies in development, protection, rearing and stocking fish and wildlife on Federal lands and to study effects of pollution on fish and wildlife. The Act also requires consultation with the U.S. Fish & Wildlife Service and the wildlife agency of any State wherein the waters of any stream or other water body are proposed to be impounded, diverted, channelized or otherwise controlled or modified by any Federal agency, or any private agency under Federal permit or license; with a view to preventing loss of, or damage to, wildlife resources in connection with such water resource projects. The Act further authorizes Federal water resource agencies to acquire lands or interests in connection with water use projects specifically for mitigation and enhancement of fish and wildlife.

Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421; 92 Stat. 3110), as amended: Authorizes the Secretaries of the Interior and Commerce to establish, conduct, and assist with

National training programs for State fish and wildlife law enforcement personnel. It also authorized funding for research and development of new or improved methods to support fish and wildlife law enforcement. The law provides authority to the Secretaries to enter into law enforcement cooperative agreements with State or other Federal agencies, and authorizes the disposal of abandoned or forfeited items under the fish, wildlife, and plant jurisdictions of these Secretaries. It strengthens the law enforcement operational capability of the Service by authorizing the disbursement and use of funds to facilitate various types of investigative efforts.

Flood Control Act of 1944, as amended: This act, supplemented by other flood control acts and river and harbor acts, authorizes various Corps of Engineers water development projects. The Flood Control Act expressed Congressional intent to limit the authorization and construction of navigation, flood control, and other water projects to those having significant benefits for navigation and which could be operated consistent with other river uses. This authorized the construction of numerous dams and modifications to previously existing dams. Several provisions of this act impact the responsibilities of the Service under the **Fish and Wildlife Coordination Act**.

Food Security Act of 1985 "Farm Bill" (99 Stat. 1354), as amended by the Food, Agriculture, Conservation, and Trade Act of 1990: This contains several provisions that contribute to wetland conservation. The "Swampbuster" provisions stated that farmers who produce an agricultural commodity on wetlands converted after enactment are ineligible for most farmer program subsidies. Administration of the program in the Department of Agriculture (USDA), which is required to consult with the U.S. Fish and Wildlife Service on matters relating to wetland identification, determination of exemptions to the wetland conservation provisions, issuance of implementing regulations, mitigation, and restoration of values and functions on converted wetlands. This Act also authorized the Secretary of Agriculture to grant or sell conservation easements, which may include wetlands, to State or local governments or private non-profit organizations for conservation purposes. In addition, the 1985 Act also established a Conservation Reserve program, providing incentives to private landowners (e.g., farmers) to return farmland to permanent vegetative cover and for applying soil conservation prescriptions such as wildlife habitat development. The program was expanded in 1988 by regulation to make cropped wetlands eligible for the program, with the intended result of wetland restoration (i.e., The Wetland Reserve Program).

Freedom of Information Act (1966; 5 U.S.C. 552): Requires all Federal agencies to make available to the public for inspection and copying administrative staff manuals and staff instructions, official, published and unpublished policy statements, final orders deciding case adjudication, and other documents. Special exemptions have been reserved for nine categories of privileged material, including but not limited to confidential matters relating to National defense

or foreign policy, law enforcement records, and trade or commercial secrets. The Act requires the party seeking the information to pay reasonable search and duplication costs.

Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461-462, 464-467), as amended. Also known as the Historic Sites Act, this declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration, and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January, 1989, 31 national wildlife refuges contained such sites, including Attwater Prairie Chicken NWR.

Lacey Act of 1900 (16 U.S.C. 701), as amended: Makes it unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants taken, possessed, transported, or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken possessed or sold in violation of State or foreign law. The Lacey Act covers all fish and wildlife and their parts or products, and plants protected by the Convention on International Trade in Endangered Species and those protected by State law. Commercial guiding and outfitting are considered to be a sale under the provisions of the Act. The Act also includes prohibitions on the importation of wild vertebrates and other animals listed in the Act or declared by the Secretary of the Interior to be injurious to man or agriculture, wildlife resources, or otherwise, except under certain circumstances and pursuant to regulations. The Lacey Act includes penalties and fines for violations involving imports or exports or violations of a commercial nature.

Land and Water Conservation Fund Act (1965): Authorizes the use of the receipts from the sale of surplus Federal land, outer continental shelf oil and gas sales, and other sources for land acquisition. Section 7(a)(l) of this Act provides authority to use Land and Water Conservation Fund money for acquisition of refuge areas under paragraph (5) of section 7(a) of the Fish and Wildlife Act of 1956.

Migratory Bird Conservation Act (1929; 16 U.S.C. 715-715d, 715e, 715f-715r), as amended: This established a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712), as amended: The Migratory Bird Treaty Act (MBTA) is one of the earliest Federal wildlife management laws enacted to protect migratory birds, which were rapidly declining from unregulated sport and commercial hunting. Specific provisions in the MBTA include the establishment of a Federal prohibition, unless permitted by regulations, to *"...pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be*

shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention ...for the protection of migratory birds...or any part, nest, or egg of any such bird."

Migratory Bird Hunting and Conservation Stamp Act (1934; 16 U.S.C. 718-718j), as amended: Known as the "Duck Stamp Act," this requires each waterfowl hunter 16 years of age or older to possess a valid Federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations. Funds appropriated under the Wetlands Loan Act (16 U.S.C. 715k-3 - 715k-5), as amended, are merged with duck stamp receipts and provided to the Secretary of the Interior for the acquisition of migratory bird refuges under provisions of the Migratory Bird Conservation Act (16 U.S.C. 715 et seq), as amended, and since August 1, 1958, for acquisition of "Waterfowl Production Areas."

National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347), as amended: The National Environmental Policy Act (NEPA) requires that all Federal agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. NEPA stipulates factors to be considered in environmental impact statements, and requires that Federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that un-quantified environmental values are given appropriate consideration, along with economic and technical considerations.

National Historic Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n), as amended: Provides for preservation of significant historical features (buildings, objects, and sites) through a grant-in-aid program to the States. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468-468d). The Act established an Advisory Council on Historic Preservation, which was made a permanent independent agency in 1976. That Act also created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register. As of January, 1989, 91 historic sites on national wildlife refuges have been placed on the National Register.

National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority

public uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a comprehensive conservation plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Wildlife Refuge System Improvement Act (1997): Sets the mission and administrative policy for all refuges in the National Wildlife Refuge System. Clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); establishes the responsibilities of the Secretary of the Interior for managing and protecting the system; and requires a comprehensive conservation plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

Native American Graves Protection and Repatriation Act (1990): Requires Federal agencies and museums to inventory, determine ownership of and repatriate cultural items under their control or possession.

North American Wetlands Conservation Act (1989; 16 U.S.C. 4401-4412), as amended: Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, U.S. and Mexico.

Protection Act (1922; 16 U.S.C. 594): Provides for the Secretary of the Interior to protect and preserve, from fire, disease, or the ravages of beetles or other insects, timber on the public lands owned by the United States.

Reciprocal Fire Protection Act of 1955 (42 U.S.C. 1856), as amended by the Wildfire Suppression Assistance Act of 1989 (102 Stat. 1615): Provides authority for Federal agencies to enter into mutual assistance agreements with foreign, State, and local governments for combating wildfires, and to provide emergency assistance when no agreement exists.

Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), as amended: Authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. The Act provides for public use fees and permits, and penalties for violation of regulations. It also authorizes the acceptance of donations of funds and real and personal property to assist in carrying out its purposes. Amendments to the Act authorize acquisition of lands and interests

suitable for: 1) fish and wildlife-oriented recreation, 2) protection of natural resources, 3) conservation of endangered or threatened species, or 4) carrying out two or more of the above. Such lands were required to be adjacent to or within an existing conservation area. Acquisition was not permitted with "duck stamp" receipts for these purposes.

Refuge Revenue Sharing Act of 1935 (16 U.S.C. 715s), as amended: Provides for payments to county governments in lieu of taxes, using revenues derived from the sale of products from refuges. Revenues received from refuge products, such as animals, timber and minerals, or from leases or other privileges, are required to be deposited in a special Treasury account and net receipts distributed to counties. Remaining monies are required to be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act. The Act was later amended to expand the revenue sharing system to include National Fish Hatcheries and Service research stations. It also included in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as: 1) on acquired land, the greatest amount calculated on the basis of 75 cents per acre, three-fourths of one percent of the appraised value, or 25% of the net receipts produced from the land, and 2) on land withdrawn from the public domain, 25% of net receipts and basic payment, in lieu of taxes on public lands. Amendments to the Act authorized appropriations to make up any difference between the amount in the Revenue Sharing Fund and the amount scheduled for payment in any year. Counties are also required to pass payments along to other units of local government within the county which suffer losses in revenues due to the establishment of Service areas.

Refuge Trespass Act of 1948 (18 U.S.C. 41): This consolidated penalty provisions of various acts from 1905 through 1934, establishing and protecting fish and wildlife areas, and restated the intent of Congress to protect all wildlife within Federal sanctuaries, refuges, fish hatcheries and breeding grounds.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal government to ensure that anybody can participate in any program.

Secretarial Order No. 3226; Evaluating Climate Change Impacts in Management Planning (2001): Directs each Department of Interior bureau to consider and analyze potential climate change impacts when undertaking long-range planning efforts or multi-year management plans.

Transportation Equity Act for the 21st Century (TEA-21): 23 U.S.C., as amended: In part, this established the Refuge Roads Program and requires that all projects funded under the Refuge Roads Program be consistent with the Service's CCP plans and step-down management plans.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b-d), as amended: This Act provides that, upon a determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred without reimbursement to the Secretary of the Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4601 et seq.), as amended: Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

Volunteer and Partnership Enhancement Act (1998): This amended the Fish and Wildlife Act of 1956 to promote volunteer programs and community partnerships for the benefit of national wildlife refuges, and for other purposes.

Waterfowl Depredations Prevention Act (1956; 7 U.S.C. 442-445), as amended: This Act authorizes the Secretary of the Interior to use surplus grain owned by Commodity Credit Corporation in feeding waterfowl to prevent crop damage. Findings regarding possible crop damage are to be made by the Secretary of the Interior and grain is to be used to lure waterfowl away from crops while not exposing them to shooting over areas to which they have been lured. Such grain may be made available to Federal, State or local governments or private organizations or individuals. Appropriations are authorized to reimburse the Corporation for packaging and transporting such grain.

Water Resources Planning Act (1965), as amended: This established a Water Resources Council to be composed of Cabinet representatives, including the Secretary of the Interior. The Council was empowered to maintain a continuing assessment of the adequacy of water supplies in each region of the U.S. In addition, the Council was mandated to establish principles and standards for Federal participants in the preparation of river basin plans and in evaluating Federal water projects. Upon receipt of a river basin plan, the Council was required to review the plan with respect to agricultural, urban, energy, industrial, recreational, and fish and wildlife needs. This also established a grant program to assist States in participating in the development of related comprehensive water and land use plans.

