PROGRAMMATIC BIOLOGICAL ASSESSMENT

AND

PROGRAMMTIC BIOLOGICAL OPINION

FOR THE

NATURAL RESOURCES CONSERVATION SERVICE'S

ARKANSAS HEALTHY FOREST RESERVE PROGRAM

Written by

U. S. Fish and Wildlife Service
Arkansas Ecological Services Field Office

and

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Introduction

This represents the United States Fish and Wildlife Service's (Service) programmatic biological opinion (PBO) regarding the Healthy Forest Reserve Program (HFRP) in Arkansas. The Natural Resources Conservation Service (NRCS) and the Service have jointly agreed to a streamlined consultation process whereby a biological assessment and biological opinion are jointly developed. Therefore, this document serves as the NRCS' biological assessment and the Service's biological opinion of the proposed HFRP and potential impacts to the bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*), *Geocarpon minimum* (no common name), pondberry (*Lindera melissifolia*), pink mucket (*Lampsilis abrupta*), winged mapleleaf (*Quadrula fragosa*), and Ouachita rock-pocketbook (*Arkansia wheeleri*) from activities associated with this program. The purpose of this PBA/PBO is to expedite consultations on proposed HFRP activities. This consultation document has been prepared pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended (Act) (16 United States Code [U.S.C.] 1531 *et seq*.) and 50 Code of Federal Regulations [CFR] §402 of our interagency regulations governing section 7 of the ESA.

Section 7(a)(2) of the ESA requires federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any federally listed species nor destroy or adversely modify critical habitat. The Service and the federal agency or its designated representative implement section 7 of the ESA by consulting or conferring on any federal action that may affect federally listed or proposed threatened and endangered species and/or designated or proposed critical habitat.

This PBA/PBO is based on the best available scientific and commercial data including electronic mail and telephone correspondence with NRCS officials, Service files, pertinent scientific literature, discussions with recognized species authorities, and other scientific sources. A complete administrative record of this consultation is on file in the Arkansas Ecological Services Field Office in Conway, Arkansas.

This PBA/PBO concerns all HFRP management activities (easements, agreements, Habitat Restoration Plan of Operation [HRPO], landowner protections, and conservation practices/measures that implement HRPOs) detailed in the Healthy Forest Reserve Act of 2003 that will occur on an ongoing basis for 10, 30, or 99 years. This follows the general design criteria in an area designated as the HFRP eligibility area for the pilot program (2006) in portions of Ashley, Bradley, Calhoun, Drew, Ouachita, and Union counties in south central Arkansas. HRPOs that are consistent with the PBO conditions and area may be appended to this PBO only as the Service deems appropriate. In addition, the NRCS is responsible for making sure that individual HRPOs comply with this PBO and that take is not exceeded.

Consultation History

On May 23 to 25, 2006 NRCS and Service personnel from the designated pilot states (Arkansas, Maine and Mississippi) met in Pearl, Mississippi for a HFRP and Section 7 and 10 training session. The purpose of the training session was to formulate the consultation and coordination procedures for implementing the pilot HFRP in fiscal year 2006 The program calls for unprecedented collaboration on behalf of the two agencies in the development of Biological Assessments (BA) and BO in order to meet ESA § 7(a)2 consultation requirements and HRPOs. The following outcomes resulted from this training session:

1. NRCS will prepare a combined programmatic BA/BO in each of the 3 pilot states with the assistance of NRCS National Technology Support Centers (NTSC);

2. The Service will provide species life history, habitat, and technical expertise/information needed by NRCS to complete the PBA/PBO and develop HRPOs, including Service participation in all phases of HFRP formulation;

3. The pilot states set program enrollment dates for mid June through mid July;

4. Pilot states identified targeted species and geographic areas for implementation of the HFRP; and

5. Signed contracts (for restoration agreements) or intent to continue certifications (for easements) will be submitted to NRCS'National Headquarters by September 1, 2006 in order to obligate funds.

The NRCS Arkansas field office training session was held June 12, 2006 at Felsenthal National Wildlife Refuge. The purpose of the training was to inform Arkansas NRCS field office personnel of the HFRP objectives, requirements, and procedures to help them identify potential HFRP participants, communicate the HFRP provisions, and administer the HFRP in their field office area. A public meeting was held following the training session to notify and inform interested property owners of the HFRP. The training session and public meeting was attended by NRCS staff from Ashley, Bradley, Calhoun, Drew, Ouachita and Union counties, the NRCS state office, NRCS Fort Worth NTSC, Felsenthal National Wildlife Refuge and the Service's Arkansas Ecological Services Field Office. The following outcomes resulted from this training session and public meeting:

1. NRCS field personnel acquired the essential knowledge to deliver the HFRP. The participants were very receptive to working closely with the Service and exhibited a positive attitude towards developing and implementing the pilot HFRP;

2. NRCS state and area staff and Service staff exhibited the knowledge and commitment necessary to conduct the pilot HFRP;

3. the public meeting was conducted in an informal manner which resulted in open discussion and good participation; and

4. at least three landowners indicated a desire to participate in the program, and NRCS personnel identified a number of potential participants.

A conference call between Arkansas HFRP managers, NRCS Fort Worth NTSC, and the Service's Arkansas Ecological Services field office to discuss the creation of the combined PBA/PBO document and to identify personnel and agency responsibilities was conducted on June 16, 2006. Outcomes of this conference call were as follows:

1. required information for the PBA/PBO was identified;

2. NRCS and Service personnel responsible for completing various sections of the PBA/PBO and dates for completion were identified; and

3. a follow-up meeting was scheduled for July 31 and August 1, 2006 to discuss PBA/PBO progress and develop the Effects of the Action section.

The Arkansas NRCS state office sent a letter to the Service's Ecological Services field office on June 19, 2006 requesting initiation of formal consultation regarding the HFRP. In addition to the request for consultation, the letter also requested a complete list of federally listed species within the HFRP area. The Service received the request on June 26, 2006 and concurred with this request to enter formal consultation on July 7, 2006.

On July 31, 2006, representatives of the Service's Arkansas Ecological Services Field Office met with employees from the Arkansas NRCS state office in Little Rock. This meeting was organized to discuss the completion of the PBO/PBA. Outcomes of this meeting were as follows:

1. NRCS and Service personnel responsible for editing and modifying various sections of the PBA/PBO and dates for completion were identified; and

2. a follow-up meeting was scheduled for August 9 and 10 to discuss the completed Effects of the Action section.

On August 17, 2006, representatives of the Service's Arkansas Ecological Services Field Office and Arkansas NRCS state office in Little Rock met to discuss the 2006 HFRP ranking/selection criteria, net conservation benefits, and landowner assurances. Outcomes of this meeting were as follows:

1. defined riparian buffer widths that are eligible for HFRP landowner incentives;

2. both agencies acknowledge that the applicant ranking and selection criteria need to be refined in 2007 to help ensure landowner's that have the greatest potential to promote threatened and endangered species recovery rank as "high" priority applicants; and

3. extend the buffer area surrounding RCW populations from 0.5 mile to five miles and re-evaluate applicants.

BIOLOGICAL OPINION

The goal of this Programmatic Biological Assessment/Biological Opinion (PBA/PBO) is:

1. to develop an effective and efficient implementation approach of the Healthy Forest Reserve Program (HFRP);

2. to evaluate, assess, and ascertain its effects on targeted endangered, threatened, candidate and other imperiled species of fish, wildlife and/or plants; and

3. to develop a consistent conceptual national framework on the delivery of ESA regulatory assurances through HFRP using the section 7 process.

DESCRIPTION OF PROPOSED ACTION

NRCS and Service propose to implement the HFRP and integrate specific operational and structural elements and concepts that already exist under the Service's ESA program authorities. This is expected to be accomplished without the need to create additional bureaucratic or administrative encumbrances on interested landowners or the agencies. A description of the HFRP and applicable incentive-based ESA programs is discussed below.

The NRCS will work closely with the Service to further the affected species recovery objectives as part of the HFRP and to help make available to HFRP program participants safe harbor or similar assurances and protection under the ESA section 7(b)(4) or Section 10(a)(1), 16 U.S.C. 1536(b)(4), 1539(a)(1). In addition, technical support associated with forest management practices also may be provided by the Forest Service. Section 501 of the Act provides that the program will be carried out in coordination with the Secretary of the Interior and the Secretary of Commerce.

Program Requirements

Title V of the Healthy Forests Restoration Act of 2003 (Act) (Pub. L.108–148) authorizes the establishment of the HFRP. The HFRP is a voluntary program which the Secretary of Agriculture will administer in coordination with the Secretaries of Interior and Commerce. The purpose of this program is to assist landowners restoring and enhancing forest ecosystems to:

1. promote the recovery of threatened and endangered species;

2. improve biodiversity; and

3. enhance carbon sequestration (removal).

This interim final rule sets forth how NRCS will implement HFRP to meet the statutory objectives of the program.

Private forest land eligible for enrollment is that which will restore, enhance or otherwise measurably increase the likelihood of recovery of a species listed as endangered or threatened under section 4 of the ESA or improve the well being of species that are not listed as endangered or threatened under section 4 of the ESA but are:

1. candidates for listing under section 4 of the ESA;

2. state-listed species; or

3. special concern species.

The legislation establishes specific priorities for enrollment. The highest priority is to enroll land that provides the greatest conservation benefit to species listed as endangered or threatened under section 4 of the ESA, and the next priority is to enroll land that provides the greatest conservation benefit to species that are candidates for listing under section 4 of the ESA, state listed species, or special concern species. However, the Secretary of Agriculture or a designee also is required to consider the cost effectiveness of each agreement or easement and associated restoration plans so as to maximize the environmental benefits per dollar expended. If the land meets the basic eligibility criteria, the Secretary of Agriculture or a designee is also directed to give additional consideration to land which will improve biological diversity and increase carbon sequestration.

There are three enrollment options available 1) 10-year cost-share agreement, 2) 30-year easement, or 3) 99-year easement. Land will be enrolled in each according to the approximate proportion of landowner interest shown in each enrollment method. A maximum of 2 million acres may be enrolled in the program nationwide, regardless of the length of enrollment. NRCS evaluated whether the HFRP could be administered by partnering with third parties to acquire easements, in a manner similar to the Farm and Ranch Lands Protection Program, 16 U.S.C. 3838h and 3838i, and concluded that the Act does not provide authority to do so. Thus, the United States Department of Agriculture will hold title to HFRP easements.

Program Eligibility

Eligible lands in Arkansas occur within Ashley, Bradley, Calhoun, Drew, Ouachita, and Union counties (Figure 1). These lands also must:

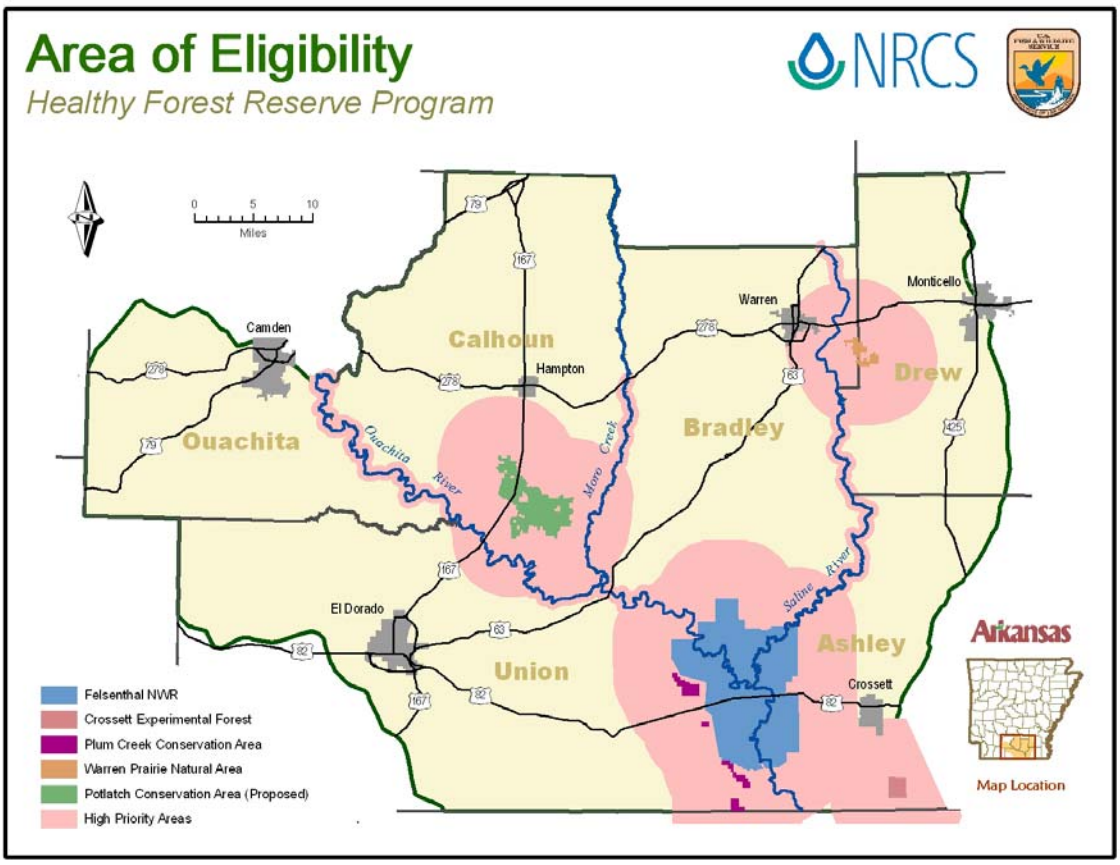
1. contain at least 50 percent forested land or land that can be returned to forest;

2. support or have the ability to support habitat for the bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*), *Geocarpon minimum* (no common name), pondberry (*Lindera melissifolia*), pink mucket (*Lampsilis abrupta*), winged mapleleaf (*Quadrula fragosa*), and Ouachita rock-pocketbook (*Arkansia wheeleri*);

3. contribute significantly to the practical administration of adjacent HFRP easements or agreements; and

4. a minimum of 50 percent of the applicants property must lie within the aforementioned counties.

Figure 1. Area of Eligibility for the 2006 Arkansas Healthy Forest Reserve Program.



Applications will be prioritized according to ranking criteria that promote the recovery of the identified threatened and endangered species.

The NRCS State Conservationist is responsible for developing eligibility requirements detailed above. In order to accomplish this, the NRCS coordinated with the Service to establish program policies. In carrying out the HFRP, NRCS may consult with private forest landowners, federal agencies, state agencies, and non profit conservation organizations.

Application Ranking Criteria

Applications will be ranked based on the possible benefits that inclusion in HFRP could provide for threatened and endangered species on the candidate tract of land (Appendix 1). The applications that have existing populations of threatened and endangered species on them will be given the highest priority. Priority will then be given to applications that:

1. benefit more than one threatened and endangered species;

2. are within close proximity of lands (or waterways) with existing populations of threatened and endangered species; and

3. the landowner is willing to allow the creation of nesting or foraging habitat for threatened and endangered species.

Program Benefits

Landowners who enroll their private forest land in HFRP are eligible for landowner protections from the ESA through a safe harbor like agreement. These protections will allow for incidental take of threatened and endangered species back to a baseline that will be determined upon acceptance into the HFRP.