Wetlands Reserve Program: The Wetlands Reserve Program (WRP) is a voluntary program. It provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands in an environmentally beneficial and cost-effective manner. The program provides an opportunity for landowners to receive financial incentives to restore, protect, and enhance wetlands in exchange for retiring marginal land from agriculture. There are three enrollment options for landowners: 1) permanent

easement, 2) 30-year easement, and 3) a restoration cost-share agreement. The WRP was re-authorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). The Natural Resources Conservation Service administers the program (*See Also: Food Security Act of 1985*).

Wilderness Act of 1964 (16 U.S.C. 1131): The purpose of this act is to preserve and protect wild lands in their natural condition *"...to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.*" This directed Federal agencies such as the U.S. Fish and Wildlife Service to survey their roadless lands for possible wilderness designation. Wilderness areas are protected from development and the operation of motorized equipment. A Wilderness Area is defined as an area with at least 5,000 acres of undisturbed, undeveloped land affected by the forces of nature and may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

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Appendix H: Glossary

accessible facilities: structures accessible for most people with disabilities without assistance; facilities that meet UFAS standards; ADA-accessible

adaptive management: a management style in which the effectiveness of management actions is monitored and evaluated, and future management is modified as needed, based on the results of this evaluation or other relevant information that becomes available

alternatives: Different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission, and resolving issues. A reasonable way to fix an identified problem or satisfy a stated need [40 CFR 1500.2 (cf. "management alternative")]

appropriate use: A proposed or existing use on a refuge that is a wildlife-dependent recreational use as identified in the 1997 Refuge System Improvement Act (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) or the use contributes to the fulfillment of refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997.

approved acquisition boundary: a project boundary that the Director of the U.S. Fish and Wildlife Service approves upon completion of the planning and environmental compliance process. An approved acquistion boundary only designates those lands which the Service has authority to acquire or manage through various agreements. The approval of an acquisition boundary does not grant the Service jurisdiciton or control over lands within the refuge boundary part of the National Wildlife Refuge System. Lands do not become part of the System until the Service buys them or they are placed under an agreement that provides for their management as part of the System.

best management practices: land management practices that produce desired results [n.b. usually describing forestry or agricultural practices effective in reducing non-point source pollution, like not storing manure in flood plain. In their broader sense, practices that benefit target species.]

biological diversity: The variety of life and its processes, including the variety of living organisms, the genetic differences among them and communities and ecosystems in which they occur.

biological integrity: Biotic composition, structure and functioning at genetic, organism and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms and communities.

biotic community: A set of plants, animals and microorganisms occupying an area interacting directly or indirectly with each other and their physical environment.

breeding habitat: habitat used by migratory birds or other animals during the breeding season

candidate species: species for which we have sufficient information on file about their biological vulnerability and threats to propose listing them

cave: naturally occurring void/recess below the Earth

compatible use: A wildlife-dependent recreational use, or any other proposed or existing use on a refuge that will not materially interfere with or detract from the purposes of the refuge or the National Wildlife Refuge System mission.

Comprehensive Conservation Plan: A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge; helps fulfill the mission of the Refuge System; maintains and, where appropriate, restores the ecological integrity of each refuge and the Refuge System; helps achieve the goals of the National Wilderness Preservation System; and meets other mandates.

concern: cf. “issue”

connectivity: community occurrences and reserves have permeable boundaries and thus are subject to inflows and outflows from the surrounding landscape. Connectivity in the selection and design of nature reserves relates to the ability of species to move across the landscape to meet basic habitat requirements. Natural connecting features within the ecoregion may include river channels, riparian corridors, ridgelines, or migratory pathways.

conservation: managing natural resources to prevent loss or waste [N.b. Management actions may include preservation, restoration, and enhancement.]

conservation easement: a non-possessory interest in real property owned by another imposing limitations or affirmative obligations with the purpose of returning or protecting the property’s conservation values.

conservation status: assessment of the status of ecological processes and of the viability of species or populations in an ecoregion.

cooperative agreement: a usually long-term habitat protection action, which can be modified by either party, in which no property rights are acquired. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System

coyote mentoring: Ozark Plateau NWR's EE programs are based on this philosophy, as highlighted in *Coyote's Guide to Connecting with Nature* (Young, et. al., 2010), which is the art of guiding people to have a deep nature-connection by mentoring and facilitating an edge-walking experience, as coyote does, between the ancient, primitive world of the wilderness and instinct, and the modern, civilized world of science and technology

cultural resources: The remains of meaningful sites, structures, or objects used by people in the past.

deep nature-connection: a strong kinship between students and their environment through a quality of awareness and a quality of connection to a place and all its living things (Young et. al., 2010)

delineate: to indicate the exact position or boundaries of something

desired future condition: the qualities of an ecosystem or its components that an organization seeks to develop through its decisions and actions.

disturbance: any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment

ecological integrity: The relative intactness of biotic and abiotic components and their interrelated structure and function within a given ecosystem.

ecoregion: a territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations; generally, a system of related, interconnected ecosystems.

ecosystem: Dynamic and interrelating complex of plant and animal communities and their associated non-living environment.

ecosystem approach: A strategy or plan to protect and/or restore the natural function, structure and species composition of an ecosystem, recognizing that all components are interrelated.

ecosystem management: Management of an ecosystem that includes all ecological, social, and economic components, which make up and/or that affect the whole of the system.

endangered species: A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

environmental assessment: A systematic analysis to determine if proposed Federal actions would result in a "significant effect on the quality of the human environment" thereby requiring either the preparation of an environmental impact statement (EIS) or a determination of a "Finding of No Significant Impact."

environmental education: curriculum-based education aimed at producing a citizenry that is knowledgeable about the biophysical environment and its associated problems, aware of how to help solve those problems, and motivated to work toward solving them

exotic: A non-native plant or animal species to the ecosystem under consideration introduced intentionally or unintentionally.

extinction: the termination of any lineage of organisms, from subspecies to species and higher taxonomic categories from genera to phyla. Extinction can be local, in which one or more populations of a species or other unit vanish but others survive elsewhere, or total (global), in which all the populations vanish (Wilson 1992)

fauna: all animal life associated with a given habitat, country, area or period

federal land: public land owned by the Federal Government, including national forests, national parks, and national wildlife refuges

federally listed species: a species listed either as endangered, threatened, or a species at risk (formerly, a "candidate species") under the Endangered Species Act of 1973, as amended

federal trust species: Important fish and wildlife resources that the U.S. Fish and Wildlife Service is specifically mandated to protect including migratory birds, threatened species, endangered species, inter-jurisdictional fish, marine mammals, and other species of concern.

fee-title acquisition: the acquisition of most or all of the rights to a tract of land; a total transfer of property rights with the formal conveyance of a title. While a fee-title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (e.g., the ability to continue using the land for a specified time period, such as the remainder of the owner's life).

Finding of No Significant Impact (FONSI): supported by an environmental assessment, a document that briefly presents why a Federal action will have no significant effect on the human

environment, and for which an environmental impact statement, therefore, will not be prepared [40 CFR 1508.13]

firebreak: A firebreak is a permanent or temporary strip of bare or vegetated land planned to retard fire. Firebreaks shall consist of bare ground, roads, or fire-resistant vegetation. Firebreaks will be of sufficient width and length to contain the expected fire. They will be located and constructed in areas to minimize risk (detrimental effects) to the target species.

fire regime: the characteristic frequency, intensity, and spatial distribution of natural fires within a given ecoregion or habitat

flora: all the plants found in a particular place

flyway: any one of several established migration routes of birds

fragmentation: the disruption of extensive habitats into isolated and small patches. Fragmentation has two negative components for biota: the loss of total habitat area; and, the creation of smaller, more isolated patches of habitat remaining.

geographic information system (GIS): a computerized system to compile, store, analyze and display geographically referenced information [E.g., GIS can overlay multiple sets of information on the distribution of a variety of biological and physical features.]

goal: Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not defined measurable units.

habitat fragmentation: the breaking up of a specific habitat into smaller, unconnected areas [N.b. A habitat area that is too small may not provide enough space to maintain a breeding population of the species in question.]

habitat conservation: protecting an animal or plant habitat to ensure that the use of that habitat by the animal or plant is not altered or reduced

habitat: The place or type of site where species and species assemblages are typically found and/or successfully reproduce. [N.b. An organism's habitat must provide all of the basic requirements for life, and should be free of harmful contaminants.]

historic conditions: the composition, structure and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human-related changes to the landscape

hydrology: the science of waters of the earth: their occurrences, distributions, and circulations; their physical and chemical properties; and their reactions with the environment, including living beings

interpretive facilities: structures that provide information about an event, place, or thing by a variety of means, including printed, audiovisual, or multimedia materials [E.g., kiosks that offer printed materials and audiovisuals, signs, and trail heads.]

interpretive materials: any tool used to provide or clarify information, explain events or things, or increase awareness and understanding of the events or things [E.g., printed materials like brochures, maps or curriculum materials; audio/visual materials like video and audio tapes, films, or slides; and, interactive multimedia materials, CD-ROM or other computer technology.]

invasive plant species: A non-native plant to the ecosystem under consideration that lacks natural controls and tends to aggressively dominate the plant community, often forming extensive mono-cultures. Invasive species generally reduce the diversity and health of ecosystems when they become dominant.

Issue: Any unsettled matter that requires management decision, e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition.

karst environment: a landscape that is marked by caves, sinkholes, springs, and other features and has special drainage characteristics due to the greater solubility of certain rocks

Land Protection Plan (LPP): a document that identifies and prioritizes lands for potential Service acquisition from a willing seller, and describes other methods of providing protection. Landowners within project boundaries will find this document, which is released with environmental assessments, most useful.

limiting factor: an environmental limitation that prevents further population growth

losing stream: a stream with a bed that allows water to flow directly to the groundwater system

mission statement: a succinct statement of the purpose for which the unit was established; its reason for being

mitigation: actions to compensate for the negative effects of a particular project [E.g., wetland mitigation usually restores or enhances a previously damaged wetland or creates a new wetland.]

National Environmental Policy Act (of 1969): (NEPA) requires all Federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in planning and implementing environmental actions [Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making (cf. 40 CFR 1500).]

national wildlife refuge: A designated area of land or water or an interest in land or water within the Refuge System, such as refuges, wildlife management areas, waterfowl production areas and other areas under Service jurisdiction for the protection and conservation of fish and wildlife and plant resources. A complete listing of all units of the Refuge System may be found in the current "Annual Report of Lands under Control of the U.S. Fish and Wildlife Service."