Landowners who enroll their private forest land in a HFRP 99 year easement will receive two types of payments—one for the easement (compensation for enrollment) and another to implement conservation practices (cost share payments). The payment for the 99 year easement will be 100 percent of the appraised value of the enrolled land during the period the land is subject to the easement, less the fair market value of the land encumbered by the easement (Yellow Book Process). The cost share payment will be for 100 percent of the average cost of approved practices/measures.

Landowners who enroll their private forest land in a HFRP 30 year easement will receive the same kinds/types of payments as a 99 year easement. However, the payment for the easement will be 75 percent of the appraised value of the land, less the fair market value of the land encumbered by the easement (Yellow Book Process). The cost share payment for implementing conservation practices and measures will be 75 percent of the average cost of approved practices/measures.

Landowners who enroll private forest land in a HFRP ten year agreement will receive a 50 percent cost share payment of the average cost of approved practices/measures.

The provisions of the HFRP also allow:

1. NRCS to accept and use contributions of non-federal funds to make HFRP payments;

2. NRCS to provide additional conservation measures that are identified after the final HFRP restoration plan has been approved and signed (the landowner also may receive HFRP cost-share assistance to implement those measures/practices);

3. landowners enrolled in the HFRP to receive technical assistance for compliance with restoration plans that are incorporated in their HFRP agreements or easements; and

4. NRCS may use the services of certified technical service providers to develop and implement the HFRP.

Enrollment Process

Landowners interested in the HFRP can sign up for the program by visiting their local NRCS county office and filling out an application. Once the application has been completed, the landowner, working in conjunction with the District Conservationist has 7 days to complete and turn in a "HFRP Self Assessment Form" (Appendix 1). This form will be used to determine the priority (high, medium or low) of each landowner's property. Once the property status has been determined, high priority areas will be ranked by state, area and county office personnel. After high priority applications are ranked medium and low applications may be ranked depending on the availability of funds. This ranking process is designed to determine which tracts of land hold the highest potential for sustaining or improving the status of threatened and endangered species. Those tracts of land that score the highest will be selected for funding. Owners of selected tracts will then be sent a "Letter of Intent to Continue" (LIC). By signing the letter, the landowners agree to continue in the enrollment process.

Upon receipt of the signed LIC for a 30 or 99 year easement, the NRCS will order a survey to be completed on the tract. The acreage determined by this survey will be used during the Yellow Book appraisal. After completion of the appraisal, the landowner has the option to accept or decline the NRCS offer. If the offer is declined, the process ends. If the offer is accepted, the landowner, NRCS, and Service will determine baseline conditions and prepare a Habitat Restoration Plan of Operation (HRPO) (Appendix 2). The NRCS and the landowner are responsible for implementing the HRPO. Certified Technical Service Providers may be contracted to complete approved practices.

Upon receipt of the signed LIC for a 10 year agreement, the landowner, NRCS, and Service will immediately begin preparation of a HRPO. Once the plan has been

approved, the landowner will sign the contract and implementation will begin. Certified Technical Service Providers are contracted to complete approved practices.

Landowner Assurances

When conservation activities on land enrolled in the HFRP are anticipated to result in a population stabilization or increase for listed, candidate, or other species, the legislation provides that the landowner will receive safe harbor or similar assurances and protection under ESA. These are called "landowner protections" by NRCS.

Habitat Restoration Plan of Operation

A HRPO shall be developed for all land enrolled in the HFRP. The HRPO plan is developed jointly by the landowner and the Secretary of Agriculture or a designee in coordination with the Secretaries of Interior and Commerce or their designee. The HRPO must include any restoration practices or measures necessary to protect, restore and enhance habitat for threatened or endangered species. HRPOs will describe the conservation measures and practices that are to be implemented and the goals and objectives during each 10 year period. Forest management is dynamic; therefore, HRPOs will be updated every 10 years for 30 and 99 year easements.

Implementation of HFRP and Integration of ESA Assurances

The Service and NRCS both acknowledge the significant overlap between the legislative intent of HFRP and existing ESA incentive programs. Moreover, the Service and NRCS agree to adopt specific operational aspects of the Service's existing Safe Harbor Policy[1] and Candidate Conservation Agreement with Assurances Policy[2] within the implementation of HFRP. Further, NRCS and Service agree that various aspects of the implementation of HFRP will need a consistent framework to work effectively and efficiently at a national scale. This framework includes the following elements: the effective mechanism to deliver the landowner protection/regulatory assurances; enrollment process; minimum information requirements of the HRPO; establishing the net conservation benefit; identifying the conservation activities necessary to produce the net conservation benefit; mechanisms for accounting for incidental take events, and; use of general procedures for coordination and consultation. Each of the main elements is described and explained below.

Delivery of Landowner Protections/ESA Regulatory Assurances

The Service and NRCS agree that the HRPO offers the appropriate mechanism within the scope of this federal action to deliver the landowner protection provisions and to describe the conservation benefits to the target species. Landowners will be offered landowner

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[1] The Service's Safe Harbor Policy is found and described in the June 17, 1999 *Federal Register* Notice, 64FR 32717.

2 The Service's Candidate Conservation Agreement with Assurances Policy is found and described in the June 17, 1999 *Federal Register* Notice, 64FR 32726

protection provisions at the time of HFRP enrollment; however, the provisions are not automatic. Following program eligibility requirements, landowner protections are provided only when it has been determined that a net conservation benefit to the targeted species is likely to be achieved and the other purposes and objectives of the HFRP are met. Further, the protections are contingent upon the landowner managing the enrolled property in compliance with the agreed upon HRPO.

These protections allow the landowner to alter or modify the enrolled property upon termination of the HRPO; even if such alternation or modification results in the incidental take of the targeted species. Such take is limited, however, only to the extent that the alteration and take returns to and does not reduce the originally agreed upon baseline conditions. These protections may apply to the entire enrolled property or to portions of the enrolled property as designated or otherwise specified in the HRPO.

Unforeseen events and/or changed circumstances affecting the targeted species' status have the potential to change or alter the extent of landowner protections. If as a result of these unforeseen events and/or changed circumstances, additional management, restoration, or other measures are necessary to achieve the HFRP conservation objectives for the affected species, NRCS will only require such measures by the property owner when they maintain the original terms of the HRPO, and are limited to modifications of the plan. Further, these additional conservation measures will not involve the commitment of additional land, water, or financial compensation, or additional restrictions on the use of land, water, or other natural resources available for development or use under the original terms of the HRPO without the consent of the landowner.

NRCS will work cooperatively with the Service in establishing and demonstrating that unforeseen events and or changed circumstances exist, using the best scientific and commercial data available. These findings must be documented and based upon reliable technical and scientific information about the status and habitat requirements of the affected species. Considerations include, but are not limited to, the following factors:

1. size and extent of the affected species current range;

2. percentage of the species' range enrolled in HFRP;

3. ecological significance of the range affected by the HFRP;

4. level of knowledge about the affected species and degree of the species' conservation program specificity utilized by HFRP; and

5. whether failure to adopt additional conservation measures for landowners enrolled in HFRP would appreciably reduce the likelihood of survival and recovery of the affected species.

Enrollment Procedures

Each landowner interested in enrolling in HFRP and performing voluntary conservation activities that result in a net conservation benefit for the targeted species and agree to the other elements as presented herein will receive landowner protections. In some situations, landowners may not be willing to engage in all conservation activities necessary to produce a net conservation benefit yet their activities still achieve other stated goals of the HFRP. In those cases, landowner protections will not be provided within the HRPO.

NRCS staff will meet with property owners that are interested in the targeted species conservation. The HRPO will then be developed from the guidelines and requirements presented herein. The landowner, NRCS, and Service must sign the HRPO for it to be valid. Individual and specific project level information for each project (HFRP enrollee) will be recorded in the project (enrollee) evaluation form (Appendix 1). The HRPO will include the incidental take authority, Landowner Protections, and other information as outlined Appendix 2. Upon completion and signing of the HRPO, the Service will formally append the completed HRPO to this PBO (Appendix 3).

Minimum Easement/Agreement Requirement

Each valid and executed Easement/Agreement that incorporates landowner protections via the HRPO must state that the HRPO is the primary guiding document for implementation of management decisions and activities and the delivery mechanism for landowner protections.

Minimum HRPO Requirements

Each valid and executed HRPO that incorporates landowner protections must follow the format and template as outlined in Appendix 2.

Development of the Net Conservation Benefit Standard

The requirement of a HRPO in HFRP provides an opportunity to include a description of the agreed-upon conservation activities that will produce a net conservation benefit. Net conservation benefits must contribute, directly or indirectly, to the recovery of the covered species. This contribution toward recovery may vary and may not be permanent. The benefit to the species depends on the nature of conservation measures, the activities to be undertaken, where they are undertaken, and their duration. Although species specific standards may be tailored for the species targeted in implementation of HFRP, the following conditions are generally the minimum requirement for achieving a net conservation benefit:

1. occupied breeding, feeding, and/or foraging habitats are maintained or enhanced;

2. suitable habitats are protected, enhanced, restored, and/or expanded;

3. habitat connectivity increases because of habitat enhancement, restoration, and expansion efforts;

4. reduction of the adverse effects from catastrophic events is likely;

5. compatible buffers are established around/near existing targeted populations/habitats on protected lands (e.g., publicly-owned lands managed for wildlife, etc);

6. reduction in (one or more) existing threats to the species and/or its necessary habitat components is expected;

7. contributing some offspring that may either reoccupy previously abandoned lands/habitats or that may be used for relocation (if feasible) to land protected by longer-term conservation arrangements;

8. new populations and/or associated habitat components are created and maintained; and/or

9. new management techniques are tested and/or developed.

In situations where the affected landowner desires landowner protections, NRCS will develop an appropriate level of documentation to demonstrate that one or more of the elements listed above will provide a net conservation benefit to the targeted species. The level of specificity for the species and landowner will be tailored to the individual circumstance, but the finding must clearly describe the expected net conservation benefits and how NRCS reached that conclusion.

Development of Conservation Practices/Activities Necessary to Provide a Net Conservation Benefit

The Service and NRCS have worked cooperatively to identify conservation activities necessary to provide a net conservation benefit for the targeted species. These include both intensive and passive management. The specific management activities that will be identified in the HRPO and implemented by the landowner likely vary on a case-by-case basis due to site-specific factors, which include, but are not limited to, whether or not targeted species is present on the enrolled property, age and condition of suitable habitat, requirements from other HFRP goals, and the landowners' management goals and objectives. However, all HRPOs will include a description of the nature, extent, timing, and other pertinent details of the conservation activities that he/she will voluntarily undertake to provide a net conservation benefit, including a schedule for implementation of the conservation activities

In some cases, implementation of only one conservation activity below may be necessary in a HRPO to achieve the required net conservation benefit, whereas, in other situations,

more than one conservation activity may be necessary to achieve the net conservation benefit. It is the privilege of NRCS to determine if more than one conservation activity would be necessary to meet the conservation benefit standard. However, the NRCS, as part of the enrollment process, will ensure that the conservation activities covered will result in the required net conservation benefit.

HFRP Conservation Practices:

1. *Firebreak* - A firebreak is a permanent or temporary strip of bare or vegetated land planned to retard fire. This practice applies on all land uses where protection from wildfire is needed or prescribed burning is applied. Use of this practice in the HFRP will facilitate the prescribed burning conservation practice that is used to restore/maintain an open, herbaceous understory condition for the RCW. It also will serve to protect RCW cavity trees from wildfire.

   Firebreaks may be temporary or permanent and shall consist of fire-resistant vegetation, non-flammable materials, bare ground, or a combination of these. 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 wildlife, fisheries, cultural resources, natural areas, riparian areas and wetlands. Erosion control measures will be installed to prevent sediment from leaving the site. Plant species selected for vegetated firebreaks will be non-invasive and capable of retarding fire.

2. *Forest Stand Improvement* - Forest Stand Improvement is the manipulation of species composition, stand structure, and stocking by cutting or killing selected trees and understory vegetation. This practice applies to forest land where competing vegetation hinders development and stocking of preferred overstory, midstory, understory, and herbaceous species. It will be used for several purposes in the HFRP:

   1. decrease basal area of pine stands being managed as habitat for the RCW;

   2. to reduce the density of hardwood species present;

   3. adjust stand structure to achieve the open canopy situation necessary for RCWs;

   4. lengthen harvest rotations to allow pine trees to reach an acceptable age and size to be utilized as RCW cavity trees;

   5. increase the quantity and quality of forest products by manipulating stand density and structure;

   6. harvest forest products;

7. initiate forest stand regeneration;

8. reduce wildfire hazard;

9. improve forest health by reducing the potential of damage from pests and moisture stress;

10. restore natural plant communities;

11. achieve or maintain a desired native understory plant community for special forest products, grazing, and browsing;

12. improve aesthetic and recreation values;

13. increase carbon sequestration;

14. improve wildlife habitat; and

15. alter water yield.

Purposes of this practice are achieved by the following methods:

1. pre-commercial thinning in young, overstocked stands;

2. selective chemical release to favor preferred species;

3. intermediate thinning to maintain preferred stocking;

4. regeneration cutting to establish a new forest when the current forest no longer furnishes the desired habitat; and

5. salvage cutting after catastrophic events.

The preferred species are identified and retained to achieve the intended purpose of improving the stand for targeted wildlife species and overall ecological restoration. Spacing, density, and amounts of preferred plants are carefully planned. Consideration is given to the total ecosystem. Timing of treatment and retention of some dead or dying trees will help minimize impacts on nesting birds and other wildlife. Food and cover for wildlife are further retained by minimal modifications of composition and spacing necessary to improve the vegetative cover considering the total natural resource base.

3. *Forest Trails and Landings* - Forest trails and landings are temporary or infrequently used routes, paths or cleared areas within a forest to provide infrequent access to forest stands for management activities, fire suppression, and removal and collection of forest products necessary for habitat maintenance of the

targeted wildlife species and overall ecological restoration. This practice will be planned in HFRP to properly implement Forest Stand Improvement practice components.

Trails and landings will be of a size, gradient, number and location to accomplish the intended purposes. They shall be located to minimize adverse onsite and off-site impacts such as accelerated erosion, riparian area degradation, stream channel and stream bank damage, hydrology modification, aesthetics or unacceptable damage to advance regeneration, residual growing stock or wildlife habitat. Timing and use of equipment will be commensurate with site and soil conditions to maintain site productivity and minimize soil erosion, displacement and compaction. Slash, debris and vegetative material left on the site after use will not present an unacceptable fire or pest hazard or interfere with the intended purpose. Drainage and erosion control measures for trails shall be used and located to minimize erosion rates. As needed, trails and landings will be re-vegetated to native species to control erosion or be retired.

4. *Prescribed Burning* – Prescribed burning is the application of controlled fire to a predetermined area of land. It will be used in the HFRP to reduce understory hardwood density in pine stands being managed for the RCW. Use of prescribed burning in these stands in conjunction with Forest Stand Improvement will restore, enhance, or maintain RCW habitat. Cavity trees also will be protected from wildfires through the reduction of fuels in the area.

   Burning should be managed with consideration for targeted wildlife needs such as nesting, feeding, and cover. 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, safety, equipment needed, precaution areas, and techniques.

   Wildlife habitat for various animal species can be greatly enhanced through the use of prescribed burns. Prescribed burning is basic to the management, conservation, and recovery of the RCW. The burning should mimic natural fire regimes as close as possible, but it must be carefully planned and conducted to reduce the likelihood of damage to RCW nesting and foraging habitat..

   Bottomland hardwood forests and riparian forest buffers are not normally burned due to potential detrimental effects to aquatic organisms (i.e. decreased filtration, increased erosion, and increased sedimentation in adjacent waters).

5. *Riparian Forest Buffer* – This practice applies to areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and areas associated with ground water recharge. Dominant vegetation consists of existing or planted trees and shrubs suited to the site and retained to achieve the intended purposes of improving the riparian area for targeted wildlife species and overall ecological restoration. Grasses and forbs that come in naturally further enhance the wildlife

habitat and filtering effect of the practice. The width of the riparian forest buffer will be 660 feet adjacent to the Ouachita and Saline rivers and Moro Creek and 330 feet adjacent to all other named streams (as determined by topographic maps) within the action area. Density of preferred plants is carefully planned and maintained to achieve the intended purposes.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following:

1. create shade to lower water temperatures;

2. improve habitat for aquatic animals;

3. provide a source of debris necessary for healthy, robust populations of aquatic organisms and wildlife;

4. act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water;

5. provide protection against scour erosion within the floodplain; and

6. increase carbon storage in plant biomass and soils.

6. *Tree/Shrub Establishment* – The Tree/Shrub Establishment conservation practice establishes woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration. It will be used in HFRP to regenerate pine forests for to restore/enhance/maintain suitable RCW habitat.

   Site adaptation is a major consideration for success in establishing trees and shrubs. Careful consideration also is given to the suitability of selected species for the planned purposes of creating or enhancing habitat for targeted wildlife species, storing carbon in biomass, and overall ecological restoration.

   Application of this practice may be mechanical or by hand and requires the following considerations:

   1. composition of species will be adapted to site conditions and suitable for the planned purposes;

   2. species considered locally invasive or noxious will not be used;

   3. planting or seeding rates will be adequate to accomplish the planned purposes for the site; and

4. selection of planting technique and timing will be appropriate for the site and soil conditions.

7. *Tree/Shrub Pruning* – This practice involves removing all or parts of selected branches or leaders from trees and shrubs. The purposes of this practice are to reduce fire and/or safety hazards, create potential nesting sites, gain access to nesting sites, install nesting boxes, and reduce predator access for targeted wildlife species.

   The pruning and shearing method and timing will match the limitations of the site and soils; achieve purposes for the specific tree or shrub species; and be conducted in a safe and efficient manner. Pruning or shearing will not adversely reduce the growth and vigor of the tree or shrub for the intended purpose. The pruning and shearing will be timed to minimize potential damage to the tree bole and stems and disturbance to wildlife species

8. *Tree/Shrub Site Preparation* – Forest site preparation is the practice of treating areas to encourage natural regeneration of desirable trees and shrubs or to accelerate the process by providing optimum site conditions for planting or direct seeding of desirable woody species. It will be used to facilitate the Tree/Shrub Establishment conservation practice in HFRP.

   This practice applies to areas having undesirable vegetation that inhibits or competes with a preferred habitat suitable for targeted wildlife species and overall ecological restoration. The purpose of the practice is to prepare the land for establishing a stand of desirable trees or shrubs by controlling undesirable vegetation, removing slash and debris, or altering site conditions.

   Application of this practice may be mechanical or chemical and requires the following considerations:

   1. protect existing desirable vegetation;

   2. remaining slash and debris should not harbor harmful levels of pests, hinder needed equipment operation, or create an undue fire hazard;

   3. accelerated erosion and/or runoff caused by site preparation will be controlled by other conservation practices; and

   4. the chosen method should be cost effective and protect cultural and natural resources and other unique areas.

9. *Upland Wildlife Habitat Management* – This practice creates, restores, maintains or enhances areas for food, cover, and water for upland wildlife and species which use upland habitat for a portion of their life cycle. It will be used in the HFRP to establish RCW recruitment clusters (*i.e.*, install artificial nest cavities). Habitat

development and management will be based on the needs for targeted wildlife species and overall ecological restoration.

Upland Wildlife Habitat Management is a multi-purpose practice designed to accomplish one or more of the following:

1. provide a variety of food and cover for desired wildlife species;

2. arrange habitat elements in proper amounts and locations to benefit desired species; and

3. manage wildlife habitat to achieve a viable wildlife population.

10. *Use Exclusion* – Use exclusion is excluding animals, people or vehicles from an area on a temporary or permanent basis. The purpose of Use Exclusion is to protect, maintain, or improve the quantity and quality of natural resources in an area. The purpose also includes aesthetic resources as well as human health and safety. The practice also may be used in a conservation plan in areas where vegetation establishment or maintenance is a concern. Protecting the vegetation is often essential to conserving the other natural resources.

    This practice will be used in HFRP as a facilitating practice in the form of fencing to restrict livestock from riparian forest buffers. The use restriction will enhance water quality by controlling the amount of wastes in the buffer zone, keeping livestock from loafing in the water bodies, and protecting streamside vegetation from trampling and grazing.

    The barriers constructed for use exclusion must be adequate to prevent intrusion of the target animals, vehicles, or people. The barriers are usually fences, but may also be natural and artificial structures such as logs, boulders, earth fill, gates, signs, etc.

Baseline Considerations

The purpose of determining baseline conditions is to ensure that the targeted species status on enrolled lands is no worse after HFRP participation than before enrollment. The most important feature of the baseline concept is that it will be determined by the existing ESA responsibilities present within the eligible enrolled lands. Baseline conditions can be zero (no current ESA responsibilities as illustrated by no occupied habitat or species presence throughout the identified property). Baseline conditions may be described in terms related to population size, such as number of active clusters or a specific number of individuals. However, in many cases, baseline conditions are best described using measurements of available suitable habitat and habitat conditions rather than numbers of individuals present (e.g. aquatic species). No matter whether population or habitat-based methods are used to determine baseline, there should be a description of the existing habitat type, representative species present and number, water and wetland

resources, condition of the habitat, and any other information necessary to describe the baseline conditions.

Determining Baseline Conditions

The NRCS, in cooperation and coordination with Service and other partners, has developed the following procedure for determining baselines conditions for the bald eagle, RCW, pink mucket, winged mapleleaf, Ouachita rock-pocketbook, *Geocarpon minimum*, and pondberry. Baseline conditions for RCW, bald eagle, *Geocarpon minimum*, and pondberry will be determined by surveys conducted by the landowner, and subsequently supplemented by NRCS and Service.

RCW surveys will follow recommended Service protocols (refer to recovery plan; Service 2003). A landowner's RCW baseline will be based number of active groups and RCW cavities. If there are no RCW cavities or RCWs on the property, the landowner's baseline will be zero.

Baseline conditions for the bald eagle will be based on the *Draft National Bald Eagle Management Guidelines* dated February 2006 or the latest modification. A landowner's bald eagle baseline will be based on 1) the number of bald eagle nests, 2) amount of habitat required to maintain natural forested buffers around nest trees, and 3) avoiding certain activities during the nesting season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near the nest sites.

Factors that will be considered in determining the baseline conditions for the pink mucket, winged mapleleaf, and Ouachita rock-pocketbook on a prospective enrolled property are riparian habitat (width, length, type of vegetation, fenced or not fenced), current or recommended land use practices (best management practices, nutrient management plans), and existing agreements on the property. Instream habitat will not be used to describe baselines due to the inherent natural variability (bed load movement and meandering) that is likely to occur in the streams over the course of an HRPO. In addition, enrolled landowners have no control over natural changes to instream habitat or to changes that may be caused or exacerbated by activities on properties upstream or downstream of the enrolled property. The NRCS and Service expect that through the implementation of conservation measures that protect, enhance, or restore riparian habitat and stream banks and best management practices on enrolled properties, instream habitat will be protected, enhanced, or restored through the term of an HRPO.

Baseline conditions for *Geocarpon minimum* will be based on the number of acres characterized as sandy-clay prairies on bare mineral soils of the Lafe or Wing Series (high in sodium and magnesium). Number of plants will not be used to describe baselines due to lack of germination in certain years, which perhaps is related to soil moisture. The NRCS and Service expect that through implementation of conservation measure that protect, enhance, or restore natural conditions to these soil types on enrolled properties, the natural vegetative community in these soil types will be protected, enhanced, or restored through the term of the HRPO.

Baseline conditions for pondberry will based on the number of acres classified as seasonally flooded wetlands and characterized by forested, sandy depressions. The depressions form natural swamps that hold up to 11.4 inches of water in the spring but are usually dry by October. The NRCS and Service expect that through implementation of conservation measure that protect, enhance, or restore early successional natural conditions to these soil types on enrolled properties, the natural vegetative community in these soil types will be protected, enhanced, or restored through the term of the HRPO.

NRCS will work cooperatively with Landowners and seek assistance from the Service as appropriate to determine baseline conditions. If NRCS, Service, and/or their respective agents do not directly take part in surveys to determine the baseline, concurrence with the baseline determination is mandatory.

Maintaining Baseline Conditions

For landowners that have an existing baseline responsibility above zero, (e.g., the presence of the species/occupied habitat), the landowner must agree to maintain that baseline using conservation activities that are necessary to maintain the baseline responsibilities. NRCS and the affected landowner will agree to the set of conservation activities that will ensure that baseline is maintained on each enrolled property. Conservation activities and description of how management activities will be implemented on the enrolled property (e.g., schedule of implementation) will be described in the HRPO.

Baseline Adjustment

Both NRCS and the Service acknowledge that procedures must be in place to determine how circumstances acting on targeted species/habitat outside a particular landowner's management control can affect stated baseline conditions (and therefore affect landowner protections) within implementation of HFRP

Downward Baseline Adjustments - In spite of management and protection efforts, there may be circumstances, through no fault of the landowner, where existing individuals/populations and/or occupied habitats of targeted species cease to exist. Should this situation occur, the enrolled landowner will not be held accountable for the loss of this element of his/her baseline provided each of the following have occurred:

1. the landowner must allow NRCS and Service access to the enrolled property to conduct an investigation, if they chose to do so; and

2. the loss of the baseline occurred through no fault of the landowner and in spite of total compliance with the HRPO.

A landowner's responsibility can be reduced by the appropriate increment of the targeted species baseline metric provided all of the above criteria have been met. However, the

property owner must make a request in writing for a baseline reduction. Further, the HRPO specifically will allow the NRCS, Service, and/or their authorized agents to conduct an investigation, at the agencies' option(s), to verify that conditions leading to the natural loss of the baseline occurred. If approved, the downward adjustment in baseline will be reflected in a revised HRPO.

Shifting Baseline - In certain circumstances, the concept of a shifting baseline may be appropriate and the Service and NRCS will work within the specific constraints of the targeted species conservation needs to determine whether this is a potential administrative option under HFRP. This approach presumes that an enrolled landowner may wish to modify or develop portions of occupied habitat within the original baseline area in exchange for creating an equivalent amount of enhanced/restored occupied habitat elsewhere within the enrolled lands in previously unsuitable habitat (where in that area the initial baseline is zero). In any situation where a shifting baseline is considered, the following will apply:

1. No loss of existing individuals or occupied habitat is permitted in relocating baseline responsibilities to habitat occupied because of the landowner's voluntary conservation activities;

2. No habitat can be impacted until after the landowner requests to relocate baseline responsibility to an equivalent habitat/population area, and NRCS and Service have approved that request;

3. The landowner must give the NRCS and Service 60 day notice to remove any remaining species from the area to be impacted;

4. The enrolled landowner has implemented the management activities specified in the HRPO; and

5. The enrolled landowner has maintained his or her baseline responsibilities as specified in the HRPO.

For a landowner to shift his/her baseline responsibilities, the request must be evaluated by NRCS to ensure that the conditions outlined above are met. If the conditions are met, NRCS will document the shift in the records associated with the applicable HRPO, noting that the baseline responsibilities did not change and that the baseline was maintained prior to any incidental take associated with the baseline shift. At that point, they will provide this documentation to the Service.

Conveyance of Incidental Take Authorizations

As landowners are enrolled under HFRP, including the provisions of the HRPO as outlined herein, NRCS will provide copies of these documents to the Service at appropriate and agreed upon intervals. At the time that NRCS, Service, and the

landowner sign the HRPO, this signifies that the PBA/PBO has been appended and conveyance of the incidental take authorizations is provided.

Specific Requirements for Incidental Take Authorizations

An enrolled landowner will be allowed to make any other lawful use of his/her property, even if such use results in the incidental take of the targeted species provided all of the following qualifications are met:

1. enrollee must be in total compliance with the HRPO, including maintaining his baseline responsibilities as specified in the HRPO;

2. targeted species may not be shot, captured, or otherwise directly taken (as defined by the ESA);

3. take is incidental to otherwise lawful activities;

4. take meets Conditions 1-3 above and it does not occur during the RCW and bald eagle nesting season, critical periods for *Geocarpon minimum* and pondberry germination and reproduction, and fish spawning/mussel glochidia release periods;

5. surveys may be required prior to authorization; and

6. enrollee will *not* undertake any activity that could result in incidental take of targeted species, *not* associated with implementation of measures necessary to produce a net conservation benefit, until the landowner has provided NRCS and Service with at least 60 days written notice, in order to allow the NRCS and Service and/or their respective agents the opportunity to translocate the affected targeted species to a suitable recipient site.

Monitoring and Reporting Responsibilities

NRCS will annually monitor the implementation of the effects of the HFRP and use of landowner protection. To do this, NRCS and/or its authorized agents will contact each enrollee at intervals appropriate for a particular HRPO to evaluate and assess implementation and maintenance of management activities specified, identify any modifications that may be necessary, and discuss other issues. In addition, at least 33 percent of all enrolled properties, including all enrolled properties where incidental take was proposed or occurred during the current or previous year, will be visited each year.

NRCS will submit an annual report to the FWS, no later than December 31 for the preceding fiscal year, detailing the extent of ESA regulatory assurances use under HFRP. This report will include accurate records of the following:

1. any increase in number of targeted species or their habitat on enrolled lands;

2. number of acres enrolled;

3. number of landowners enrolled;

4. summary of any incidental take that has or is expected to occur on enrolled lands;

4. list of all HRPO that have been terminated; and

5. list of all conservation practices/measures implemented on each landowner's enrolled property, including area of implementation, and date of implementation and completion.

Addressing other species

There is the possibility that other listed, proposed, candidate species, or species of concern may occur in the future on properties enrolled under the HFRP as a direct result of conservation activities undertaken. Should that occur, and if NRCS and the enrolled landowner so request, the affected HRPO and this PBA/PBO will be amended by establishing similar implementation provisions as described for the originally targeted species.

Surveys for other federally listed species will not be required of HFRP participants. However, the proposed action does not authorize incidental take of any other federally listed species. Therefore, within the scope of this PBA/PBO, only the bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*; RCW), *Geocarpon minimum* (no common name), pondberry (*Lindera melissifolia*), pink mucket (*Lampsilis abrupta*), winged mapleleaf (*Quadrula fragosa*), and ouachita rock-pocketbook (*Arkansia wheeleri*) will be considered.