National Wildlife Refuge System: All lands, waters and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas and other areas for the protection and conservation of fish, wildlife and plant resources.

native: a species that, other than as a result of an introduction, historically occurred or currently occurs in a particular ecosystem

native plant: a plant that has grown in the region since the last glaciation, and occurred before European settlement

natural disturbance event: any natural event that significantly alters the structure, composition, or dynamics of a natural community: e.g., floods, fires, and storms

Notice of Intent: (NOI) an announcement we publish in the Federal Register that we will prepare and review an environmental impact statement [40 CFR 1508.22]

objective: A concise statement of what we want to achieve, how much we want to achieve, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. Make objectives attainable, time-specific, and measureable.

partnership: a committed, long-term relationship between institutions with a common objective, allowing each side to dedicate time, money, knowledge, and/or personnel to the partnership to accomplish a certain conservation task that neither institution could do alone (Smith, 2005)

philopatry: the behavior of remaining in, or returning to, an individual's birthplace. More specifically, in ecology philopatry is the behavior of elder offspring sharing the parental burden in the upbringing of their siblings, a classic example of kin selection.

population: an interbreeding group of plants or animals. The entire group of organisms of one species.

prairie: an extensive area of flat or rolling grassland.

prescribed fire: Prescribed burning is the application of controlled fire on a pre-determined area of land. It will be used at Ozark Plateau NWR to promote the development of historic plant communities in oak/hickory forests while also reducing hardwood understory density for the targeted species. Use of prescribed burning will restore, enhance, or maintain desirable habitat. Burning should be managed with consideration for targeted species needs, particularly smoke management near cave entrances. A prescribed burn plan is required prior to the implementation of the burn. A trained and qualified individual will formulate this plan considering overall ecological restoration, smoke management, required safety equipment, special precaution areas, and techniques.

priority public use: Wildlife-dependent recreational uses involving hunting, fishing wildlife observation and photography, and environmental education and interpretation are the priority general public uses of the system and shall receive priority consideration in refuge planning and management.

priority species: Wildlife or plant species that include Federal trust species such as migratory birds, threatened species, endangered species, inter-jursdictional fish, marine mammals, and other species of concern. Priority species also include rare, declining, or species of management concern that are on lists maintained by natural heritage programs, State wildlife agencies, other Federal agencies, or professional, academic, and scientific societies, and those mentioned in landscape-level or other conservation plans.

private land: land owned by a private individual or group or non-government organization

public involvement: offering an opportunity to interested individuals and organizations whom our actions or policies may affect to become informed; soliciting their opinions. We thoroughly study public input, and give it thoughtful consideration in shaping decisions about managing refuges.

public uses: Normally refers to the six priority public uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation), but may include other permitted special uses.

purposes of the refuge: "The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit."

refuge lands: lands in which the Service holds full interest in fee title or partial interest like an easement

Refuge Operating Needs System (RONS): The Refuge Operating Needs System is a national database that contains the unfunded operational needs of each refuge. We include projects required to implement approved plans and meet goals, objectives, and legal mandates.

representative species: a species that is indicative of particular conditions in a system (ranging from natural to degraded) and used as a surrogate measure for other species of particular conditions. An element of biodiversity selected as a focus for conservation planning or action. The two principal types of targets in Conservancy planning projects are species and ecological communities.

restoration: management of a disturbed or degraded habitat that results in the recovery of its original state [E.g., restoration may involve planting native grasses and forbs, removing shrubs, prescribed burning, or reestablishing habitat for native plants and animals on degraded grassland.]

riparian: Of or relating to land lying immediately adjacent to a water body and having specific characteristics of that area, such as riparian vegetation. A stream bank is an example of a riparian area.

scoping: A process for identifying the "scope of issues" to be addressed by a CCP. Involved in the scoping process are Federal, State, local agencies, private organizations, and individuals.

species: the basic category of biological classification intended to designate a single kind of animal or plant. Any variation among the individuals may be regarded as not affecting the essential sameness which distinguishes them from all other organisms.

stakeholders: Those agencies, organizations, groups and individuals of the public, having an interest or stake in an organization's program and that affects or that may be affected by its implementation.

step-down management plan: A plan that provides specific guidance on management subjects (e.g. habitat, public use, fire, safety) or groups of related subjects. It describes strategies and implementation schedules for meeting CCP goals and objectives.

strategy: A specific action, tool, technique, or combination of actions, tools, and techniques used to meet unit objectives.

threatened species: A plant or animal species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future.

trust species: (*See Federal Trust Species*).

wetland: Areas such as lakes, marshes, ponds, swamps, or streams that are inundated by surface or groundwater that is enough to support plants and animals that require saturated or seasonally saturated soils.

white-nose syndrome: a disease caused by the fungus *Geomyces destructans*, which is responsible for unprecedented mortality in cave-hibernating bats in the northeastern and central U.S and eastern Canada (Lorch et al, 2011). This previously unknown disease has spread very rapidly since its discovery in January 2007, and poses a considerable threat to cave-hibernating bats throughout North America. More than 5 million hibernating bats have died since 2007 (Froschauer, 2012).

wildfire: unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires.

wildland fire: every wildland fire is either a wildfire or a prescribed fire [FWS Manual 621 FW 1.3]. A general term describing any non-structure fire that occurs in the wildland.

wildlife-dependent recreational use: "A use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation." These are the six priority public uses of the Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife. We also will consider these other uses in the preparation of refuge CCPs; however, the six priority public uses always will take precedence.

wildlife management: manipulating wildlife populations, either directly by regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors

vision statement: A concise statement of what the planning unit should be, or what we hope to do, based primarily upon the Refuge System mission and specific refuge purposes, and other mandates. We will tie the vision statement for the refuge to the mission of the Refuge System; the purpose(s) of the refuge; the maintenance or restoration of the ecological integrity of each refuge and the Refuge System; and other mandates.

ABBREVIATIONS AND ACRONYMS

ADA	Americans with Disabilities Act
ARPA	Archeological Resources Protection Act
BCI	Bat Conservation International
BSA	Boy Scouts of America
CAFO	Confined Animal Feeding Operation
CCP	Comprehensive Conservation Plan
CDs	Compatibility Determinations
DEQ	Department of Environmental Quality
EA	Environmental Assessment
EE	Environmental Education
EIS	Environmental Impact Statement
EO	Executive Order
ES	Ecological Services
FMP	Fire Management Plan
FONSI	Finding of No Significant Impact
FR	Federal Register
FRWC	Fossil Rim Wildlife Center
FWS	U.S. Fish & Wildlife Service
GRDA	Grand River Dam Authority
GS	General Schedule (pay rate schedule for certain Federal positions)
GSA	Girl Scouts of America
HMP	Habitat Management Plan

I&M	Inventorying & Monitoring
IPCC	International Panel on Climate Change
ITA	Indian Trust Asset
LCC	Landscape Conservation Cooperative
LE	Law Enforcement
MMLERC	Mary & Murray Looney Education & Research Center
MOU	Memorandum of Understanding (Agreements)
NEPA	National Environmental Policy Act
NGOs	Non-governmental Organizations
NNL	National Natural Landmark
NRCS	Natural Resources Conservation Service (U.S. Department of Agriculture)
NSS	National Speleological Society
NSU	Northeastern State University
NVCS	National Vegetation Classification System
NWR	National Wildlife Refuge
O&M	Operation & Maintenance
ODWC	Oklahoma Department of Wildlife Conservation
OPNWR	Ozark Plateau National Wildlife Refuge
OSU	Oklahoma State University
OTS	Ozark Tracker Society
OU	University of Oklahoma
PIF	Partners in Flight
Plan	Comprehensive Conservation Plan
Refuge System	National Wildlife Refuge System
RNA	Research Natural Area
RONS	Refuge Operating Needs System
RRP	Refuge Roads Program
RSU	Rogers State University
SAMMS	Service Asset Maintenance Management System

SCA	Student Conservation Association
SCEP	Student Career Experience Program
SHC	Strategic Habitat Conservation
Service	U.S. Fish & Wildlife Service
SUP	Special Use Permit
System	National Wildlife Refuge System
T&E	Threatened and Endangered Species
TCPP	Texas City Prairie Preserve
TNC	The Nature Conservancy
TPWD	Texas Parks and Wildlife Department
UA	University of Arkansas
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USFWS	U.S. Fish & Wildlife Service
WG	Wage Grade Schedule (pay rate schedule for certain Federal positions)
WMA	Wildlife Management Area
WNS	White-nose Syndrome

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Appendix I: References

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Appendix J: List of Preparers

Core Planning Team:

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Other USFWS Staff involved in the development of the CCP:

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Appendix K: Response to Public Comments

This appendix identifies public comments received on the Ozark Plateau National Wildlife Refuge (NWR; Refuge) Draft Comprehensive Conservation Plan (Draft CCP) and Environmental Assessment (EA) and the U.S. Fish and Wildlife Service's response to those comments.

The public was notified of the release of the Draft CCP and EA with a Notice of Availability published in the *Federal Register, Vol. 78, No. 27*, on February 8, 2013 ([FWS–R2–R–2012–N277] FR00001273), as well as mailing a postcard notifying everyone on the Refuge mailing list of the Draft CCP/EA public review process. In addition, the Refuge also advertised in various media outlets (local newspapers and local and national social media sites) and by posting fliers at local community centers. The public comment period was open for 30 days, closing on March 8, 2013. The Ozark Plateau NWR hosted three public meetings (see Table K-1) during the Draft CCP public review period to engage locals in discussions regarding Refuge management and get feedback on what was being proposed in the Draft CCP.

Table K-1. Location, Attendance, and Dates of Public Meetings during Draft CCP Public Review Period.

Meeting Location	Attendance	Meeting Date
Delaware County Library. Jay, OK	9	Monday, February 25, 2013
Stilwell Community Center. Stilwell, OK	13	Tuesday, February 26, 2013
Cherokee Nation Headquarters Community Ballroom. Tahlequah, OK	14	Thursday, February 28, 2013

The Service received 64 total responses that included a combination of letters, emails, and comments submitted (orally and via comment forms) during the public meetings. All responses were analyzed using a process called content analysis. Content analysis organizes and groups comments made during the public comment period to reflect different resource issues. A number of issues were identified in the public's response to the Draft CCP/EA. Respondents were self-selected (i.e., they voluntarily provided comments); therefore their comments do not necessarily represent the sentiments of the public as a whole.

Geographic Representation

Table K-2. Geographic representation was tracked for each respondent.

State/Native Nation	Number of Respondents
Oklahoma	30
Arkansas	11
Texas	1
Washington, DC	1
Unspecified	21
Total	**64**

Organization Affiliation

Responses were received from various organizations and unaffiliated individuals. Organization types were tracked for each comment received. Organization Types, and the number of respondents in each category, are identified in Table 2.

Table K-3. Number of Responses by Organizational Affiliation

Organization Type	Number of Respondents
General Public	45
Non-Governmental Organization	5
Local Government (City/County)	1
University/Education Institution	5
State Agency	7
Tribal Nation	1
Federal Agency	0
Total	**64**

Response to Public Comments

The Service's response to public comments is displayed below under the following topics:

- Comprehensive Conservation Plan/EA – General
- Partnerships
- Land Acquisition
- Scientific Research
- Habitat Management

- Wildlife Management
- Hunting
- Environmental Education/Interpretation

Some of the Service's response to public comments did not warrant changes to the Final CCP while others did. The comment portion of this table is mostly verbatim of the comments we received. However, some may contain a clarified version of the actual comment submitted, especially if there were spelling errors, etc. All comments are on file in the Ozark Plateau National Wildlife Refuge Comprehensive Conservation Plan administrative file located in the Southwest Regional Office.