Emergency Salvage Harvest Situations

Emergencies, such as natural disasters or insect infestations, may require that emergency (salvage) harvesting of timber on the enrolled property begin with less than the 60 day notice set forth above. If emergency situations warrant actions by the landowner that also will not violate the easement/agreement or HRPO and will not affect above baseline conditions, the enrolled landowner will notify the NRCS and Service by written certified notice at least five days prior to conducting an emergency harvest. The NRCS, Service, and/or their respective agents will have this five day time period to translocate and/or rescue the affected species to sites that are outside the enrolled property or, with the landowner's written permission, to sites within the enrolled property which have suitable habitat conditions. The landowner will not initiate an emergency response until notified by NRCS and Service or five days after they have received the written certified notice.

Access of Enrolled Lands

NRCS will ensure that the HRPO provides the opportunity for NRCS and Service or their designated agents:

1. to access the land enrolled in HFRP with landowner protections at least annually to verify that the agree-upon conditions and expectations are being upheld;

2. to assess the baseline condition of targeted species;

3. to provide other technical assistance, as appropriate; and

4. to allow relocation or release of covered species.

The NRCS must give the landowners reasonable notice of these visits and may be accompanied by the landowner or an agent of the landowner. The scope of the visit will be agreed to in advance. The landowner will not unreasonably withhold access to enter upon his/her property and agrees to grant the NRCS and/or the Service access with reasonable notification.

DESCRIPTION OF THE ACTION AREA

Physical Characteristics

The action area is within the West Gulf Coastal Plain geomorphic province and is located in parts of Ashley, Bradley, Calhoun, Drew, Ouachita, and Union counties in Arkansas (Figure 1). Parts of three watersheds, the Lower Ouachita-Bayou DeLoutre sub-basin to the south; the Lower Saline sub-basin to the east; and the Lower Ouachita-Smackover sub-basin to the west, make up the action area and all are part of the Lower Ouachita River Basin.

Topography is flat to gently rolling, with shallow to moderately dissected plains formed by deposition of continental sediments onto a shallow, submerged continental shelf, which was later exposed by sea level subsidence. Elevation in the action area ranges from about 55 feet above mean sea level in the Ouachita River bottoms to about 200 feet above mean sea level in the uplands. Precipitation within the action area averages 55 inches per year and is well dispersed throughout the year. Droughts are rare. Average annual temperature is 64 degrees Fahrenheit, with temperatures ranging from about 94 degrees Fahrenheit during the summer to about 34 degrees Fahrenheit during the winter (USDA 1979).

Soil associations in the action area include Guyton, Amy-Pheba, and Savannah-Sacul-Sawyer. The Guyton association occurs in the major stream bottoms, consists of hardwood stands, and is generally poorly drained, deep, loamy, and level. This association makes up approximately 25 percent of the action area. Other soils associated with Guyton include Tillou, Bussy, and Amy.

The Amy-Pheba association makes up roughly 25 percent of the action area and occurs on Pleistocene terraces outside the active floodplains. It is poorly drained to somewhat poorly drained, nearly level, and is loamy in texture. The Amy-Pheba association terrace sites are best described as pine flatwoods. The Savannah-Sacul-Sawyer association occurs in the true uplands and comprises approximately 50 percent of the action area. It is nearly level to gently sloping, moderately well drained, and loamy in texture. The Savannah-Sacul-Sawyer association sites are typical coastal plain pine sites. Site index for loblolly pine ranges from 80 feet to 100 feet in 50 years. The Arkabutla soil series occurs in minor creek bottoms throughout the action area and is an important inclusion in the Savannah-Sacul-Sawyer association because of its increased productivity (USDA 1976, USDA 1979).

Plant Communities

Natural plant communities within the action area are dominated by both loblolly and shortleaf pine stands interspersed with bottomland hardwood stands and wet prairies. Historically, pine stands were maintained in low density conditions by the periodic use of fire. Native Americans burned the landscape intentionally and frequently and created woodlands with a heavy herbaceous component dominated by grasses. These same stands, when fire is suppressed, are eventually dominated by hardwoods with a sparse herbaceous component. Fire suppression began in earnest during the early 1900's and continues today, although some of the federal and industrial lands in the action area are now subjected to prescribed fire for wildlife management, fuel reduction, and competition control (Baker 2002). Common tree species in the uplands include shortleaf pine (*Pinus echinata)*, loblolly pine (*Pinus taeda)*, sweetgum (*Liquidambar styraciflua)*, white oak (*Quercus alba)*, southern red oak (*Quercus falcata)*, green ash (*Fraxinus pennsylvanica)*, mockernut hickory (*Carya tomentosa)*, and blackgum (*Nyssa sylvatica)*. The uplands were interspersed with prairies where the dominant vegetation included big bluestem (*Andropogon gerardii)*, little bluestem (*Schizachyrium scoparium)*, Elliott's bluestem (*Andropogon elliottii)*, Indian grass (*Sorghastrum nutans)*, switch grass (*Panicum virgatum)*, eastern gamma grass (*Tripsacum dactyloides)*, and a plethora of native legumes, composites, and other forbs.

Historically, shortleaf pine was the dominant species within the action area, with loblolly pine being relegated to lower topographic positions where fire occurred more sporadically (McNab 1994). Forest management over the last 100 years has favored loblolly pine over shortleaf pine, primarily for faster growth rates and more reliable seed production. Although dominance shifted between the two major species in the area, structural conditions remained similar due to the use of prescribed fire and longer rotations for high value forest products (Baker 2002). Prescribed burning was a popular forest management tool for competition control until the mid 1980's, when industrial ownership changes led to decreased use of natural stand management and increased plantation silviculture.

Bottomland hardwood stands comprise a large portion of the action area. These stands occur on alluvial soils laid down by the Ouachita River and its tributaries. Even though these are alluvial soils, they are of local origin and when compared with other bottomland hardwood sites, are not extremely productive. The Ouachita River originates in the Ouachita Mountains in Arkansas, and does not carry the productive sediment found in rivers that flow through the Great Plains. Site index for most bottomland hardwood species that occur in both the Ouachita River Basin and the Mississippi Alluvial Valley are lower in the floodplain of the Ouachita River (Baker 1976). Common bottomland hardwood species in the action area are willow oak (*Quercus phellos)*, water oak (*Quercus nigra)*, swamp chestnut oak *(Quercus michauxii)*, Nuttall oak (*Quercus nuttallii)*, overcup oak (*Quercus lyrata)*, green ash (*Fraxinus pennsylvanica)*, water hickory (*Carya aquatica)*, red maple (*Acer rubrum)*, and American elm (*Ulmus americana)*.

Ownership Patterns and Current Land Use

Lands within the action area are owned by forest industry, state and federal government entities, and non-industrial private landowners. Forest industry owns approximately 25 percent of land within the action area and these lands are managed for a variety of forest products ranging from pulp and paper to dimensional lumber. Several saw mills, paper mills, and plywood mills operate in the area and are the driving economic force in the region (Greis 2002). Major industrial landowners include Potlatch Corporation, Plum Creek Timber Company, Deltic Timber Corporation, and timber investment management operations. Both Potlatch and Plum Creek have voluntarily implemented RCW Conservation Areas within the action area.

Federal ownership in the action area includes Felsenthal National Wildlife Refuge, Overflow National Wildlife Refuge, and the Crossett Experimental Forest. Felsenthal NWR comprises roughly 80,000 acres of bottomland hardwood forest and pine upland. Overflow NWR is entirely bottomland hardwood forests, and the Crossett Experimental Forest contains upland forests where extensive, long-term research is being conducted on forestry practices that promote southern yellow pine production and management. Both Felsenthal NWR and the Crossett Experimental Forest have existing RCW populations. State government ownership within the action area includes the Warren Prairie Natural Area, owned and maintained by the Arkansas Natural Heritage Commission. Plans are in place to translocate RCWs to Warren Priarie Natural Area within the next two years. Additional public ownership includes wildlife management areas owned or leased by the Arkansas Game and Fish Commission. However, no RCWs are known to occur on these lands.

The majority of lands within the action area (about 60 percent) are owned by non-industrial private landowners. Most of this acreage is overstocked forest land that is of little benefit at this time to the RCW. A lack of forest management in the form of prescribed fire and mid-rotation forestry practices which reduce stand density have led to stands with dense hardwood midstory and minimal herbaceous vegetation (Greis 2002). Non-industrial private lands are also heavily utilized for livestock grazing, predominately

on lands that were cleared and established to tame grass pastures. Other private land agricultural enterprises include poultry production, hog farming, and vegetable farming. Much of the land in the action area is suitable for commercial tomato and pepper growing operations and this has been a major agricultural use for years.

STATUS OF THE SPECIES/CRITICAL HABITAT

This section summarizes the biology and ecology as well as information regarding the status and trends of the bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*; RCW), *Geocarpon minimum* (no common name), pondberry (*Lindera melissifolia*), pink mucket (*Lampsilis abrupta*), winged mapleleaf (*Quadrula fragosa*), and Ouachita rock-pocketbook (*Arkansia wheeleri*) throughout their entire range. The Service uses this information to assess whether a federal action is likely to jeopardize the continued existence of the aforementioned species. The "Environmental Baseline" section summarizes information on status and trends of the species specifically within the action area. This summary provides the foundation for the Service's assessment of the effects of the proposed action, as presented in the "Effects of the Action" section.

<u>Bald Eagle</u>

Species/critical habitat description

Bald eagles are large raptors that occur throughout North America and are generally found near large rivers and lakes. Juvenile bald eagles have mottled brown and white plumage, gradually acquiring their dark brown body and distinctive white head and tail as they mature. Bald eagles generally attain adult plumage by five years of age. Most are capable of breeding at four or five years of age, but in healthy populations they may not start breeding until much older. Bald eagles may live 15 to 25 years in the wild. Adults weigh eight to fourteen pounds (occasionally reaching 16 pounds in Alaska) and have wing spans of five and a half to eight feet. Those in the northern range are larger than those in the south, and females are larger than males. No critical habitat has been designated for this species.

Life history

The bald eagle is an opportunistic feeder. Accordingly, its diet varies tremendously depending on the time of year and habitat. Most studies indicate that fish are an important component of the eagle's diet, while birds and mammals account for the bulk of the remaining foods (Johnsgard 1990). During the winter, reduced availability of prey resulting from frozen waters require interior-based eagle populations to switch from a predominantly fish diet to one of birds and mammals. Carrion is taken by many eagles and is also a substantial portion of the diet, especially for coastal eagles dependent on post-spawning salmonids. Non-coastal populations may also rely heavily on carrion particularly during the late winter and early spring.

In the southeastern United States the bulk of the diet is fish. Broley (1947) found catfish (*Ictalurus* sp.), mullet, and turtles to be the most common food items found at nests in Florida. He also found that the variety of prey items differ among individual pairs. McEwan (1977) reported 79 percent fish and 17 percent bird prey, by occurrence, based on 788 animal remains recovered from nests. Of these, the dominant items were catfish and the American coot (*Fulica americana*).

Bald eagles are considered a water-dependent species typically found near estuaries, large lakes, reservoirs, major rivers and some seacoast habitats (Service 1999a). Their distribution is influenced by the availability of suitable nest and perch sites near large, open water-bodies, typically with high amounts of water-to-land edge.

Nesting habitat and territory include the nest tree, perch and roost sites, and adjacent high use areas, but does not include foraging areas. The nest, perch, roost sites, and use areas around the nest tree comprise the nesting territory. The size and shape of a defended nesting territory varies greatly depending on the terrain, vegetation, food availability, and eagle density in the area. Generally, bald eagle nesting habitat is adjacent to, or near large bodies of water that are used for foraging (Service 1999a). Nest sites must also provide good visibility, and a clear flight path to the nest (Montana Bald Eagle Working Group 1991). In Arkansas, nests are often in the ecotone between forest and water, and are typically constructed in dominant or co-dominant living pines (*Pinus* sp.) or sycamores (*Platanus occidentalis*). In forested areas, they often select the tallest trees with stout limbs to support a nest that can weigh more than 1,000 pounds (Service 2006).

Although bald eagle nests are legally protected, a nest in and of itself, from a biological perspective, is relatively inconsequential to a given pair of eagles, (a pair can construct a nest in less than a week). The nest site that originally attracted the pair is of critical importance. It is not uncommon for nests to be blown from trees by storms, after which the resident pairs typically re-nest on the same sites, often in the same trees. Therefore, in instances where nests, and even nest trees, are lost, these Guidelines should continue to apply in their absence for a period extending through at least three complete breeding seasons subsequent to the loss.

Bald eagles often use alternate nests in different years. Although nests used by a given pair are situated in the same general vicinity, some nests go unused for several consecutive years and thereby may appear abandoned. Nests may remain unused for several years, often due to the death of one member of the resident pair, and then be reoccupied by either the original pair or one member of the original pair with a new mate. Even in instances where both members of a pair have died, the site would likely be taken over by another pair if no habitat degradation occurs. Therefore, the bald eagle Guidelines apply to apparently "abandoned" nests for a period extending at least through five consecutive breeding seasons of non-use.

In the southeastern United States bald eagles nest once a year, with the mated pair returning to the same breeding/nest area beginning in early fall, refurbishing their nest between September and January, and egg laying in December through February.

Depending on the geographic area, incubation may be initiated as early as December or as late as March, with the eggs requiring about 33 to 35 days for incubation, but can be as long as 45 days. Clutches usually consist of one or two eggs, but occasionally three are laid. In Arkansas, the eaglets will grow to the size of the adult birds within 10 to 12 weeks, at which time they typically fledge. Parental care may extend four to six weeks after fledging even though young eaglets are fully developed and may not remain at the nest after fledging.

Population dynamics

Bald eagles are a North American species that historically occurred throughout the conterminous United States and Alaska. The largest North American breeding populations are in Alaska and Canada, but there are also significant bald eagle populations in Florida, the Pacific Northwest, the Greater Yellowstone area, the Great Lakes States, and the Chesapeake Bay region. Bald eagle distribution varies seasonally. Bald eagles that nest in southern latitudes frequently move northward in late spring and early summer, often summering as far north as Canada. Most eagles that breed at northern latitudes migrate southward during winter, or to coastal areas where waters remain unfrozen. Migrants frequently concentrate in large numbers at sites where food is abundant and they often roost together communally. In some cases, concentration areas are used year-round in summer by southern eagles and in winter by northern eagles (Service 2006).

The overall population size in Arkansas is unknown due to the transient nature of bald eagles. Based on Arkansas Game and Fish Commission data (K. Rowe, pers. comm. 2005), there are 94 known bald eagle nest sites in the state. Of these, 78 were active in 2004.

Status and distribution

After severe declines in the lower 48 States between the 1870's and the 1970's, the bald eagle was listed as endangered on March 11, 1967, due to significant population declines (32 FR 4001). On July 12, 1995, the bald eagle's status was down graded from endangered to threatened due to substantial population increases following conservation efforts, including the banning of DDT and other organochlorine pesticides (60 FR 36010). The Service reopened the public comment period on its original 1999 proposal to remove the bald eagle from the Federal list of threatened and endangered species in February 2006.