Topic: COMPREHENSIVE CONSERVATION PLAN/EA – GENERAL

Comment (ODWC): In general, the Ozark Plateau NWR CCP is a very thoughtful and well-written plan of action and it address the known conservation issues in the Oklahoma Ozarks and articulates the needs of the Refuge very well. It contains an impressive level of detail with respect to the Ozark Region's geology, biological communities, hydrology, invasive species issues and economic setting… We also appreciate your incorporation of information from Oklahoma Comprehensive Wildlife Conservation Strategy (CWCS) into multiple sections of the CPP including Section 1.3.3, Section 3.3 regarding the biological environment of the refuge, and Appendix C. We believe that the Oklahoma CWCS contains a complete summary of the conservation issues affecting the Ozark region and identifies the species that are in greatest need of conservation action in association with the habitats upon which they depend. It appears that the Refuge's CCP and the Oklahoma CWCS have identified many of the same conservation issues and have recommended many of the same conservation strategies to address these.
Response: We appreciate the State of Oklahoma's ODWC for taking the time to review our Draft Comprehensive Conservation Plan and provide thorough comments to us. We are glad to hear that ODWC supports what Ozark Plateau NWR outlines in its CCP – especially to address our State's common conservation issues at the landscape-level. We would also like to mention that the Oklahoma Comprehensive Wildlife Conservation Strategy was a great resource for us in the development of this CCP. Thank you.

Comment (ODWC): Section 3.4.1 Population (page 3-37): The caption under the photo should read Bentonville AR instead of Bentonville AK.
Response: Thank you for your attention to this detail. We have made the appropriate change, as suggested.

Comment: Many thanks for the opportunity to comment on the OPNWR Draft Comprehensive Conservation Plan. I fully support Alternative B, the Proposed Future Management of OPNWR.
Comment: I'm genuinely heartened by all past and proposed work. I support partnerships, increasing land acquisition, education and outreach, increased science and monitoring, and habitat management (including prescribed fires) fully. Allowing hunting makes good PR sense. I also appreciated the opportunity tonight [at the Tahlequah public meeting] to learn more about the OPNWR's work and the history of white-nose syndrome.
Comment: My input is that this is a very good idea. All life deserves to live! My only input is to conserve and keep conserving! I love it, thank you so much you guys!
Comment: I am pleased to see the amount of focus on education and involvement of our youth. I feel that this CCP encompasses the best possible scenarios possible with both public involvement and preservation of our natural resources.
Comment: Thank you for your commitment to preserve and protect the bats and associated terrestrial/aquatic environments in the Ozark Plateau. Your approach is right on! It's a worthwhile undertaking! Future generations will benefit… Again thank you…
Comment: Did cave gate welding the past 30 years, one or two caves a year. These guys (refuge managers) are doing a good job and the funding needs to be continued for their work in the Ozark areas.
Comment: I am with The Nature Conservancy. We have been partnering with the Refuge for a long time to protect caves and bats. We have also been through a planning process for a long time and we have come to the same conclusions! To address our conservation issues, we need: to form partnerships; make decisions based on good science; perform public outreach and education – and work with private landowners. I agree with everything the Refuge proposes. You are on the right track… Mostly for habitats in Oklahoma beyond TNC boundaries.
Response: Thank you all for taking the time to comment. We truly appreciate your support.

Comment: …An EA is a cheap unsubstantial way to environmentally evaluate an area and an EIS should be completed per NEPA… Please remember that the refuge is paid for by 325 million people all over this nation and is not simply a local site for locals people. It belongs to the entire nation. We need to watch our wildlife since bats are sick, moose are sick, deer are sick, rabies is rampant. It is clear that living outdoors is becoming more and more unhealthy for wildlife in America… They are given tax exemption for that reason - to give back to all of us… This comment is for the public record.
Response: Thank you for taking the time to share your thoughts and comments. An Environmental Assessment (EA) was performed for the implementation of the Ozark Plateau NWR Comprehensive Conservation Plan in order to determine if the actions outlined would have significant impacts. As described throughout Chapter 4 of the EA, no significant impacts were identified as a result of either of the alternatives. Therefore, an Environmental Impact Statement (EIS) is not required, as per the National Environmental Policy Act. Please see

http://www.fws.gov/habitatconservation/nepa.pdf for more information.

Comment: On page 3-13, 2nd paragraph, change 1977 to 1972 regarding the enactment of the Clean Water Act.

Response: Thank you for your attention to this detail. We have referenced the Clean Water Act of 1977 because this includes major amendments to the Federal Water Pollution Control Act of 1972. The 1977 Act bolstered the Environmental Protection Agency's authority to eliminate toxic pollutants by: (1) requiring industry to meet best available technology standards for specified toxic pollutants by July 1, 1984, and (2) mandating compliance with best available technology standards for newly listed toxins within three years. Three new categories of pollutants were created under this law: conventional, non-conventional, and toxic pollutants.

Topic: PARTNERSHIPS

Comment: Continue and improve the relationship between Cherokee Nation and USFWS as a whole. Cherokee Nation and USFWS employees already work well with each other, but need to improve the government to government relationship. The Ozark Plateau NWR employees are doing a great job.

Response: Thank you for sharing your insight and comments with us. We are sympathetic to your concerns. The U.S. Fish and Wildlife Service is working to improve the government to government relationship and communication with its fellow Tribal Nations, including the Cherokee Nation.

As outlined throughout the Final CCP, Ozark Plateau NWR plans to continue working with the Cherokee Nation as well as other Tribal Nation neighbors to address common conservation issues at the larger landscape-level and with respect to Native American Nations. As described in Chapter 4, Goal 1, Objective 1 of the Final CCP, “continuously building relationships with a variety of landscape-level stakeholders remains to be essential in order for the Refuge to acquire and conserve lands and conservation easements from willing sellers, monitor and research, protect and restore habitat, share information about resources, conduct environmental education, and reduce Ozark habitat loss and fragmentation”. We will not be able to accomplish our CCP’s objectives if we do not work with our Tribal Nations.

Comment: I am the 2013 chairman of the Tulsa Regional OK Grotto, (TROG). My group represents the NE Oklahoma chapter of the National Speleological Society (NSS). Our organization has been partnered with the Ozarks Plateau National Wildlife Refuge in Eastern and Northeastern Oklahoma for many years. In Response to the mail correspondence I received outlining the planning options for the future of this refuge, I would like to take this opportunity to express our groups utmost gratitude, and admiration for the OPNWR, it's resources, it's staff,

and the steps taken by many over the years to preserve and keep it for the enjoyment of future generations. This refuge is the fruit of the combined efforts of several cave management agencies in our state, who have come together for a common goal. To preserve and protect the fragile cave ecosystems of the OPNWR, and the fascinating wildlife within. To preserve high quality forest habitat above ground, and water resources both above and below ground. Together, we help each other by providing resources in our own area of expertise. And our efforts are paying off tremendously. This congruency of ideas, has inspired, and continues to inspire improvements to refuge preservation activities along with educational opportunities for volunteers such as our group, and the general public. Perhaps most of all... the refuge provides an outstanding opportunity for a connection with the pristine beauty of nature for anyone with a passion for the outdoors. It is our hope, that during this time of financial distress, that our nation's great natural resources such as this refuge and other like it continue to receive much needed funding, equipment, staff, and other resources to continue doing the outstanding job that they do. Let's continue something that our great grandchildren will thank us for. After all, the land is certain outlive each of us. May we be good stewards of it while we are here, and leave it in as good if not better shape than we found it. Thank you for this opportunity to express our gratitude and great appreciation for the OPNWR and all of those who continue to make a dream of many into reality.
Response: Thank you. We could not have accomplished many of our cave protection and monitoring projects without your numerous volunteer hours. We appreciate your support and look forward to continue working together in the future to achieve our common conservation goals.

Comment: Make sure that any alleged "partners" such as non-profits that come knocking at your door are not there to get on the government payroll and be paid by taxes. Such groups need to exist on donations, not stick their hands into the taxpayers wallets. Unfortunately, they have turned into lobbyists for taxpayers cash from government agencies…
Response: Thank you for sharing your concerns. We are very attentive to funding sources and allocation when operating the Refuge, including when working with non-governmental organization partners. We do and will continue to abide by all laws and regulations regarding how federal dollars are spent.

Topic: LAND ACQUISITION

Comment (ODWC): Section 4.1.3 (pages 4-8 and 4-9): It is not clear whether this Refuge objective is the expansion of the refuge's approved acquisition boundary or the expansion of its authorized acquisition acreage. This should be more carefully explained. If the goal is to increase the acreage authorized for acquisition, then other justifications could be cited that include the need to conserve habitat within the recharge areas of refuge caves, the need to conserve forested foraging habitat for the endangered bats inhabiting refuge caves and a desire to maintain buffers of undeveloped land surrounding refuge units.

Response: Thank you for your comment. We agree that this objective needed some clarification. We have modified the title and objective itself to read,

"4.1.3 Objective 3: Acquire Lands within Approved Acquisition Area."
"Within the length of this CCP, take a Strategic Habitat Conservation approach to prioritize land acquisition within the approved acquisition boundary of up to a total of 15,000 acres of Refuge land utilizing fee title acquisition, conservation easements and/or agreements from willing sellers with private landowners, conservation organizations, state agencies, Tribal Nations, and other federal agencies to address Ozark habitat loss, fragmentation and to accomplish the Refuge goals at a landscape-level."

Therefore, this objective focuses on acquire lands within our already approved acquisition boundary and acreage limitation of 15,000 acres within the length of this CCP. We have also modified the final strategy of this objective to read, "Once 15,000-acre limit has been acquired within the approved acquisition area, explore the feasibility and need to expand into other areas and/or to acquire additional acreage (a Land Protection Plan would need to be developed)".

Comment: My husband and I attended the meeting at Tahlequah, OK, Thursday, February 28, concerning the Ozark Plateau NWR. Thank you for the work you have already began. We are for protecting and managing the area, with the ownership of the land remaining in private hands. We are not for our government buying more land. I believe we have enough land closed to the public. We liked the lease agreement for protection of the bats with private landowners. Thank you for accepting our comments.

Response: Thank you for sharing your comments with us. We have been approved, since 2005, to expand Ozark Plateau NWR to up to 15,000 acres total within northeastern Oklahoma. Working with private landowners via conservation easements and/or agreements (where the ownership remains in private hands) is a key strategy to help us accomplish our conservation objectives. These conservation easements and/or agreements with private landowners will be used to help us achieve our goal of acquiring up to 15,000 acres. In addition, when fee title is utilized, portions of these Refuge lands will be open to the public for educational and recreational purposes, including scientific research, environmental education, interpretation, wildlife photography/observation, and hunting.

Comment: I'm interested in learning more about conservation easements and the Healthy Forest Reserve Program.
Response: The Healthy Forest Reserve Program is administered by the Natural Resource Conservation Service (NRCS). For more information about HFRP, please contact your local U.S. Department of Agriculture - NRCS Service Center or visit: http://www.nrcs.usda.gov/wps/portal/nrcs/main/ok/programs/easements/forests/. The purpose of the HFRP is to assist landowners, on a voluntary basis, in restoring, enhancing and protecting forestland resources on private lands through conservation easements, 30-year contracts and 10-year cost-share agreements. The program is being offered in five counties in northeastern Oklahoma: Adair, Cherokee, Delaware, Sequoyah, and Ottawa counties. The federally-listed species that are being targeted for habitat and population recovery activities include the gray bat, the Ozark big-eared bat, and the Ozark cavefish.

Topic: HABITAT MANAGEMENT

Comment (ODWC): Section 4.2.1 (page 4-19): This Section describes some of the forest land conditions in the Ozark Region. In the fourth sentence of the first paragraph in the Rationale section, it states that the region has an abundance of uneven age stands. In actuality, the Ozarks Region is comprised of many even-aged forest stands as a result of historic commercial logging. Uneven-aged forest stands typically support greater wildlife diversity and abundance because they have a more diverse canopy structure and a greater abundance of understory vegetation.
Response: We agree that the Ozarks Region currently is comprised of many even-aged forest stands due to factors such as historic commercial logging. This paragraph has been modified to more accurately describe current and desired forest land conditions in the Ozarks region. Please see modified objective and rationale below (changes highlighted in italics): **4.2.1 Objective 1: Protect, Enhance, and/or Restore Forested Habitat.** Over the lifetime of this CCP, protect, enhance, and/or restore approximately 4,038 acres (and up to 15,000 acres of approved acquired land) of upland and riparian forested habitat to conditions believed to exist prior to European settlement on- and off- Refuge in order to improve the overall health of the forest ecosystem, enhance opportunities for foraging, provide movement corridors, and offer watershed protection for the benefit of migratory birds, bats, and other cave species. *Desired forest conditions include a moderately-stocked, healthy forest that is able to naturally regenerate, with a well-developed understory dominated by native grasses and forbs, with a small shrub and woody component.* **Rationale:** Early descriptions of the Ozark region of Oklahoma described the presence of grass-covered savannahs and open woodlands with an abundant understory of grasses, wildflowers, and other herbaceous plants (Heikens, 1999). *However, since European settlement, suppression*

of the natural fire regime has led to overcrowded forest conditions. In addition, many fragments of forest were cut for commercial logging. As a result, today's remaining forest areas mostly consist of exceedingly high densities of even-aged stands with an excessive fuel load and a lack of well-developed understory. Current conditions not only lead to unnatural and uncontrollable wildfires, but they are also not ideal for native vegetation and wildlife to thrive as they once had. Forest habitat restoration measures (such as prescribed fire, thinning, native planting, etc.) that mimic the historic fire regime and maintain a natural mosaic of plant communities representative of the ecosystem will reduce the risk of unplanned, high-intensity wildfires while also supporting a greater diversity of native flora and fauna.

Comment: We own private lands adjacent to the Refuge. We are concerned that you will regulate our pesticide use on our private property.

Response: Thank you for your comment. The Ozark Plateau NWR does not have regulatory authority over the use of pesticides on private lands. However, all pesticide use should be conducted in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136 et seq), and all label instructions and requirements. The Federal Insecticide, Fungicide, and Rodenticide Act requires that the Environmental Protection Agency (EPA) evaluate pesticides before they can be sold and used in the United States. The EPA's Office of Pesticide Programs is responsible for ensuring that a pesticide will not pose unreasonable adverse effects to human health and the environment. In addition, the EPA must ensure that use of pesticides it registers will not result in harm to species listed as endangered or threatened under the federal Endangered Species Act of 1973, as amended. To prevent and minimize the impacts of pesticides on fish, wildlife, and plants, the Service provides technical assistance and consults with the EPA during the registration and reregistration of pesticides. If pesticide use in a certain geographic area may affect a federally listed species, EPA may place limitations on its use.

Comment: I really would like to see this land managed with burning and to have the boundaries marked. This would allow law enforcement to patrol this area, allowing more management of the wildlife and resources.

Response: Thank you for your comments and support. As outlined throughout Chapter 4 of the Final CCP, we do plan to enhance habitat with prescribed burns (see Goal 2, Objective 1: Protect, Enhance, and/or Restore Forested Habitat), survey and mark Refuge boundaries (see Goal 3, Objective 9: Survey and Mark Refuge Boundaries) and increase law enforcement to patrol and monitor Refuge Units (see Chapter 5, Table 5-2 [0.3 FTE Law Enforcement Officer]).

Comment: I am interested in coordinating with the FWS on a controlled burn on my property.

Response: Ozark Plateau NWR can assist private landowners in managing their properties adjacent to the Refuge with prescribed fire for the benefit of fish and wildlife resources. For more information, contact the Refuge at (918) 326-0156; 16602 County Road 465, Colcord, OK 74338; or email shea_hammond@fws.gov or richard_stark@fws.gov. In addition, the Service's

Partners for Fish and Wildlife Program provides technical and financial assistance for restoration and enhancement of fish and wildlife habitat on private lands, in partnership with other state and federal agencies and non-governmental organizations. For more information, please visit: http://www.fws.gov/southwest/es/oklahoma/pwp.htm.

Comment: Prescribed burns kill fellow American citizens. You release both mercury and fine particulate matter when you burn. You pollute the air but can't see it because it is microscopic. You cause lung cancer, heart attacks, strokes, pneumonia, allergies and asthma a horrible health consequence of vegetation burning. That dirty air goes eastward poisoning along the way. Stop it now. We need clean air.

Response: Thank you for sharing your concerns about the use of prescribed fire as a management tool. Early descriptions of the Ozark regions of Oklahoma described the presence of grass-covered savannahs and open woodlands with an abundant understory of grasses, wildflowers, and other herbaceous plants – all of which cyclical fires played a major role in creating (Heikens, 1999). Since settlement, however, suppression of the natural fire regime has resulted in overcrowded forest conditions. Restoring habitat (including use of prescribed fire) on and surrounding the Refuge to conditions that promote a more open, and regenerating, mature forest condition (e.g., basal area of 50-60) is anticipated to provide an enhanced foraging environment and abundant food source for the federally listed Ozark big-eared bat, and protect important flight corridors for gray bats. Mimicking the natural fire regime would benefit these species as well as migratory interior forest nesting birds.

As described in Chapter 4 of the Environmental Assessment (Appendix A), prescribed fire would have minor adverse impacts that are short-term in duration at the local scale due to smoke from burning vegetation. Prescribed fires could produce smoke that could drift into residential communities and cause breathing and eye irritation and inconvenience during times of unpredicted inversions. There are also short-term adverse impacts on visibility, which is in conflict with the Class 1 Airshed designation. However, carefully planned prescribed fire gives refuge managers the flexibility and increased control to burn under the right conditions, more effectively managing fire effects and smoke to benefit natural resources while keeping firefighters and the public safe. These actions help reduce the risk of devastating wildfires that can threaten people, fish, wildlife and plants.

The benefits of using prescribed fire as a management tool far outweigh these minor adverse effects described above. The Template for Assessing Climate Change Impacts and Management Options (TACCIMO) study suggests that prescribed burning could reduce CO_2 and other emissions from fires in dry forest types by 52-68%. This equates to overall fire emission reduction in the western U.S. of 18-25%, and as much as 35% at the state level (http://www.forestthreats.org/). In addition, the Refuge proposes to acquire and restore up to 15,000 acres of, at minimum, 80% mature oak-hickory forest which would ultimately benefit air

quality because the trees would:

- Help to settle out, trap and hold particle pollutants (dust, ash, pollen and smoke) that can damage human lungs.
- Absorb CO_2 and other dangerous gasses and, in turn, replenish the atmosphere with oxygen.
- Produce enough oxygen for people and wildlife to breathe.
- Absorb enough CO_2 on each acre, over a year's time, to equal the amount one produces driving a standard car over 20,000 miles. Trees remove gaseous pollutants by absorbing them through the pores in the leaf surface. Particulates are trapped and filtered by leaves, stems and twigs, and washed to the ground by rainfall (www.dnr.state.md.us).

Comment: Taxpayers say no new roads.

Response: Thank you for providing your comment. The Refuge agrees that it would rather refrain from developing any new roads. The Refuge prides itself on maintaining its units as natural as possible, with very limited access. However, there is a possibility that the Refuge will acquire a new tract of land that may require access to an important site(s) by Refuge staff or the public. Therefore, as outlined in Chapter 4 of the Final CCP, we plan to "keep construction to a minimum of any new roads or infrastructure on all Refuge Units, unless necessary".

Comment: We support you prohibiting 4-wheeling on Refuge lands.

Response: Thank you for your support.

Topic: WILDLIFE MANAGEMENT

Comment (ODWC): Section 4.1.2 (page 4-6): This Section lists the existing recovery plans and their completion dates for all federally listed species. It lists the Ozark Cavefish Recovery Plan date as 2010; however we believe that the first edition of this recovery plan was printed in 1986 and has not been updated since that time.

Response: The Ozark Cavefish Recovery Plan was finalized on January 1986 and revised on November 19, 1989 (U. S. Fish and Wildlife Service. 1989. Ozark Cavefish Recovery Plan. U. S. Fish and Wildlife Service. Atlanta, Georgia. 15 pp.). You may download this revision here: http://www.fws.gov/southwest/es/Documents/R2ES/OzarkCavefish.pdf

Comment (ODWC): Section 4.2.10 (page 4-41): The last sentence within the rationale section describes cavefish and cave crayfish as "precious" aquatic species. This is probably not the best word to use in this situation and we recommend an alternate adjective such as "unique" or "rare."

Response: Thank you for your suggestion. We have omitted an adjective altogether ("precious").

Comment (ODWC): Appendix C: There have been two recent taxonomic changes since the Refuge conducted its initial herpetofaunal surveys:

The Oklahoma Salamander (*Eurycea tynerensis*) and the Gray-bellied Salamander (*Eurycea multiplicata griseogaster*) are not considered to be the same species which goes by the name Oklahoma Salamander (*Eurycea tynerensis*) because that taxon was described first. The Oklahoma Salamander is a variable species in terms of the physical size of animals in different populations and the life history traits of different populations. Some populations are paedomorphic and consist of individuals that remain aquatic as both juveniles and as adults. Other populations are comprised of metamorphic individuals that have an aquatic juvenile stage and a terrestrial adult stage. The name Oklahoma Salamander was former used to describe paedomorphic populations of the salamander while the name Gray-bellied Salamander was used to describe metamorphic populations.

The Grotto Salamander (*Typhlotriton spelaeus*) has been assigned to the genus *Eurycea* and is now *Eurycea spelaeus*. Since the initial herpetofaunal surveys on the Refuge, believe that the Grotto Salamander has been documented in January-Stansberry Cave on the Looney Unit of the Refuge.

Response: Thank you for so carefully reviewing our species list survey. We have updated the Appendix C, Table C-1: Salamanders section to reflect these recent taxonomic changes.

Comment: Leave feral cats alone since you cannot tell the difference between an owned cat and a feral cat. And they have a right to live.