State natural resource agencies and conservation organizations initiated surveys for nesting bald eagles in the early 1950s, revealing that bald eagle numbers declined from historic numbers in many locations. A nationwide survey by the Service, several State wildlife agencies, and conservation groups in 1974 indicated that eagle numbers and their reproductive success in certain areas were low enough to warrant protective actions.

The bald eagle population in the lower 48 states has recovered from a population estimated at 417 nesting pairs in 1963, to a current population of an estimated 7,066

breeding pairs. The threats to the species have been reduced; reproductive success has increased to a healthy level; and the population is growing and distributed across 47 of the lower 48 states (Vermont does not currently have a nesting population of bald eagles).

Bald eagle nesting and productivity has increased dramatically since the early 1970s in Arkansas. The state currently supports approximately 80 nesting pair of bald eagles. Although numbers and productivity of bald eagles are increasing in Arkansas, concerns remain about the cumulative impacts associated with continued agricultural, residential, and commercial development.

A primary threat to bald eagles after World War II was the widespread use of the pesticide DDT for mosquito control (Broley 1950). DDT was sprayed directly into wetlands, entered the food chain, and resulted in eggshell thinning. This caused massive reproductive failure, which became evident in the 1960s. Peterson and Robertson (1978) indicated that the eagle population decreased by 50 percent in a 30-year period. The Federal government subsequently banned the use of DDT in 1972.

Individual bald eagle pairs return to their same territories year after year, and often territories are inherited by subsequent generations. Eagles are most vulnerable to disturbance during the nesting period, *i.e.*, during courtship, nest building, egg laying, incubation, and brooding (roughly the first 12 weeks of the nesting cycle). Disturbance during this critical period may lead to nest abandonment and/or chilled or overheated eggs or young. Disturbance near a nest later in the nesting cycle may cause premature fledging, thereby lessening the chance of survival.

Habitat loss and degradation from human alteration of the environment remains a major threat to eagles (Heinzman 1961, 1962; Smith 1969). The Service worked with each bald eagle recovery unit in the United States (*e.g.*, southeast, Chesapeake Bay, northern States, southwest, Pacific), to produce Guidelines that provide recommendations to avoid or minimize detrimental human-related effects to nesting bald eagles. These Guidelines include recommendations on the frequency, distance, and type of disturbances that should be avoided near bald eagle nests. The Guidelines provide for spatial and temporal protection of the nest site and foraging areas. These Guidelines have been widely adopted by Federal and State agencies and are applied to both public and private lands.

The Guidelines have been used in Arkansas to avoid or minimize potential adverse effects to nesting bald eagles. Nesbitt et al. (1993) evaluated the effectiveness of the Guidelines in protecting bald eagle habitat and found that bald eagle use and productivity were not significantly affected by encroachment if the Guidelines were implemented as recommended.

Analysis of the species/critical habitat likely to be affected

The bald eagle potentially will be affected by implementation of HFRP conservation measures/practices that occur near nest sites. No critical habitat has been designated for the bald eagle; therefore, none will be affected.

Red-cockaded Woodpecker

Species/critical habitat description

The RCW is a small woodpecker, about 7.25 inches in length, with a wingspan of about 14 to 15 inches. They have black and white horizontal stripes on their backs, with white undersides and white cheek patches. Cap and stripe on side of neck are black. Males have a small red spot above the white cheek patch.

The RCW is a territorial, non-migratory, and cooperative breeding species (Lennartz *et al.* 1987; Walters *et al*. 1988). It is the only North American woodpecker that exclusively excavates its roost and nest cavities in living pines. In 1970, the RCW was listed as endangered (FR 35:16047), and in 1973 the RCW was listed as an endangered species under the Act. No critical habitat has been designated for the RCW.

The RCW was historically found throughout fire-maintained, old-growth southern pine forests. The number of RCW groups persisting today represents about one percent of the population estimated to have occupied southern pine forests prior to European settlement. Their decline has been due to the loss of foraging and nesting habitat through conversion of the habitat to agricultural, rural and urban uses (Service 1985). In areas that have remained forested, the decline has resulted from timber harvest, followed by establishment of short-rotation pine plantation management in which trees do not reach a sufficient age and size for suitable habitat, from fire suppression efforts and the loss of the natural fire regime across the landscape, and from encroachment and succession of hardwoods in the absence of frequent fire. The remaining RCW populations exist primarily on federal lands located in the Coastal Plain from North Carolina to Texas, the Piedmont of Georgia and Alabama, the Sandhills of the Carolinas, and the interior highlands of Arkansas and Oklahoma (Costa and Walker 1995).

Life history

RCW cavity trees must be sufficiently large to allow for excavation of a cavity and of an age where heartwood decaying fungus (*Phellinus pini*) has begun to weaken the wood for to allow for excavation (Jackson and Jackson 1986; Conner and O'Halloran 1987; Delotelle and Epting 1988; Hooper 1988; Rudolph and Conner 1991). Generally, the heartwood from such cavities are excavated is not infected by the fungus until the trees, longleaf or loblolly pine, are between 90 to 100 years old and 75 to 90 years old, respectively (Clark 1992; Clark 1993).

RCWs live in social units called groups. The aggregate area of cavity trees occupied by a group is called a cluster, which often range from five to ten acres. Each member of a group has its own cavity, although birds may use different cavities in the cluster from year to year (Loeb and Stevens 1995). When cavities are limited, birds may roost in the open, or they may use an available cavity associated with an adjacent territory or cluster (Hooper and Lennartz 1983). RCWs roosting in the open may be subject to greater predation. A cavity may be active and currently inhabited by a RCW, temporarily

uninhabited and inactive, or uninhabited and abandoned. Other wildlife such as flying squirrels, pileated woodpeckers and red-bellied woodpeckers will compete with RCWs for the use of their cavities. A cavity that is being excavated is called a "start cavity."

Depending on the composition of a RCW group, it is classified as either a breeding or non-breeding group. A breeding group consists of a breeding male and female, with or without "helpers," while a non-breeding group is a single bird group, typically a single male. Helpers usually are present in breeding groups. They include the offspring produced during the year and one or more adult helpers that are normally a previous year's male offspring of that breeding pair (Walters 1990). RCW breeding groups contain from two to nine birds, but never more than one breeding pair per group. RCWs nest between April and July. Females nest in the breeding male's cavity and lay an average of three eggs (the range is one to five eggs)(Ligon 1970; Beckett 1971; Carter *et al*. 1983; Lennartz *et al*. 1987; Walters *et al*. 1988; Walters 1990). Eggs hatch in 10 to 12 days and one to two nestlings usually fledge.

Juvenile female offspring disperse before the next breeding season, searching for a breeding vacancy at a single bird (male) group or cluster. Juvenile males will either stay as helpers or disperse to search for a cluster site without a breeding male. If a breeding male dies, a male helper within the group or from a nearby group usually inherits the vacancy. Thus, male fledglings become helpers and helpers become breeders in this system in which a pool of replacement breeders is usually immediately available in relatively large or dense populations (Walters et al. 1988; Walters 1990; 1991). Most helpers inherit breeding vacancies within their own group or a breeding vacancy in a nearby group, and rarely disperse more than a few kilometers to locate another territory (Walter *et al*. 1988).

Members of the group maintain and defend their territory for nesting and foraging. The territory actively occupied and defended by a group varies in size, but most foraging activity occurs within 0.5 mile of the cluster (Hooper *et al*. 1982; DeLotelle *et al*. 1987, 1995; Porter and Labisky 1986; Epting *et al*. 1995). RCWs feed on a variety of invertebrate animals (Beal 1911; Rosenberg and Cooper 1990; Hess and James 1998), almost exclusively from the bark of pine trunks and limbs (Ligon 1968, Hooper and Lennartz 1981, Porter *et al.* 1985). RCWs prefer to forage on pines greater than 10 inches dbh (Service 1985; Hooper and Harlow 1986), although in some habitat types they will use smaller pine trees as foraging substrate (Delotelle *et al*. 1987).

Population dynamics

RCW populations have declined dramatically due to habitat loss and degradation (Costa and Escano 1989; James 1995), although certain small and seemingly isolated populations of less than 25 birds and 10 groups have persisted over short-term intervals (10+ years). Factors influencing population persistence may include life span (a 10 year life span is not uncommon) and a cooperative social system and breeding structure that provides a large number of non-breeding helpers that can rapidly become breeders (Walters 1990, 1991). The ability of small RCW populations to persist is unusually

greater for RCWs than for other bird species (Letcher *et al.* 1998; Crowder *et al.* 1998), but without active habitat management with prescribed fire and hardwood control RCWs are not viable for the long-term (Haig *et al*. 1993; Crowder *et al*. 1998).

From models that account for the unique breeding structure of RCWs and the spatial arrangement of their territories (Crowder *et al*. 1998), small populations of three to five groups are likely to become extirpated. However, the spatial arrangement of RCW groups tan the extent that they are highly aggregated or dispersed will significantly affect their ability to persist. Populations of 10 to 20 aggregated (high density) groups and 25 to 100 low density groups are likely to persist in managed (suitable) habitat for a period of 20 years. Larger populations of 100 or more aggregated (high density) groups may be able to persist indefinitely, as long as the habitat remains suitable. Because the natural growth rate of the smaller persistent populations is low, active management is required to maintain habitat, to create new cavities and clusters, and to replace birds by translocation can maintain these populations (Letcher *et al*. 1998; Crowder *et al*. 1998).

Status and distribution

The number of RCW groups persisting today represents about one percent of the population estimated to have occupied fire maintained southern pine forests prior to European settlement. Since the RCW was listed as endangered, its decline has documented on public as well as private lands (*e.g*. Baker 1983; Ortego and Lay 1988; Costa and Escano 1989; Conner and Rudolf 1991b; James 1991, 1994, 1995; James *et al.* 1995; Carter *et al*. 1995; Beyer *et al.* 1996). Of 5,210 active cluster across 13 states in the early 1980's, a decline of about 23 percent occurred by 1990, with the greatest loss on privately owned lands (34 percent) (James 1994, 1995). On non-industrial forestlands, excluding the quail plantations of South Carolina and Georgia, the populations declined about 42 percent during this period (Costa 1995). The most common factors identified with declining populations have been hardwood encroachment and succession in the absence of fire, a lack of cavities and sufficient replacement cavity trees, and small, unstable populations fragmented and isolated by unsuitable forest or other habitat. In addition, hurricanes can cause catastrophic losses to populations near the coast, especially in the absence of post-storm management actions to restore habitat (Watson *et al.* 1995; Hooper and McAdie 1995).

More recently, however, some RCW populations (mostly on federal lands) have increased in response to actions designed to reduce the factors limiting RCW persistence. Hardwood encroachment (midstory) control, provisioning RCW sites with drilled cavities and artificial cavity inserts, and the translocation of RCWs into suitable habitat have increased populations (Copeyon *et al.* 1991; Walters *et al*. 1992, 1995; Haig *et al.* 1993; Hooper *et al.* 1990; Watson *et al.* 1995; Hess and Costa 1995; Escano 1995). These actions represent key ecological techniques to reverse limiting factors associated with habitat degradation and the number suitable territories available for population expansion (Walters 1991).

Today, most RCWs occur on federal lands, with about 3,698 active groups on 55 properties in nine states (Service 2003). RCW populations on national forest land currently appear relatively stable or increasing, although a few are declining, in contrast to the almost range wide declines documented through the mid 1980s (Costa and Escano 1989). In addition to national forests, military installations variously managed by the Department of Defense contain significant populations that generally are stable or increasing. Stable or increasing populations on these and other land were attained by forest habitat management to regulate timber stocking and basal area, controlling hardwood encroachment, prescribed fire, and the use of RCW artificial cavity inserts, translocation, and augmentation.

The Service, in response to the apparent range wide decline of the species on private lands, developed a private lands conservation strategy in 1993 that has been aggressively implemented, modified as necessary based on new scientific findings, and regularly evaluated to ensure objectives are being achieved. The objectives of the private lands strategy are to increase the acreage of private lands under management conducive to RCWs, maintain or increase the larger existing RCW population on private lands, rescue RCW groups from private lands that would be lost as a result of demographic and/or genetic uncertainty, foster and develop cooperative partnerships between and among federal, state and private parties responsible for and /or interested in, RCW recovery, and increase the size of designated recovery and support populations while pursuing those objectives (Costa 1995).

To achieve those strategic objectives, the Service has implemented three types of agreements involving private landowners: Safe Harbor Agreements, Habitat Conservation Plans, and "no-take" management plans implemented via Memoranda of Agreement (Costa 1995). When the private lands strategy was first initiated in 1993, no RCW management agreements existed between the Service and any private landowners. By 2003, habitat was being restored and managed for 509 RCW groups on 347,439 acres of privately-owned lands, under agreements with 130 landowners (Service 2003). About 40 percent of the known RCWs on private lands are included in these agreements.

Analysis of the species/critical habitat likely to be affected

The RCW potentially will be affected by implementation of HFRP conservation measures/practices. No critical habitat has been designated for the RCW; therefore, none will be affected.

<u>Pink Mucket</u>

Species/critical habitat description

The pink mucket has long been mired in controversy over its taxonomy. It has been confused with, considered the same species as, or a subspecies of the federally endangered Higgins' eye (*Lampsilis higginsii*; Harris and Gordon 1987). The pink mucket is round to elliptical, solid, and inflated. The anterior end is rounded and posterior

end bluntly pointed in males, truncated in females. The dorsal margin is straight with the ventral margin straight to slightly curved. Umbos are turned forward and elevated above the hinge line and beak sculpture, if visible, consists three or four double-looped ridges. The shell is smooth, yellow or yellowish green, and rayless or with faint green rays. Maximum length is approximately 4 inches. Pseudocardinal teeth are triangular, thick, divergent; two in the left valve, one in the right, occasionally with a smaller tubercular tooth in front. The lateral teeth are short, heavy, and relatively thick. Nacre color is pink or white, iridescent posteriorly. The pink mucket is characterized by an elliptical, subovate, subquadrate shell. It may attain a size of approximately 4.1 inches long, 3.2 inches high (depth), and 2.4 inches wide. The valves are inflated, thick, heavy, unsculptured, and gaping at the anterior-ventral base (Hildreth 1828; Simpson 1914; Johnson 1980 as cited in Service 1985b). No critical habitat has been designated for the pink mucket.

Life history

The life history of the pink mucket is poorly known but is similar to other naiades. Sperm produced by males are discharged into the surrounding water and dispersed by water currents. Eggs produced by the female are fertilized in the gills by sperm obtained during feeding and respiration. The fertilized eggs are retained in the posterior section of the outer gills, which are modified and function as brood pouches. Embryos develop over winter in the female and are released as glochidia (larvae) the following spring or summer. The glochidia must attach to the gills and briefly parasitize the appropriate fish host before settling out as juvenile mussels. Fish hosts include the largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieui*), spotted bass (*M. punctulatus*), and walleye (*Stizostedion vitreum*) (Barnhart *et al.* 1997).