Response: Thank you for your comment. The Refuge acknowledges that this may be a common concern, especially among cat owners. The Refuge has no intention of interfering with domestic cats. Feral cats (a descendent of a domesticated cat that has become a wild cat), however, are currently found on most Refuge units and management recognizes that they may be a threat to the bat and migratory bird species the Refuge was established to protect and recover. Therefore, the Refuge plans to work with landowners, NGOs, cities, universities, states, Tribal Nations, and federal agencies to identify (survey), document, and monitor all non-native wildlife species occurring on and near the Refuge including feral cats, while also assessing their impacts on native wildlife, before taking any action. If these studies demonstrate that feral cats indeed cause a great negative impact to native species, such as T&E and non-T&E bats and migratory birds, the Refuge may develop and implement population control strategies (within an Integrated Pest Management Plan) in order to meet Refuge objectives. See page 4-40, Goal 2, Objective 10 for more information.

Comment: The draft documents suggest that the Service and Refuge employees may have to manage invasive fauna (feral hogs and feral cats) in the near future. Safari Club International recommends that, when the time comes, the Service partner with local hunters to manage feral

hogs through hunting. Experienced hunters have proven to be a valuable resource for wildlife population control and should be used in Ozark Plateau NWR as well.
Response: Thank you for your recommendation. If and when our invasive fauna species studies show the need for population control, we will consider providing local hunters with the opportunity of managing these species, according to the Refuge's hunt plan.

Topic: SCIENTIFIC RESEARCH

Comment (ODWC): Section 4.1.4 (page 4-11 and 4-46): We recommend that the USFWS investigate potential collaboration with the Oklahoma Mesonet program to develop one or more permanent weather stations on or near the Refuge if they are interested in additional monitoring sites in this region. Additionally, the word "herpatofauna" should be replaced with "herpetofauna" in the fifth strategy listed in this Section.
Response: Thank you for your suggestion. We will look into this potential partnership. We have also edited "herpetofauna", as per your comment.

Comment: I wanted to take a minute and comment on the importance of the Ozark Plateau NWR. I have been using these tracts of land in my research of subterranean species (biology, ecology, and conservation) for an excess of 12 years. In particular, I have spent much time at the Looney Unit and working in January-Stansberry Cave. During many bioinventory efforts in the region with which I have been involved, I have used the cabin on the Looney Unit as a base from which to work. The facility is ideally positioned and provides critically important resources to aid in cave research. In particular, when we have a group of cave biologists that converge from several corners of the United States to work in the western Ozarks, the cabin accommodates all of us and gives us a place to sort specimens, take measurements, etc. The cave on the property has been a place of considerable scientific study, including all of my Masters work. Several scientific publications have resulted as well as inclusion of said data in *The Cave Life of Oklahoma and Arkansas*, which two collaborators and myself published through the University of Oklahoma Press. Should you require a list of publications that have resulted from these efforts, I can provide one. The personnel at the Ozark Plateau NWR have been fantastic in assisting our academic work. Before he retired, Steve Hensley assisted with many of our projects and has been instrumental in a number of our publications. Shea Hammond has been helpful in the same ways. In particular, a study of a blind cave silverfish has advanced owing to his assistance. Richard Stark has been of considerable assistance in cave crayfish counts, in accessing particular localities, and with other research. I simply can not say enough positive things with regard to the dedication by these individuals to the conservation of subterranean ecosystems and species across the years.

I hope that the Ozark Plateau NWR continues to support research in subterranean systems and threatened subterranean species. The NWR has been critically important in this field across the past 15 plus years. The western Ozarks is a hotspot for subterranean biodiversity and the Ozark Plateau NWR, in particular the Looney Unit and its personnel, have supported the study of the subject. The number of publications that have resulted from this support, and the upcoming publications, represent a considerable advancement in our knowledge base for the regional subterranean biodiversity, including a number of threatened and endangered species. Please continue to support these valuable resources.

Response: Thank you for sharing your experience and support. We are very grateful for your bioinventory and other scientific research contributions to us and to the whole scientific community. As proposed throughout Chapter 4 of the Final CCP, we will continue protecting and conserving the natural resources of the Ozark Plateau, especially to advance scientific knowledge regarding subterranean ecosystems and biodiversity. Throughout Chapter 4 of the Final CCP, we plan to accomplish the following objectives related to scientific research of cave habitats and species within the next 15 years:

- Goal 2, Objective 3: Provide Undisturbed, Safe, and Protected Cave Habitat;
- Goal 2, Objective 4: Locate Additional Caves;
- Goal 2, Objective 5: Delineate Recharge Area of Cavefish and Crayfish Caves;
- Goal 2, Objective 6: Inventory & Monitor to Advance Scientific Knowledge Regarding Federally Listed Cave Species and Species of Concern; and
- Goal 2, Objective 7: Inventory & Monitor to Advance Scientific Knowledge Regarding Migratory and Resident Non-T&E Species, among others.

We look forward to continue working with the scientific community in the future on these efforts.

Comment: In recent years I have been able to use the OPNWR in a couple of different ways, for some of my professional research through my university job, and through the environmental education opportunities offered at the refuge. In my job as a researcher/teacher at the Oklahoma Museum of Natural History of the University of Oklahoma, a few years ago I was granted a permit for paleontological work studying ice-age vertebrate fossils. The permit allowed recovery of Pleistocene fossils in one of the OPNWR caves. These fossils are currently under study by a graduate student and myself. My fossil research at other caves in the Ozarks was suspended when white-nose syndrome became a potential problem in Ozark caves and I became concerned for the survival of the bats, but the identification of fossils and lab analysis phase of this particular project continues at the museum. This kind of study might provide some time depth to inform the conservation and adaptive management of living species as climate changes. In the meanwhile, given the potential lethality of white-nose syndrome to the refuge's bats, I support continued monitoring and protection of the OPNWR caves from unnecessary human disturbance and potential transmittal of the disease-causing fungus…

Response: Thank you for sharing your experience and comments. We appreciate your fossil research contributions to the scientific advancement of understanding the Ozark Plateau's natural history and ecology.

We also appreciate your understanding and support for our closed-caves policy in light of the dire threat of white-nose syndrome to Ozark cave species and ecosystems. White-nose syndrome is an extremely important issue for us and we are doing all that we can to prevent it from occurring and/or spreading to Refuge and surrounding caves.

Comment: …Similarly for the sake of other native wildlife and plants, including other cave species, I also strongly encourage you to do all possible to protect surface and groundwater quality in the area, and to protect the land from ever-increasing human impacts that cause habitat loss or fragmentation.

Response: Thank you for sharing your concern. We too, are concerned with protecting surface- and groundwater quality and mitigating habitat loss and fragmentation. As discussed in Chapter 4 of the Final CCP, one of our objectives is: "Over the lifetime of this CCP, through outreach efforts, stronger partnerships and implementation of watershed and groundwater recharge area management practices, protect, enhance, and/or restore surface and subterranean aquatic habitats, on- and off-Refuge, used by federally listed cavefish, and species of concern cave crayfish, and other aquatic species in order to achieve sustainable population trends of these species". We also propose to address human impacts that cause habitat loss and fragmentation by using "[Strategic Habitat Conservation] planning to establish wildlife corridors to connect tracts of forests, springs, gravel bottom streams, rivers, wetlands, etc. with other habitat types such as caves or other protected lands (National forests, State wildlife management areas, tribal lands, etc.) through land acquisition and entering into conservation easements and/or agreements with willing sellers", among many other partnership strategies described throughout Chapter 4.

Topic: HUNTING

Comment (ODWC): I also would like to take this opportunity to express my appreciation to the Service and to the staff of the Refuges Division for your interest and past cooperation with the Oklahoma Department of Wildlife Conservation to increase hunting opportunities on national wildlife refuges within the state. We have discussed our desire to see walk-in hunting access on the Sally Bull Hollow Unit with the Ozark Plateau NWR staff and we would like to reiterate that here. We were very encouraged to see that our interest in opening the Sally Bull Hollow unit for walk-in hunting was cited several times within the CCP. The Oklahoma Department of Wildlife Conservation owns fee title to a 98-acre tract in the SW/4 of Section 26, T15N, R26E, which is land-locked within the Sally Bull Hollow Unit. We have a strong interest in providing access to the ODWC-owned tract, as well as the Sally Bull Hollow Unit of the Refuge as a whole, to the

sportsmen and women of Oklahoma. At the present time, our constituents cannot access the ODWC property because of the Refuge's current management plan. But, we know from constituent contacts within the community and from our visitors to the adjacent Ozark Plateau WMA that there is a substantial interest in having walk-in access to the area to provide hunting opportunities. We understand that the Service's compatibility analysis for hunting activities determined that hunting is a compatible use on the Refuge, with some stipulations. We understand that this will require the development of a hunting plan for the area, a completed survey of the Unit's boundaries and signage. We appreciate your preparation of Section 4.3.6, Objective 6: "Collaborate with ODWC to Provide Hunting Opportunities" in the Refuge's CCP (pages 4-53 through 4-54). We strongly support this objective and are eager to work with you on its implementation.
Response: We appreciate your support and look forward to working with the ODWC on the development of this hunt plan at the Sally Bull Hollow Unit of the Refuge.

Comment: Protecting the water is very important. For that reason, no hunting with lead shot should be allowed anywhere within this national refuge. Do not allow any baiting of any wildilfe in this site and ban all hunting… No trapping should be allowed, this site is for protection of wildlife, not facilitating their death… The other more peaceful activities are not at all "compatible" with allowing a ton of wacko wildlife murderers in this site, which is called a "refuge".
Response: Hunting is identified by the 1997 Refuge System Improvement Act as a priority wildlife-dependent recreational use of national wildlife refuges and is needed as a management tool for some Refuge wildlife populations such as deer. Through the development of a compatibility determination (see Appendix B), we have determined that these programs are determined to be compatible with the establishment purposes of the Refuge and the mission of the National Wildlife Refuge System. The awareness, enjoyment and education gained from these activities are expected to outweigh their associated impacts. Ozark Plateau National Wildlife Refuge has determined that hunting, in accordance with the stipulations provided above, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the Refuge. Instead, providing opportunities for hunting has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving habitat, thereby further contributing to the overall mission of the National Wildlife Refuge System. In addition, all hunting on the Refuge would abide by existing non-toxic shot regulations (for more information, see http://www.fws.gov/migratorybirds/CurrentBirdIssues/nontoxic.htm).

Comment: As District 2 Wildlife Commissioner for the ODWC and portions of the Refuge being in my District, I very much support the opening of the Sally Bull Hollow Unit of the Refuge to Hunting. As time passes, it becomes increasingly difficult for our sportsmen to locate properties on which to hunt. Many of the privately owned properties in this day and time are

leased for hunting, so it becomes very difficult for our sportsmen to find properties to hunt. This is especially difficult for our younger sportsmen, as many of them do not have the wherewithal to pay any type of lease price for hunting. The Sport of Hunting is rich in tradition in the State of Oklahoma. We are but one of a handful of states throughout this Nation that continues to attract our citizenry to the Sport of Hunting. Our Department continues to purchase properties for our sportsmen as our funding becomes available.

As a representative of the sportsmen in my District and our Department, I would very much appreciate your consideration to the opening of the Bull Hollow Unit for Hunting.

Comment: I and ODWC's Wildlife Division are very much in favor of the Fish and Wildlife Service opening the Sally Bull Hollow Unit to public use and hunting. This acreage, along with our 2,000 plus –acre Ozark Plateau WMA would provide the public with a great area to recreate and hunt.