Status and distribution

The pink mucket (*Lampsilis abrupta*) is a freshwater bivalve found in medium to large rivers (60 feet wide or greater) in the Ohioan or Interior basin. It occupies a range of habitats including silt, boulders, rubble, gravel, and sand substrates and is found in moderate to fast flowing water at depths ranging from 1.5 to 260 feet (Hickman 1937; Yokley 1972; Buchanan 1980; Clarke 1982 as cited in Service 1985b). Though it occurred historically in 25 river systems and was considered to have an extremely widespread distribution, it has never been collected in large numbers from any one site or drainage, and has usually been considered rare (Service 1985b). Historical records show this species to be found mainly in the Tennessee, Cumberland, and Ohio River systems, with occasional records from the other portions of the Mississippi River drainage.

The species was listed as endangered in 1976 due to its extirpation from many river systems and reduction in range, with only two or three substantial populations remaining (Service 1985b). The pink mucket was found in only 16 rivers by the time the recovery plan for the species was published by the Service in 1985, with the greatest concentrations reported from the Tennessee River (Yokley 1972; TVA 1978; Pardue

1981; Leroy Koch, TVA, and James Sickel, Murray State University, pers. comm. as cited in Service 1985b).

Since publication of the pink mucket recovery plan, the species has been reported from the White, Black, Current, Eleven Point, Spring, Little, Little Missouri, Saline, and Ouachita Rivers in Arkansas (Harris and Gordon 1987; Harris *et al*. 1997; Davidson 1997; Davidson and Clem 2002, 2004; Christian and Harris 2004; B. Posey, AGFC, pers. comm.). A single specimen tentatively identified as pink mucket was collected in the Cache River (Harris *et al.* 1997), but was never verified. Harris *et al.* (1997) reported the population to be low but stable in the Black, Ouachita, and Spring Rivers. Davidson and Clem (2002, 2004) collected pink mucket at 17 of 169 sites and suggested that there was limited reproduction in the Saline River.

Decline of the pink mucket parallels the general decline and elimination of freshwater mussels from many big river systems in the United States. Factors contributing to the decline of freshwater mussels include impoundments, siltation, pollution (Service 1985, Williams *et al.* 1993), and maintenance dredging for navigation (Harris *et al.* 1997, Harris and Gordon 1987, Williams *et al.* 1993).

The impoundment of rivers and streams for flood control, navigation, hydroelectric power, and other uses is the primary factor contributing to the decline of freshwater mussel populations across North America. Impoundments destroy or alter stream habitat through reduced flows, altered temperature regimes, and creation of anoxic conditions (Service 1985b). Further, cold, anoxic hypolimnetic releases from dams cause habitat to be unsuitable for many miles downstream. Impoundments also prevent fish passage, thus fragmenting fish populations and often extirpating host fish from habitats otherwise suitable for mussels.

Impacts from siltation begin with increased turbidity. Direct effects can include irritation, damage, or clogging of the gills or feeding structures and inhibition of or reduced feeding (Loar *et al.* 1980 as cited in Service 1985b) caused by the abrasive action of increased levels of suspended solids. Heavy sediment loads in the water column can interfere with feeding, spawning, and release of juveniles (Brim Box and Mossa 1999), as mussels in turbid waters remain closed about 50 percent longer than mussels in silt free water, reducing the time available for these activities (Ellis 1936). Increased sedimentation can also dilute the density of food particles in the water column (Widdows *et al.* 1979), which over periods can affect growth and fecundity. Additionally, fine sediment fills interstitial spaces in the substrate in which young juveniles feed (Yeager *et al.* 1994). Sedimentation can also affect mussels indirectly by disrupting the life cycle. Impacts to host fish populations, such as reduced food availability and the elimination of spawning beds and habitat critical to young fish, will affect dependent mussel populations detrimentally (Loar *et al.* 1980 as cited in Service 1985b). If severe enough, sediment can be deposited directly over the mussel beds, completely smothering the mussels.

Adverse effects of various forms of pollution, such as municipal, agricultural, and industrial waste discharges, vary according to a complex of interrelated factors, including characteristics of the receiving stream and the nature, magnitude, and frequency of the stresses being applied. Chemicals often bind to sediment particles and can be resuspended in the water column after a dredging or rain event. Correlation of impacts to mussel fauna with specific chemical or physical disruptions is difficult to quantify; however, several studies have documented severe impacts and losses of mussel fauna because of specific polluted discharges into the streams (Ortman 1918; Williams 1969 as cited in Service 1985b). Effects can be chronic, in which an individual is exposed to non-lethal levels of toxins over a long period, or lethal, in which one exposure causes direct mortality. Direct correlations are difficult to draw with chronic exposure.

Analysis of the species/critical habitat likely to be affected

The pink mucket potentially will be affected by implementation of HFRP conservation measures/practices. No critical habitat has been designated for the pink mucket; therefore, none will be affected.

Winged Mapleleaf

Species/critical habitat description

The winged mapleleaf, is a medium-sized (reaching up to 100 mm in length) freshwater mussel with a dull brown shell with broad, broken green rays and two prominent, heavily tuberculated, radial ridges (Service 1997). Like other freshwater mussels, the winged mapleleaf feeds by filtering food particles from the water column. No critical habitat has been designated for the winged mapleleaf.

Life history

The specific food habits of the species are unknown, but other juvenile and adult freshwater mussels have been documented to feed on detritus, diatoms, phytoplankton, and zooplankton (Churchill and Lewis 1924). The diet of winged mapleleaf glochidia, like other freshwater mussels, comprises water (until encysted on a fish host) and fish body fluids (once encysted).

The reproductive cycle of the winged mapleleaf is similar to that of other native freshwater mussels. Males release sperm into the water column; the sperm are then taken in by the females through their siphons during feeding and respiration. The females retain the fertilized eggs in their gills until the larvae (glochidia) fully develop. The mussel glochidia are released into the water, and within a few days they must attach to the appropriate species of fish, which they parasitize for a short time while they develop into juvenile mussels. Wilson and Clark (1914) reported two gravid individuals from the Cumberland River on May 17 and 29, and noted they brood glochidia on all four gills. Heath *et a*l. (1999), however, reported a short brooding period in September and October. Gravid females were discovered in October 2005 (water temperature 68ºF) in the Saline

River, Arkansas. Recent studies using 28 fish species indicated that the channel catfish and blue catfish are suitable host species for the winged mapleleaf (Hove et al. 2000). The maximum age of the winged mapleleaf is not known, but the oldest known individual in the St. Croix population was aged at 22 years (Service 1997).

Historical descriptions characterized winged mapleleaf as a "large-stream" species (Wilson and Clark 1914; Baker 1928) found on mud (Baker 1928), mud-covered gravel (Ortmann 1924), and gravel (Ortmann 1925) substrates. Wilson and Clark (1914) reported winged mapleleaf from 21 different beds in the Cumberland River system and these beds varied considerably in their habitat from impounded water to fast flowing water and from muddy to sandy to clear gravel substrates. They found mussels in five to 20 feet depth. Ortmann (1924) reported the species from a spillway just below a dam. There is substantial information on the habitat of the remnant population in the St. Croix River. The species has also been found in riffles with clean gravel, sand, or rubble substrates and in clear water of high water quality. Winged mapleleaf was most abundant in shallow areas with fast current (USFWS 1997).

Harris (2006) found winged mapleleaf in the Ouachita River basin at depths ranging from less than three to greater than 30 feet. The aggregations with the highest *Q. fragosa* densities in the Ouachita River basin were located in varying habitats; including the end of a long, slow flowing pool at the transition into riffle/run habitat, a deep run transitioning into a deeper lateral scour pool, and in moderately deep (mean depth ca. 8 feet), moderate current velocity run habitats (Harris 2006). All of these sites provided excellent resting and/or foraging habitat for *Ictalurus punctatus* (channel catfish) and *I. furcatus* (blue catfish) that are the known fish hosts for *Q. fragosa* (Hove 2004; C. Barnhart, personal communication).

Status and distribution

The winged mapleleaf, *Quadrula fragosa*, historically occurred in 34 rivers in 12 states (Service 1997). Due to misidentifications, its relative similarity of appearance to *Quadrula quadrula*, and the rarity of the winged mapleleaf relative to that species, population declines of this mussel went largely undetected until more recently (NatureServe 2003). Alterations to the rivers, changes in land-use practices, and pollution had reduced the range of the species to a single known population in the St. Croix River between northwestern Wisconsin and east-central Minnesota (Hornbach *et al.* 1996). All known specimens from this population have been found within a 12.4 river mile reach, but the full distribution and size of the winged mapleleaf population in the St. Croix River are not defined (Service 1997).

Posey *et al.* (1996) discovered a winged mapleleaf population in the Ouachita River, Arkansas, which was disjunct from all other extant populations and extended the historical range of the species. Posey *et al.* (1996) reported that the species occurred in a 20 mile reach of the Ouachita River near Camden, Arkansas. Davidson (1997) subsequently reported the species from near the mouth of the Little Missouri River (AR), a tributary to the Ouachita River upstream of Camden, Arkansas. Davidson and Clem

(2002, 2004) found winged mapleleaf in the Saline River in a 65 mile reach extending from near Mt. Elba to near Crossett, Arkansas. Outside of Arkansas, additional populations of winged mapleleaf have been recently discovered in the Bourbeuse River, MO and the Kiamichi River, OK (S. Oetker, personal communication 2004). A singe winged mapleleaf recently was collected from the Ohio River; however, the condition of the shell and the status of the population, if it exists, is unknown (NatureServe 2003).

Harris (2006) determined winged mapleleaf population estimates at six sites in the Ouachita River and four sites in the Saline River. Saline River population estimates ranged from 510 ± 253 to 9,217 ± 4,114 individuals. Ouachita River population estimates ranged from 217 ± 261 to 1,770 ± 1,227 individuals. One of two sites in the Ouachita River that was sampled had one winged mapleleaf collected during qualitative sampling, but the population estimates for these two sites is zero. Harris (2006) also measured individuals and determined that length frequencies show a bimodal distribution for Saline River specimens, whereas the Ouachita River specimens present a unimodal distribution.

Habitat modification including land use changes, river channel modifications, and pollution are the primary factors threatening the continued existence of the winged mapleleaf. The species was usually found in well-preserved large to medium-sized clear-water streams in riffles or on gravel bars. These areas have been lost due to the development of impoundments, channelization, soil erosion, and sediment accumulation originating from land use practices.

Additional threats to the small, remaining populations include expanded agriculture or modified land use practices in the watershed, toxic substance spills, point discharges of harmful chemicals, low water levels, and large recreational boat traffic. The small size of the population makes it particularly vulnerable to single catastrophic events and genetic deterioration. These factors may affect the host fish, which is necessary for the reproduction of the winged mapleleaf in addition to affecting the remaining mussel population. In addition, it is likely that many of the remaining populations are now small enough that their long-term genetic viability is in question (Service 1991).

Analysis of the species/critical habitat likely to be affected

The winged mapleleaf potentially will be affected by implementation of HFRP conservation measures/practices. No critical habitat has been designated for the winged mapleleaf; therefore, none will be affected.

<u>Ouachita Rock Pocketbook</u>

Species/critical habitat description

The Ouachita rock pocketbook was previously known as Wheeler's pearly mussel. The Ouachita rock pocketbook does not have a sexually dimorphic shell, both sexes appearing the same. The shell is subcircular to subovate to subquadrate in profile, truncated

posteriorly, moderately inflated, up to 4.4 inches long, 3.4 inches high, and 2.4 inches wide, moderately heavy, somewhat thickened anteriorly, up to 0.24 inch thick, and half as thick posteriorly. The periostracum (outer shell layer) is chestnut-brown to black with a silky luster, and appears slightly iridescent when wet. The umbos are prominent, and project over a well-defined lunule depression. The posterior half of the shell is sculptured by irregular, oblique ridges that are sometimes crossed by smaller ridges or sometimes indistinct. Beak sculpturing, rarely intact, is very restricted and consists of weak double loops. The nacre (inner shell lining) is usually salmon-colored above the pallial line, white to light blue below, with a dark prismatic border. The shell has the so-called "complete" dentition for unionid bivalves, with all hinge teeth usually well-developed. The anterior left and right pseudocardinals are both curved and parallel to the lunule; the posterior left pseudocardinal joins a conspicuous, flange-like, interdental projection that runs to the lower lateral. The lateral teeth are moderately short; the upper left lateral is sometimes reduced (Ortmann and Walker 1912; Johnson 1980; Clarke 1981; C.M. Mather, University of Science and Arts of Oklahoma, *in litt.* 2001). No critical habitat has been designated for the Ouachita rock pocketbook.

Life history

The Ouachita rock pocketbook inhabits pools, backwaters, and side channels of rivers and large creeks in or near the southern slope of the Ouachita Uplift. The species occupies stable substrates containing gravel, sand, and other materials. The Ouachita rock pocketbook always occurs within large mussel beds containing a diversity of mussel species.

Like other freshwater mussels, the Ouachita rock pocketbook feeds by filtering food particles from the water column. The specific food habits of the species are unknown, but other juvenile and adult freshwater mussels have been documented to feed on detritus, diatoms, phytoplankton, and zooplankton (Churchill and Lewis 1924). The diet of Ouachita rock pocketbook glochidia, like other freshwater mussels, comprises water (until encysted on a fish host) and fish body fluids (once encysted).

The reproductive cycle of the Ouachita rock pocketbook is similar to that of other native freshwater mussels. Males release sperm into the water column; the sperm are then taken in by the females through their siphons during feeding and respiration. The females retain the fertilized eggs in their gills until the larvae (glochidia) fully develop. The mussel glochidia are released into the water, and within a few days they must attach to the appropriate species of fish, which they parasitize for a short time while they develop into juvenile mussels. Suitable fish host include the river carpsucker, longear sunfish, largemouth bass, white crappie, black crappie, emerald shiner, green sunfish, bluegill, and warmouth. Bluegill and green sunfish had the highest success rates of transformed juveniles.

Little is known about the habitat requirements of the Ouachita rock pocketbook. Historically, it has been found in muddy or rocky substrate, in stream-side channels and backwaters with little or no flow, and near riffles. Mehlhop-Cifelli and Miller (1989) found that backwater areas in the Kiamichi River were usually next to sand/gravel/cobble

bars that either were scoured clean or supported emergent aquatic vegetation. They also found *A. wheeleri* in pools with rock substrate. The species appears to be more abundant in pools than in backwaters and to prefer a stable substratum containing a mixture of cobble and gravel. Backwaters inhabited by the Ouachita rock pocketbook had a substratum of gravel and sand and the species always occurred within large mussel beds containing a diversity of mussel species (Vaughn 1991).

Status and distribution

On October 23, 1991, the Ouachita rock pocketbook was designated as endangered throughout its entire range in Arkansas and Oklahoma (Service 1991). A recovery plan addressing the Ouachita rock pocketbook was approved September 27, 2002.

This species once inhabited the Kiamichi River in Oklahoma, the Little River in southwestern Arkansas, and the Ouachita River in central Arkansas. Historic records for the species from the Ouachita River stated it was rare in that area. Ortmann (1921) and Isely (1925) reported specimens being collected in the Kiamichi River, Pushmataha County, Oklahoma, near Antlers and Tuskahoma, respectively. Few other records were reported until recently. Valentine and Stansbery (1971) reported the mussel from the Kiamichi River at Spencerville Crossing, Choctaw County, Oklahoma, a site since flooded by Hugo Reservoir. Review of museum records added two additional localities in the Little River (White Cliffs, Little River County, Arkansas) and the Kiamichi River (3 miles south of Clayton, Pushmataha County, Oklahoma) (Service 2004). Harris and Gordon (1987) found several empty shells on the Little River in Arkansas. They also found relict shells on the Ouachita River near the mouth of Saline Bayou in Clark County and at Malvern, Hot Spring County, Arkansas.

Currently, it is known to exist in approximately 157 miles of the Red River system (including the Kiamichi and Little Rivers) and 111 miles of the Ouachita River system. The only known substantial population (fewer than 1,800 individuals) inhabits a 88 mile section of the Kiamichi River, Oklahoma. A smaller, attenuated population (less than 100 individuals) inhabits approximately 69 miles of the Little River in Oklahoma and Arkansas, although quality habitat for the species prevails in only a limited portion (15 miles) of that section above the Mountain Fork River. Recent observations of the species in the Ouachita River, Arkansas, are rare and widely separated. The only other recent evidence of the species consists of single shells recovered from Pine and Sanders creeks, Texas, which enter the Red River near the Kiamichi River.

Living populations have been found recently only in the Kiamichi River (estimated to be about 1,000 individuals) in Oklahoma (Oklahoma Natural Heritage inventory 1989); and in the Little River (less than 100 individuals) in Arkansas (Clarke 1987). The Ouachita rock-pocketbook also has been documented in a 30 mile stretch of the river not previously known to be inhabited, for a total range in the Kiamichi River of 80 river miles (Mehlhop- Cifelli and Miller 1989). One live individual was recently found in the Ouachita River near Camden (Posey *et al*. 1996). The Ouachita rock pocketbook has occurred in very low densities at all documented sites. Surveyors have recently examined

other sites for mussels but found no individuals at any other locality. The species has apparently been eliminated from the lower Kiamichi River, and the lowermost Little River (Service 2004). A recent investigation resulted in the discovery of a new population on the Little River in Arkansas below Millwood Dam (Farris *et al*. 2003). Beyond the records discussed, it has not been found in other portions of the streams it inhabits, nor in any other streams or waters, including tributaries (Service 2004).

The species' range has been seriously reduced by the construction of reservoirs, water quality degradation, and other impacts to its habitat (Service 2004). Ouachita rock pocketbook habitat has been greatly restricted by the construction of reservoirs, and in one case, a site that was known to be occupied by the species was flooded by establishment of Hugo Reservoir (NatureServe 2003).

Current threats to the species include the continued development of impoundments, water quality degradation resulting from nonpoint sources such as agriculture and industrial development, hydropower proposals, gravel mining, and infestation by the Asiatic clam (NatureServe 2003). Owing to the species' limited distribution, any factors that adversely modify habitat or water quality in these stream segments could further reduce the species and the habitat it occupies (Service 2004).

Analysis of the species/critical habitat likely to be affected

The Ouachita rock pocketbook potentially will be affected by implementation of HFRP conservation measures/practices. No critical habitat has been designated for the Ouachita rock pocketbook; therefore, none will be affected.

Geocarpon minimum

Species/critical habitat description

Geocarpon minimum is a small succulent annual ranging from one to four centimeters (cm) in height. The stems, which may be simple or branched near the base, extend from a slender tap root. Leaves are opposite, sessile, joined at base, three to four cm long and narrowly oblong in shape. The flowers, which are inconspicuous in the leaf axils, are apetalous, and have a greenish-red calyx. The fruit, a capsule, dehisces into three parts at maturity, releasing numerous seeds measuring 0.5 millimeters (mm) long. Young plants are dull gray and turn reddish-purple at maturity (Morgan 1980; Karl 1983; Tucker 1983). No critical habitat has been designated for the *Geocarpon minimum.*

Life history

Geocarpon minimum grows on moist, sandy soils on exposed sandstone outcrops which are primarily of the Channel sands formation (Morgan 1980). Arkansas sites are characterized as sandy-clay prairies on bare mineral soils of the Lafe or Wing Series (high in sodium and magnesium) which may represent relict Pleistocene lake beds. Species richness is low in these communities. Common associates include *Houstonia*

minima, Nothoscordum bivalve, Plantago elongate, Krigia occidentalis, Oenothera linifolia. (Tucker 1983; Kral 1983). Sites in Arkansas also are characterized by prominent blue-green alga colonies. The population recently discovered in Texas was found growing along the edge of sparsely vegetated "slick spots" characterized by Nahatche-Wehadke soils with high sodium content (Keith *et al*. 2004).

Population structure consists of solitary individuals or small groups within these communities. Colonies typically do not exceed one square meter, although larger colonies have been noted from Missouri and Arkansas. *Geocarpon minimum* is a pioneer species that tolerates little competition from other species. Overcrowding and shading by invading plants which occur with succession pose a threat. The species is ephemeral, usually completing its life cycle within a four week period. However, the species does not germinate every year, a condition perhaps related to moisture availability (Morgan 1980; Tucker 1983).

Status and distribution

The Service listed *Geocarpon minimum* as a threatened species on July 16, 1987 (Service 1987). The species was known to have occurred at 28 locations in Arkansas, Louisiana, and Missouri. When the species was federally listed in 1987, two sites in Arkansas, one site in Louisiana, and six sites in Missouri were known to support relatively large populations (Service 1993). Currently, populations are known from 21 locations in Missouri; including nine in Dade County, four each in St. Clair and Cedar counties, two in Polk County, and one each in Greene and Lawrence counties; four location in Arkansas; a large population at Warren Prairie Natural Area in Bradley and Drew counties, two in Cleveland County, and one in Franklin County; two locations in Winn Parish, Louisiana; and one location in Anderson County, Texas.

Ten of the Missouri sites are on unprotected private property with the remainder under ownership or protection by state, federal, or private conservation groups. The Arkansas Natural Heritage Commission owns the majority of sites in Arkansas. Sites in Louisiana and Texas are unprotected private property.

The major threat to this species is the destruction of its habitat. Many of the sites have been damaged from trampling and grazing by cattle, although Chaplin (1986) suggests that the physical disturbance associated with cattle grazing may actually benefit the species at some sites by maintaining bare substrate for seedling establishment. A more serious threat concerns pasture improvement, which couple with the invasion of prairie grasses is thought to have destroyed the type locality (Chaplin 1986).

The species habitat continues to be damaged by off-road vehicles, and this problem is amplified by the easy access to many of the sites from adjacent roads (Tucker 1983). Suitable habitat for the species is limited, and most such areas have been intensely disturbed. In southern Arkansas, many of the areas have been adversely modified by silvicultural practices (Tucker 1983). Populations in close proximity to roads are further threatened by future road expansions and improvements. Even though habitat is of low

agricultural quality, some areas have been cultivated in the past or are presently in pasture (Kral 1983)

Analysis of the species/critical habitat likely to be affected

Geocarpon minimum potentially will be affected by implementation of HFRP conservation measures/practices. No critical habitat has been designated for the *Geocarpon minimum*; therefore, none will be affected.

Pondberry

Species/critical habitat description

Pondberry or Southern Spicebush is a deciduous, aromatic shrub, reaching heights of six feet. The plants are stoloniferous and generally grow in clones of numerous stems that individually are not highly branched (Service 1990). This species has both male and female plants. The flowers of both sexes are small and pale yellow in color. The pistillate flowers are less conspicuous than the staminate flowers. The fruit is bright red, 12 mm long, and oval shaped. Pondberry has drooping, thin, membranaceous, and ovately to elliptically-shaped leaves that have a strong, sassafras-like odor when crushed.

No critical habitat has been designated for this species.

Life history

Reproduction seems to be primarily vegetative by means of stolons. The plants flower when they are a little more than two to three years of age, but appear to live for only a few years. Flowering occurs in mid March while the ponds are still flooded, and shoot growth begins in late April concurrent with leaf expansion in the tree canopy (Wright 1990). New stems from the root stock replace those that die. Fruit set is rare and sporadic in some populations (Devall *et al*. 2001). Mature fruits can be found on the plants in October, but they seem to have no reproductive value as no seedlings have been observed at any of the known sites. Pondberry shrubs produce few seedlings during the course of their life cycle, due to lack of seed germination in the wild (Tucker 1984).

Pondberry occurs in sandy sinks, at pond margins (Radford et al. 1968) and in swampy depressions (Steyermark 1949). The populations in Arkansas occupy depressions associated with forested, sandy depressions in due fields (Service 1990). The depressions form natural swamps and farm ponds that hold up to 29 cm of water in the spring but are usually dry by October. Pondberry tends to occur close to pond edges under complete or partial canopy (Wright 1990). In most cases, the land surrounding the sand pond has been put to agricultural use.

Status and distribution

Pondberry is known to occur in seasonally flooded wetlands in Arkansas, Georgia, Missouri, Mississippi, North Carolina, and South Carolina; with historic populations reported from Alabama, Florida, and Louisiana (Service 1990). The major threat to the continued existence of Pondberry is alteration or destruction of its habitat. Factors like silviculture, agricultural practices, and drainage ditch construction all are reported causes for population declines. The apparent lack of seedling production could have an adverse effect on the remaining populations due to limitations in genetic variation among individuals.

The species is presently known from Arkansas in Ashley County (one population); Clay County (four populations); Woodruff County (one population); Lawrence County (one population); and Jackson County (three populations). Georgia has populations in Wheeler County (three populations) and Baker County (one population). Mississippi has one population each in Sharkey County; Bolivar County; and Sunflower County. One population each exists in Ripley County, Missouri and in Bladen County, North Carolina. Berkley County, South Carolina, has four populations. The populations in Arkansas; North Carolina; Sunflower and Bolivar Counties, Mississippi; and the four naturally occurring Georgia populations are on private lands. One of the Georgia populations was originally found only on private land, but because of impacts from domestic hogs, a portion of the population relocated in 1984 to adjacent State protected lands. The populations in Sharkey County, Mississippi, and Berkeley County, South Carolina, are located on U.S. Forest Service lands. Most of the Missouri population is on land owned by the Missouri Department of Conservation and The Nature Conservancy. Pondberry's historical distribution included Wilcox County, Alabama, and an unidentified site in Louisiana, and Florida, although at least one authority believes the Florida collections were made elsewhere and improperly labeled as to locality. There are 22 currently known locations for pondberry, but the total number of plants has not been determined.

Analysis of the species/critical habitat likely to be affected

Pondberry potentially will be affected by implementation of HFRP conservation measures/practices. No critical habitat has been designated for the Pondberry; therefore, none will be affected.

ENVIRONMENTAL BASELINE

The environmental baseline is defined as the effects of past and ongoing human induced and natural factors leading to the status of the species, its habitat, and ecosystem, within the project area. The environmental baseline is a snapshot of bald eagle, red-cockaded woodpecker, *Geocarpon minimum*, Pondberry, pink mucket, winged mapleleaf, and ouachita rock-pocketbook status at this time.

Bald Eagle

Status of the species within the action area

There is one active bald eagle nest located approximately two-half miles northeast of Felsenthal National Wildlife Refuge's (NWR) northeast corner (AGFC 2004 Bald Eagle Database). Five nests are known from Ashley and Drew counties just east of the action area. Bald eagle nests generally occur within one mile of water bodies such as lakes and larger streams, rivers, and bayous. While no other nest sites are known from the action area, previously undocumented nests may exist. Bald eagles are transient species and common sightings occur during winter months. Bald eagle populations are increasing range wide (Service 2006).

Factors affecting species environment within the action area

Limited information is available on the bioaccumulation of mercury in bald eagles in Arkansas. Without extensive monitoring, however, the potential chronic effects such as changes in growth, development, reproduction, and behavior are difficult to identify and quantify. It is likely that the transfer of mercury to eagles from prey will remain a conservation problem due to their diet. McEwan (1977) reported bald eagle prey to consist of 79 percent fish and 17 percent bird species. Because bald eagles forage primarily on large bodied fish, largemouth bass and catfish, and the larger rivers in the lower Ouachita River system are under mercury consumption advisory, it's possible that effects associated with mercury toxicity may affect bald eagles.

Silvicultural activities may affect nesting bald eagles if appropriate management guidelines are not followed. Impacts are usually associated with timber harvesting (*i.e.*, noise, physical disturbance, removal of suitable nest trees and encroachment in nesting territory) and may result in nesting failure, nest loss or abandonment, and disrupt foraging thereby reducing health, etc.

Red-cockaded Woodpecker

Status of the species within the action area

Demographically isolated RCW groups occur on private land throughout the action area, although the exact number is currently unknown for several reasons such as: 1) consolidation efforts, and 2) absence of adequate monitoring on private, non-industrial properties. Plans currently exist or already have been implemented to consolidate demographically isolated RCW groups on Plum Creek and Potlatch properties into designated conservation areas. One RCW was seen at Warren Prairie Natural Area in 2005. Arkansas Natural Heritage Commission, who owns Warren Prairie Natural Area, plans to establish a new population at the natural area in the next few years. Additionally, Deltic Timber Corporation has six to ten active RCW groups scattered across the south central portion of the action area. Otherwise, active RCW group status and location (to some extent) is unknown for private property.

The largest RCW populations in the action area exist at Felsenthal NWR, Plum Creek RCW Habitat Conservation Area (HCP), and Potlatch RCW Conservation Area. Felsenthal NWR has 14 active RCW groups primarily located in upland areas on the western portion of the refuge. Plum Creek's HCP, with 26 active RCW groups, is located adjacent to Felsenthal NWR's western boundary. Potlatch currently has 16 active RCW groups and is in the process of developing an RCW HCP to consolidate groups outside their proposed HCP area into the conservation area. Potlatch's long-term goal is to maintain a minimum of 30 active RCW groups within the conservation area.

Factors affecting species environment within the action area

Currently, forest stand conditions in the action area outside of select areas at Felsenthal NWR, Plum Creek's RCW HCP, and Potlatch's proposed RCW HCP conservation areas are unsuitable for RCW's. Such stands typically are too young in age, small in acreage, or are excessively dense, with either an encroaching understory of hardwoods or a canopy of mixed pine and hardwoods. Moreover, stands containing old (65+ years of age) potentially suitable cavity trees for RCW are very uncommon in the area because of forest management practices using shorter rotation.

Pink Mucket

Status of the species within the action area

The Saline and Ouachita River systems are inhabited by the pink mucket (*Lampsilis abrupta*) (Posey, 1997; Harris *et al.* 1997; Davidson and Clem 2002, 2004). Davidson and Clem (2002) reported pink mucket from 13 Saline River sites upstream of the action area in Grant, Dallas, and Cleveland counties. The species is extremely rare upstream of Arkansas Highway 167. While more common downstream of Arkansas Highway 167 to the confluence with the Ouachita River, the species is never locally abundant (Davidson and Clem 2002, 2004). Davidson and Clem (2004) collected pink mucket at six Saline River sites in the action area (Bradley and Ashley counties). Harris (2006) collected pink mucket at four of four sites quantitatively sampled downstream of Longview Landing. Percent total composition per mussel bed was less than 0.5 percent at all four sites. An accurate population estimate for the species is difficult to assess due to the rare occurrence of the pink mucket within the Saline River.