Comment: I am from Oklahoma and I am in favor of opening these lands for hunting. Hunting is a tradition and way of life in Oklahoma, it is also part of our culture.

Comment: I think [you] should allow walk in hunting in the Sally Bull Hollow Unit of the refuge to help keep the population of some of the animals down. So there would be enough food for other animals.

Comment: As a hunter, I would love to see and would certainly utilize the Sally Bull [Hollow Unit] portion of the NWR if open for hunting. Several of my friends already use the ODWC portion and would also love to see Sally Bull [Hollow Unit] opened.

Comment: Safari Club International ("SCI") appreciates the opportunity to provide our comments on the draft Comprehensive Conservation Plan ("CCP") and Environmental Assessment ("EA") for the Ozark Plateau National Wildlife Refuge. In particular, SCI supports the Service's recognition of hunting as an appropriate and compatible use of the unit.

Safari Club International, a nonprofit IRC § 501(c)(4) corporation, has approximately 51,000 members worldwide, many of whom hunt on refuges throughout the National Wildlife Refuge system. SCI's missions include the conservation of wildlife, protection of the hunter, and education of the public concerning hunting and its use as a conservation tool. SCI is an active supporter of hunting opportunities on National Wildlife Refuges. SCI participated as a Defendant-Intervenor in the almost decade-long litigation concerning the U.S. Fish and Wildlife Service's compliance with National Environmental Policy Act requirements regarding the opening of hunting opportunities on National Wildlife Refuge system lands.

Among other reasons, SCI supports hunting in National Wildlife Refuges across the United States because it is beneficial to the refuges. The Service has recognized the value of hunting in previous planning documents for other refuges:

> the cumulative effect of closing refuges to hunting may result in decline in social and financial support for wildlife conservation, as hunters have provided, through purchases of hunting licenses

> and migratory bird conservation stamps, and taxes levied on purchases of hunting equipment, a steady stream of revenue to build the National Wildlife Refuge System, and to restore upland and wetland habitats on millions of acres of public and private lands across the country. (USFWS 2000). These habitat projects also benefit migratory songbirds and other wildlife. Conversely, the cumulative effect of closing refuges to hunting may result in decline in duck stamp and hunting license sales, leading to a decline in funds for conservation. The cumulative effect on closing refuges to hunting may be reduced conservation of wildlife habitats if the above revenues are not replaced by another source. (Draft Environmental Assessment for Moosehorn National Wildlife Refuge 2007).

SCI commends the Service and the Refuge personnel specifically for the efficient and comprehensive manner with which they have examined and reported the possible effects and benefits of hunting on the Refuge. The purposes for which Ozark Plateau NWR was established include (1) "to reduce the need for future listing of species of concern in the Ozarks"; and (2) "to provide important environmental educational opportunities identifying the need for protecting fish and wildlife and other karst resources of the Ozarks." The draft CCP/EA make clear that hunting both is compatible with and actually helps the Service fulfill these purposes.

SCI appreciates that the Service and Refuge personnel will be collaborating with the Oklahoma Department of Wildlife Conservation ("ODWC") to produce an effective Hunt Plan for the Sally Bull Hollow Unit of the Refuge. While we understand that the development of the plan may take some time, we encourage and suggest that all parties involved work to open the unit to hunting as soon as possible. We also suggest that the Service and ODWC work together to allow hunting on other areas of the Refuge as lands are acquired. Opening the Sally Bull Hollow Unit to hunting and allowing hunting on future units of the Refuge is in accord with Oklahoma's appreciation of the rights of hunters reflected in Article 2, Section 36 of Oklahoma's Constitution.

The draft documents correctly note that hunting can play a valuable role in managing the environment that exists within the Refuge. The planning documents aptly explain how allowing more public use opportunities, including hunting, will improve relationships with the public, local landowners, Tribal Nations, and the State. Public use opportunities will heighten awareness of the Ozark Plateau NWR's purposes, provide support from people to benefit the lands and species in the long-term, and possibly create future conservationists for the Refuge. Compatible wildlife-dependent uses, including hunting, increase public appreciation and awareness of conservation efforts, including protection and recovery of the threatened and endangered cave species on the Refuge.

The National Wildlife Refuge System Improvement Act of 1997 defines a unifying mission for the Wildlife Refuge System, establishes the Service's obligation to give priority to six priority wildlife-dependent recreation activities, including hunting, and identifies a formal process for determining the compatibility of the six recreation activities in each refuge. The compatibility determination for hunting does an excellent job of explaining the benefits of allowing hunting on

the Refuge. Hunting is an important wildlife management tool used to control populations of some species that may exceed the carrying capacity of their habitat or threaten the sustainability of other native wildlife species. The compatibility determination correctly notes that allowing hunting can benefit many species by controlling populations so that long-term sustainability is attainable and so that there is no over-abundance of any one species on the Refuge. It also points out that hunting is an important cultural, recreational and even spiritual experience for many people, and hunting provides opportunities to observe nature and enjoy local, natural food.
Response: Thank you all for taking the time to share your insights and show your support for our CCP's hunting objective which states, "Within 5 years of the approval of this CCP, collaborate with the Oklahoma Department of Wildlife Conservation (ODWC) to allow walk-in, open-access hunting, according to state regulations, adjacent to the state Ozark Plateau Wildlife Management Area (WMA) on the Sally Bull Hollow Unit of the Refuge". We look forward to having people like you enjoy the rich Oklahoma and Native American culture of hunting on Refuge land. As soon as we can get funding to survey and mark the boundaries of Sally Bull Hollow Unit, we will work with ODWC to develop a hunt plan and keep those on our mailing list informed of available public use opportunities.

Comment: If/when the 2000-acre block gets opened to hunting, it would be greatly beneficial to Law Enforcement if the USFWS restrictions could be enforced at the State/District Court level. Otherwise, only State laws would be enforced by State Game Wardens.
Response: USFWS restrictions can be enforced at the State/District Court level by State Game Wardens as long as the hunting regulations are added under Title 800 (http://www.wildlifedepartment.com/laws_regs.htm). We will coordinate with the ODWC in developing our hunt plan, which will include hunting regulations and details regarding law enforcement.

Comment: I am a lifetime resident of Oklahoma and a lifetime holder of an Oklahoma hunting license. I live in Claremore, OK and would greatly benefit from being able to hunt on the refuge near Vian, Ok.
Response: Thank you for taking the time to provide your comments. Ozark Plateau NWR proposes to open the Sally Bull Hollow Unit to hunting, which is approximately 95 miles from Claremore, OK. We are approved to acquire additional lands within seven counties of northeastern Oklahoma, including Sequoyah County, where Vian is located. We will assess the feasibility and necessity of opening any newly acquired Refuge Units to hunting, as they are acquired, as long as they are compatible with our purposes of establishment. Additionally, the Sequoyah National Wildlife Refuge, located in Vian, permits waterfowl and upland game hunting in designated areas, including Sandtown Bottom, Webbers Bottom, and Girty Bottom. Contact Refuge headquarters at (918) 773-5251; Route 1, Box 18-A, Vian, Oklahoma 74962; or email chad_ford@fws.gov before hunting for current hunting regulations and maps.

Topic: ENVIRONMENTAL EDUCATION/INTERPRETATION

Comment *(x 5)***:** I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge.
Comment: I am married and have 2 daughters. We started doing the Ozark Nature Connection Series. This became an important thing we did together as a family. We now take what we learned there back home to the farm. My kids have been soo motivated to continue going and to show even adults what they have learned, such as starting a primitive fire. FWS has had such a positive impact on our family, even on that little 100 acres where they hold their programs. You don't need a $2 million visitor center to enjoy and learn. Thank you from my family to the federal government.
Comment: My family has taken advantage of the Looney programs. We have incorporated what we have learned into homeschooling and extended this knowledge and methods into our family life. I believe that these programs have actually shaped my son's identity.
Comment: I like this public interaction you are having on the Refuge. Back in the 70's and 80's you didn't tell the public where they caves were. Now, its nice that you allow and teach people about this stuff.
Comment: … For about the last three years I have also been privileged to participate in several of the OPNWR environmental education workshops held at the MMLERC. These have included programs on deep nature connection, mentoring in nature, edible and medicinal plants, and various other outdoor and survival skills. In my opinion, these environmental education workshops provide outstanding hands-on "interactive" educational opportunities in nature in a safe, natural setting, and at low cost. They are multigenerational, completely experiential workshops that represent a very wise use of public lands and an excellent collaboration with NGOs such as the Ozark Tracker Society, tribes, and others. To me the OPNWR environmental education workshops are tax dollars extremely wisely spent. I strongly encourage you to continue partnering with the Ozark Tracker Society. If more children and adults from surrounding communities could participate in this kind of beneficial educational experiences, they would gain a much better appreciation for the natural world, the ultimate provider of every resource that we need, as well as becoming well-grounded caretakers of the earth. This ultimately would make conservation, sustainability, and caretaking of wildlife refuges and the entire landscape much more of a priority among the public. The children participating in the EE program could easily become conservation and environmental leaders in the future.
Comment: Please continue USFWS support for programs provided by the Ozark Tracker Society at the Ozark Plateau NWR. I have observed first-hand the life-changing impact of these low-cost Deep Nature Connection outreach programs, and hope these opportunities will be available in years to come for my children and grandchildren.
Comment: As an affiliate and long-time participant with Ozark Tracker Society along with

dozens of other friends and colleagues, I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. This is so vitally important in today's world of nature dis-connect. I have personally seen numerous program participants immediately begin teaching and mentoring people of all ages in deep nature connection.
Comment: As an active member of Central Arkansas Taskforce 1 and Lonoke County Search and Rescue, as well as many years of experience with other SAR efforts and teams in the state, I have had the pleasure to receive multiple hours of training in both SAR related skills and nature awareness and appreciation through the Ozark Tracker Society. The combined knowledge of the members of the [OTS] is immense and immeasurable in value for a state such as Arkansas that prides itself in it's abundance of natural beauty. I sincerely hope that any and all efforts to continue funding of the [OTS] and the Ozark Plateau National Wildlife Refuge will continue.
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. I feel that the programs taking place are a very good way to get people reacquainted with nature. I, for one, am very thankful for the ability to go to these programs, meet like-minded people, and get a better and deeper understanding of our natural connection. Please continue to support these programs.
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. My son Alex and I have continued to learn and love these programs. Please make more like these.
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. My young daughter and I recently attended an OTS course, and it was invaluable. Giving children an opportunity to immerse themselves in the natural world is a rare gift.
Comment: I am an employee of the Oklahoma Conservation Commission. I work specifically in a program called “Blue Thumb”, which involves citizens in water quality monitoring and educating the public about stream and river protection. The Blue Thumb Program supports the Ozark Plateau National Wildlife Refuge and the Ozark Tracker Society in their efforts to protect wildlife and wild places. Specifically, Blue Thumb shares an important philosophy with the Ozark Tracker Society, and with the reasoning behind creating wildlife refuges. I believe we all agree that the earth is a richer, healthier, and more wonderful place when species beyond humans can have their needs met. This requires not only educating the public about the natural world, it also requires providing experiences and guidance to help people develop a relationship with nature. I can see many ways that the Blue Thumb Program can work with both the Ozark Plateau NWR and the Ozark Tracker Society. In fact, collaboration has begun. Thank you for this opportunity.

Please continue to provide support to the Ozark Tracker Society (OTS) for their wonderful nature programs in the Ozarks region. They help preserve our beautiful and valuable natural resources by educating people about the ecosystem. Thank you.
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. Thank you for supporting Nature Connection programming in Federal reserve's.
Comment: Thanks for your past and continued support of the partnership between the Ozark Plateau NWR and the Ozark Tracker Society – especially with regard to their Deep Nature Connection Programs on the Refuge! These low-cost outreach programs meet a crucial need.
Comment: I hope the Ozark Tracker Society can continue to partner with the Fish and Wildlife Service at their wildlife refuges to offer educational programs to the public. In particular, I would like to see a foraging/wildcrafting workshop series come to the Deep Fork NWR.
Comment: Greetings from Fayetteville, Arkansas!... The Deep Nature Connection programs designed and implemented by Sarah and her associates are going far to extend environmental awareness and education on multiple levels - individual, familial, and community-wide. Their impact is already apparent and I am profoundly encouraged by their prospects for continued success and public engagement. As an educator with commitment to human-nature connections, I wish to offer approbation and support for the ongoing partnerships between the Ozark Plateau National Wildlife Refuge, US Fish and Wildlife Service, and the Ozark Tracker Society. These, I believe, can continue to enrich the lives of many in ways that are compelling, productive, generative, and rewarding.
Comment: I am writing to show support for and would like to see continued support for The Ozark Tracker Society in it's affordable programs such as Deep nature connections on the Ozark Plateau National Wildlife Reserve as well as Support for the Reserve itself. I have attended several activities and have learned a lot that I would not have otherwise. The Tracker Society offers nature classes with skills and care that make learning fun and useful.
Comment: I attended one of the Ozark Tracker Society's nature connectedness workshops and it changed my life. I learned so much about mentoring, nature and why it is important to our lives. I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. Thank you!
Comment: Nothing is more important than our nature refuges and conservation efforts. Mentoring and educating at and about nature is imperative to our existence not to mention they are a lot of fun. I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge.
Comment: Please keep supporting Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. The Deep Nature Connection programs are extremely helpful to me in my volunteer work with school children and scouts.

Comment: My husband, two daughters (ages 12 & 9) and I have participated in several Ozark Tracker Society Deep Nature Connection weekends at the Ozark Plateau NWR. Big parts of my childhood were canoeing in the boundary waters between Minnesota & Canada and backpacking in Wyoming. We greatly appreciate that our daughters are able to have these deep nature connections without having to travel so far. Plus, I think we are learning far more than I did as a child. (I know I never laid down in a place where deer had been laying while it was still warm. My 12 year old did at Ozark Plateau NWR!) So, thank you for the OTS experiences we've had at Ozark Plateau NWR, and please continue the opportunities!
Comment: I am a strong supporter, and know many more who are as well, of the Ozark Plateau NWR and the Ozark Tracker Society. They are working together locally to provide strong nature-based education programs that are growing in popularity. The chance for the local community to experience place-based education of this high quality is invaluable.
Comment: I have been to several Nature Connection Workshops with the Ozark Tracker Society in conjunction with the FWS. Each time has been an incredibly rewarding experience. There are so many layers upon layers of lessons learned that we carry into our daily lives. I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. They are an invaluable tool to bring a renewed and greater respect and understanding of the natural world.
Comment: My children and I have so greatly benefitted from the low cost, deep nature connection programs the Ozark Plateau Wildlife Refuge and the Ozark Tracker Society have put on. Over the last several years, not only my family, but many of my patients and community have come to anticipate and enjoy the wonderful benefits of these great programs. As a psychiatrist who is very concerned with the effects of nature connection on our youth and communities, I strongly urge the continued support of these programs. Thanks so much to the U.S. Fish and Wildlife Service for such great programs!
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. I've had an opportunity to take advantage of the programming there through the OTS. It was an amazing and life changing experience. Furthermore, in my capacity as a teacher I've passed down these lessons to my students. Connecting people with nature is the best way to help people understand and therefore solve the problems facing our world today and OTS' programming at the refuge is the best nature connection programming that I've been a part of. Thank you for your consideration.
Comment: I was recently allowed to participate in a Coyote Mentoring Workshop, presented by the Ozark Track Society [and the U.S. Fish and Wildlife Service], at Lake Ft. Smith State Park. This workshop focused on “Bird Language” the premise of the weekend was to open ourselves up to the experience. Focus on taking in all that nature had to offer us. Traditionally cultures have been far more connected to the land. People spent more time outdoors hunting and growing their own food. Now days, people get their food from a store and don’t recreate in the out of doors on a regular basis. In general, people have lost their connection to nature. This weekend

was all about rebuilding that connection. By listening to what goes on in the forest we can learn a lot about not only birds, animal behavior and habits, but ourselves too. The workshop was all about getting out and experiencing nature in a more primal way. Instead of marching out to a spot and sitting in the woods, wander quietly until you find just the right spot. Take notice of what you see, hear, and feel as you do so. The workshop also had us taking note of how we felt throughout the process, the more relaxed and open we were the more we could see. When we were done in the woods, we returned to the group and shared our experiences. The workshop focuses on our oneness with nature.

We did a lot of what is called "sit spots" you find a spot in the woods and you sit and take notes of what you see, hear, and feel. Friday afternoon, was our first "sit" I was a little hesitant, anxious even, the setup of the workshop was not what I have become accustomed to. As I sat in the woods there wasn't much activity. I could hear a few birds way off in the distance, all and all, kind of a disappointing "sit". Saturday we got to wander and sit. We took off and wandered through the woods until we found a place that suited us. We were to sit until dark. I walked until I found a bird nest up in a tree. I climbed up a hill and found a large boulder and settled in. I felt very relaxed and comfortable. I had a hawk fly in about 30 feet in front of me. There were woodpeckers working over trees around me and off in the distance a Barred Owl began to call. There was also a lot of human noise, distant repeated gunshots, cars, dogs, all muffling what I wanted to hear. I began to get frustrated. The woodpecker silenced and so did the owl. I continued to sit and calm. I could hear something climbing on a tree. I looked and I saw two gray squirrels sitting on a knot up in a tree about 40 feet in front of me. They survey the area and one comes down the tree and hops down the drainage that in to my right. I continue to watch the tree and another head pops out of a cavity on the opposite side of the tree. They continue to pop out and sit on the knot to survey the area, until all 6 of the squirrels are out of the tree. They all disperse through the forest. As I sit I begin to hear leaves rustle and at first I thought it was the squirrels, but after getting a good listen I know it is not. Four deer walk over the hill and out in front of me about 30 feet out. One doe and one yearling walk across in front of me grazing. The other doe and yearling aren't as confident, the yearling walking right in front of me and grazes, but the doe isn't too sure. I can hear more rustling but I can't see the other deer. Then the first doe and yearling come back, closer this time, about 20 feet in front of me and the doe stops right in front of me and stares at me. I look right back into her eyes and she slowly walks away and they all move off down the hill. They never spooked. After the deer had walked away two of the gray squirrels climbed down from trees behind me, I didn't want to turn and scare them to see exactly where they were, but one was very near me gnawing on something, it was quite loud and very near my head. As it was almost dark I gathered my pack and headed down the hill myself, moving slowly and quietly and taking time to listen between steps. As I was leaving I could hear the deer coming towards me once more, not running scared, just walking back my direction. It was an amazing evening.

This workshop for me was a lot of common sense sort of stuff, I have always gone out in nature to gather my thoughts and center myself. But it did show me that the way I enter nature, how I feel and move, has a huge effect on what I see and experience. I gathered a lot of ideas for programs and camps. The workshop not only showed me new activities and games, it also reminded me that the birds can tell you a lot if you listen. They have more than one call, and some are for mates, some for marking territory, and others for alarms; if you take the time to listen you will learn to recognize when something isn't right. The Coyote Mentoring Workshop was a fun and interesting journey. I learned a lot and will continue to learn more as I implement more of the activities and build stronger nature connections. I am very glad the department allowed me to participate in this workshop. I think this workshop would be beneficial to any park interpreter interested in looking at things from a different perspective. These workshops are a great experience and very educational. The grant program that allow these workshops to be at such low costs are wonderful, and I hope they continue in the future.
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. Their programs have given us a better appreciation of nature. They are well planned and carried out.
Comment: I attended the Tahlequah meeting, but wanted to formally state that I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. These programs have been invaluable to my family and friends. Their idea of deep nature connection beyond a simple hike is revolutionary, and to allow time in wild protected space is crucial. Please consider continuing to support this outstanding partnership that helps to ensure the protection of ecosystems in the midwest.
Comment: I would greatly appreciate future funding support for the Ozark Plateau NWR and the Ozark Tracker Society so that they an continue to provide low cost outreach programs in Deep Nature Connection on the refuge. The Grant money has allowed me to be able to attend and participate in these wonderful and educational programs. I would have otherwise missed the opportunity to experience such a unique learning process. So please continue the funding!!!
Comment: I hope this finds you in good health and spirits. I've attended several weekend workshops facilitated by the Ozark Tracker Society at the Ozark Plateau NWR at the Looney Center. These truly enhanced my connection with nature, and that neck of the woods in particular, and were attended by a diverse demographic of the region. I'd love to see continued support for these affordable programs that utilize the NWR so well.
Comment: Having been in education for over 30 years and having been the recipient of, participated in, and observed many Federal programs over the years, I have seen no other more significant, cost effective, and positive environmental impacting effort than that with the Ozark Tracker Society and the Deep Nature Connection programs. This refuge is a model of what Federal refuges should be: engaging, teaching and inspiring the public to care for our Earth in

community. It is my hope that not only is this effort recognized and continued here in the Ozark Plateau, but also that it is replicated wherever possible nationwide. With great admiration for the refuge and strong support of its 15-year plan.
Comment: I would like to see continued support for the Ozark Plateau NWR and the Ozark Tracker Society in providing low-cost outreach programs in Deep Nature Connection on the refuge. I had an amazing experience attending one of the weekend programs that I wouldn't have been able to go to if it weren't low cost. I hope this can keep reaching more and more people by making it affordable and easy to participate in.
Response: Thank you for your support and sharing your personal insights regarding how our nature connection programs have impacted you. We are very moved to hear that these programs are having such a positive impact on individuals, families, and communities. As proposed in Chapter 4, Goal 3, Objective 3, we plan to continue collaborating with Ozark Tracker Society, among other partners, to increase program opportunities for environmental education. Although educational funding is a challenge for us year to year, we will also do our best to maintain these programs at a low cost. We appreciate your support and look forward to having you join us again for more programs in the future.

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Looking out from January-Stansberry Cave / Richard Stark / USFWS
Stansberry Cave Entrance / Richard Stark / USFWS
Ozark Big-eared Bats / Richard Stark / USFWS
Twin Crayfish / Steve Hensley / USFWS
Ozark Big-eared Bat / Richard Stark / USFWS
Ozark Plateau Overview / USFWS Photograph

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