In the Ouachita River, most pink mucket sites are located upstream of Camden, Arkansas (Posey, 1997). Posey (1997) collected three pink mucket from two sites downstream of Camden, Arkansas (within action area). As with the Saline River, comprehensive surveys have been conducted on the entire river within the action area. Surveys since Posey (1997) have generally been focused on threatened and endangered species sites concentrated upstream of the action area. An accurate population estimate for the species is difficult to assess due to the rare occurrence of the pink mucket within the Ouachita River.

Factors affecting species environment within the action area

The decline, extirpation, and extinction of mussel species is overwhelmingly attributed to habitat alteration and destruction (Neves 1993). Dredging and channelization activities have profoundly altered riverine habitats nationwide. Channelization impacts a stream's physical (e.g., accelerated erosion, increased bedload, reduced depth, decreased habitat diversity, geomorphic instability, riparian canopy loss) and biological (e.g., decreased fish and mussel diversity, changed species composition and abundance, decreased biomass, and reduced growth rates) characteristics (Hartfield 1993; Hubbard *et al*. 1993). Channel construction for navigation has been shown to increase flood heights (Belt 1975). This is partially attributed to a decrease in stream length and increase in gradient (Hubbard et al. 1993). Flood events may thus be exacerbated, conveying into streams large quantities of sediment, potentially with adsorbed contaminants. Channel maintenance may result in profound impacts downstream (Stansbery 1970).

Channel maintenance operations for barge navigation likely has impacted habitat for the pink mucket in the Ouachita River. Impacts include increases in turbidity that may impede sight-feeding host fishes and potentially disrupt mussel attractant mechanisms to lure fish hosts (Hartfield and Hartfield 1996) and sedimentation that may smother juvenile mussels (Ellis 1936). Periodic navigation maintenance activities may continue to adversely affect this species in the Ouachita River downstream of Camden, Arkansas.

Contaminants in point and non-point discharges can degrade water and substrate quality, and adversely impact or destroy mussel populations. The effects of heavy metals, ammonia, and other contaminants on freshwater mussels were reviewed by Mellinger (1972), Fuller (1974), Havlik and Marking (1987), Naimo (1995), Keller and Lydy (1997), Neves *et al*. (1997), and Newton (2003). Although chemical spills and other point sources (e.g., ditch, swale, artificial channel, drainage pipe) of contaminants may directly result in mussel mortality, widespread decreases in density and diversity result in part from the subtle, pervasive effects of chronic, low-level contamination (Naimo 1995).

Among pollutants, ammonia warrants priority attention for its effects on mussels (Augspurger *et al*. 2003), and has been shown to be lethal at concentrations of 5.0 parts per million (ppm) (Havlik and Marking 1987). The un-ionized form of ammonia (NH_3) is usually attributed as being the most toxic to aquatic organisms (Mummert *et al*. 2003), although the ammonium ion form (NH_4^+) may contribute to toxicity under certain conditions (Newton 2003). Sources of ammonia are agricultural (e.g., animal feedlots, nitrogenous fertilizers), municipal (e.g., waste water treatment plant effluents), and industrial (e.g., chemical companies) as well as from precipitation and natural processes (e.g., decomposition of organic nitrogen) (Augspurger *et al.* 2003; Newton 2003). Atmospheric deposition is one of the most rapidly growing sources of anthropogenic nitrogen entering aquatic ecosystems (Newton 2003). Agricultural sources of ammonia may be highly variable over time, compounding the determination of accurate concentration readings.

Agricultural sources of chemical contaminants are considerable and include two broad categories: nutrients and pesticides (Frick *et al.* 1998). Nutrient enrichment generally results from runoff from livestock farms and feedlots, and fertilizers from row crops. Nitrate concentrations are particularly high in surface waters downstream of agricultural areas (Mueller *et al.* 1995). Stream ecosystems are impacted when nutrients are added at concentrations that cannot be assimilated, resulting in over-enrichment, a condition exacerbated by low-flow conditions. Juvenile mussels utilizing interstitial habitats are particularly affected by depleted dissolved oxygen (DO) levels resulting from over-enrichment (Sparks and Strayer 1998). Increased risks from bacterial and protozoan infections to eggs and glochidia (Fuller 1974) and to host fishes may also pose a threat. Pesticide runoff commonly ends up in streams where the effects (based on studies with laboratory-tested mussels) may be particularly profound (Fuller 1974; Havlik and Marking 1987). Fertilizers and pesticides are also commonly used in developed areas.

Various mining activities take place in the lower Ouachita River system that have potentially affected or potentially continue to impact pink mucket populations. Oil and gas production is common in the southern portion of the action area. Pollutants from these activities include brines and organics. Bauxite mining also takes place in portions of the Saline River system.

Excessive sedimentation is a pervasive problem with an estimated 46 percent of all U.S. streams affected (Judy *et al.* 1984). Sedimentation, including siltation, has been implicated in the decline of stream mussel populations (Ellis 1936; Marking and Bills 1979; Vannote and Minshall 1982; Dennis 1985; Brim Box and Mossa 1999; Fraley and Ahlstedt 2000). Specific biological impacts on mussels from excessive sediment include reduced feeding and respiratory efficiency from clogged gills, disrupted metabolic processes, reduced growth rates, increased substrate instability, limited burrowing activity, and physical smothering (Ellis 1936; Stansbery 1971; Marking and Bills 1979; Vannote and Minshall 1982; Waters 1995). Primary productivity reduction is an indirect impact that affects mussel food supplies (Henley *et al.* 2000). Studies tend to indicate that the primary impacts of excess sediment levels on mussels are sublethal, with detrimental effects not immediately apparent (Brim Box and Mossa 1999). The physical effects of sediment on mussels appear to be multifold, and include:

1. changes in suspended and bed material load;

2. bed sediment composition associated with increased sediment production and run-off in the watershed;

3. channel changes in form, position, and degree of stability;

4. changes in depth or the width/depth ratio that affects light penetration and flow regime;

5. actively aggrading (filling) or degrading (scouring) channels; and

6. changes in channel position that may leave mussels high and dry (Vannote and Minshall 1982; Kanehl and Lyons 1992; Brim Box and Mossa 1999).

Interstitial spaces in the substrate provide crucial habitat for juvenile mussels. When clogged, interstitial flow rates and spaces become reduced (Brim Box and Mossa 1999), thus reducing juvenile habitat. Sediment acts as a vector for delivering contaminants such as nutrients and pesticides to streams. Juveniles can readily ingest contaminants adsorbed to silt particles or in interstitial pore water during normal feeding activities (Yeager *et al.* 1994; Newton 2003). These factors may help explain, in part, why so many mussel populations, potentially including certain pink mucket populations, are experiencing recruitment failure.

Agricultural activities produce the most significant amount of sediment that enters streams (Waters 1995; Henley *et al.* 2000). Neves *et al.* (1997) stated that agriculture (including both sediment and chemical run-off) affects 72 percent of the impaired river miles in the country. Croplands located on river banks and unrestricted stream access by livestock is not common in the lower Ouachita River basin, but is a significant threat to many streams. Grazing may reduce infiltration rates, decrease filtering capacity of pollutants (thereby increasing sedimentation run-off), and trampling and eventual elimination of woody vegetation reduces bank resistance to erosion and contributes to increased water temperatures (Armour *et al.* 1991; Trimble and Mendel 1995; Brim Box and Mossa 1999; Henley *et al.* 2000).

Erosion from silvicultural activities accounts for 6 percent of national sediment pollution (Henley *et al*. 2000). Sedimentation impacts are more the result of logging roads than from the actual harvesting of timber (Waters 1995; Brim Box and Mossa 1999). Annual run-off and/or peak flow volumes increase with timber harvests, particularly during the wet season (Allan 1995). This is partially due to the construction of logging roads, and vegetation removal tends to compact soils, reduce infiltration rates, and increase soil erosion. Increased flows and improper harvesting within streamside management zones may result in stream channel changes (Brim Box and Mossa 1999) that may ultimately affect mussel beds.

Water withdrawals for agricultural irrigation, municipal, and industrial water supplies are an increasing concern for all aquatic resources and are directly correlated with expanding human populations. Impacts include decreased flow velocities and DO levels (Johnson *et al.* 2001). Such stochastic events may be exacerbated by global climate change and water withdrawals. These primarily anthropogenic activities act insidiously to lower water tables, thus making mussel populations susceptible to depressed stream levels.

<u>Winged Mapleleaf</u>

Status of the species within the action area

Posey *et al.* (1996) first recognized winged mapleleaf in Arkansas (Ouachita River) and extended the historical range of the species. They reported that winged mapleleaf was

found along a 20 river mile reach extending from the Little Missouri River confluence to Camden, Arkansas. Winged mapleleaf also occurs in the Ouachita River downstream of Camden, although less common than upstream. The distance the species occurs downstream of Camden, Arkansas is unknown because during the Posey (1997) survey the species was undocumented from the state and mistaken as mapleleaf (*Quadrula quadrula*). Harris (2006) reported population estimates for six mussel beds upstream of Camden ranging from zero to 1,770 ± 1,227 individuals. No winged mapleleaf population estimates exists for the Ouachita River in the action area and it would be difficult to assess due to the rare occurrence of the winged mapleleaf.

Davidson and Clem (2002, 2004) first reported populations of winged mapleleaf from the Saline River. There are six known localities for the species within the action area portion of the Saline River, five of which occur downstream of Longview Landing. Population estimates for four of five sites known downstream of Longview Landing ranged from 510 ± 253 to 9,217 ± 4,114 individuals (Harris 2006). An accurate population estimate for the species is difficult to assess due to the rare occurrence of the winged mapleleaf within the Ouachita River. However, juvenile specimens have been reported from the Saline River (Davidson and Clem 2004; Harris 2006) and the population is considered viable.

The species is not currently known to inhabit any other streams or rivers in the action area. However, Moro Creek has potentially suitable habitat for winged mapleleaf. Surveys of Moro Creek are planned for 2007, as no comprehensive mussel surveys of the creek exist.

Factors affecting species environment within the action area

Factors affecting the species environment within the action area are similar to those described in the *Pink Mucket - Factors Affecting Species Environment Within the Action Area* section above.

<u>Ouachita Rock Pocketbook</u>

Status of the species within the action area

Posey (1997) collected one live Ouachita rock pocketbook from the Ouachita River at River Mile 334 (Ouachita County) in 1995. The population estimate for the species at this site was 104 ± 213 individuals. Subsequent sampling in 2002 by Farris *et al*. (2003) yielded no Ouachita rock pocketbook from this site. An accurate population estimate for the species is difficult to assess due to the rare occurrence of the Ouachita rock pocketbook within the Ouachita River. It is doubtful that a viable population of Ouachita rock pocketbook persists in the Ouachita River. No other recent records (past 30 years) for the species exist in the action area.

Factors affecting species environment within the action area

Factors affecting the species environment within the action area are similar to those described in the *Pink Mucket - Factors Affecting Species Environment Within the Action Area* section above.

Geocarpon minimum

Status of the species within the action area

Geocarpon minimum is restricted the saline barrens at or near Warren Prairie Natural Area. There currently are 26 known locations for the species at Warren Prairie. The Warren Prairie population currently is considered stable. No other populations are known from within the action area.

Factors affecting species environment within the action area

The Warren Prairie Natural Area population of *Geocarpon minimum* is currently protected by the Arkansas Natural Heritage Commission. The species is not known to occur anywhere else in the action area. However, major threats on private lands include habitat destruction from varying sources and invasion of later successional vegetation, which competes for suitable habitat.

Pondberry

Status of the species within the action area

Coffee Prairie is the only known site inhabited by Pondberry in the action area. Jody Pagan (former NRCS employee) reported 10 specimens from the prairie in 1999. The status of the population is unknown.

Factors affecting species environment within the action area

The major threat to the continued existence of Pondberry at Coffee Prairie is alteration or destruction of its habitat. Factors like silviculture, agricultural practices, and drainage ditch construction all are reported causes for population declines at other locations. The apparent lack of seedling production could have an adverse effect on the remaining populations due to limitations in genetic variation among individuals.

EFFECTS OF THE ACTION

Implementation of the HRFP involves conservation measures and management practices that ultimately work towards sustainable forests on private lands. Cost share agreements with individual landowners also will provide financial incentives for private lands conservation of federally threatened and endangered species. Moreover, any landowner desiring participation in the program will be required to implement a HRPO. Initial

evaluation of the property will identify immediate management needs, and conservation practices to be carried out in 10 year increments. Therefore, 30 year and 99 year easements will require review of each individual landowner's HRPO on a 10 year basis. Evaluation, formulation, and implementation of a HRPO designed to enhance and promote habitat in order to benefit species depends upon the nature of the activities to be undertaken, where they may occur, and the duration. The Service and NRCS will jointly develop, review, and amend each HRPO to ensure consistency with the goals and objectives of the HFRP. The NRCS will be responsible for conducting annual site reviews to ensure program consistency and intent.

HRPOs are expected to provide a net conservation benefit to the covered species via implementation of the conservation actions and practices described in the Description of Proposed Action section. Further, we expect a positive response at the landscape level for each of the covered species, due to the cumulative and sequential impact accrued through successive years of HFRP enrollment (e.g., as more acreage is enrolled and more conservation actions are deployed throughout the action area).

For as long as management activities are carried out, or the habitat they create persists, enrolled lands will benefit the conservation of the covered species. With this cooperative effort, the management of landowner's property for the covered species is assured for the foreseeable future. Therefore, the cumulative impact of the HFRP will provide a net conservation benefit to the aforementioned species.

The actions proposed under the HFRP are of limited duration making the program's benefits appear temporary. However, the habitat maintained through commitments created by the HRPOs will not necessarily cease to exist upon expiration or termination of the HRPOs. Enrolled landowners may choose not to bring enrolled properties back to baseline at the point of termination, or at any other time in the future. If the HFRP continues in future years and new landowners continue to enroll under the program over an extended period, the net effect will be an increasing matrix of lands being maintained for conservation of the targeted species, with a net conservation benefit.

Red Cockaded Woodpecker

RCW's are sensitive to spatial arrangement of habitat, with fire suppression and lack of cavity trees being the most limiting factors for breeding groups of RCW (Service 2003). Hardwood encroachment also limits growth of native ground cover, and suppresses natural arthropod communities which can negatively impact the RCW (Collins 1998, Provencher *et al* 2001a). A mixed pine/hardwood stand in the South is a forest type that develops naturally, as a result of successional forces, usually in the absence of disturbance such as fire (Clendenin and Ross 2001). Implementation of the HRPO, for instance, may involve implementation of forest management practices aimed at reducing the presence of a hardwood mid-story. This may be achieved through the use of prescribed fire and/or mechanical, or chemical means, including pre-commercial thinning in stands containing excessively stocked pine saplings and seedlings. In addition to mid-story removal, the establishment and restoration of native grasses within suitable RCW

pine stands will enhance or maintain occupied feeding and/or foraging habitats. Management actions designed for RCW will also target natural regeneration of native pine canopies, restoration of historic pine densities and reestablishment of native ground covers.

Enrollment of the HFRP for areas adjacent to public lands (*i.e.* Felsenthal National Wildlife Refuge) will expand RCW habitat, increase habitat connectivity between clusters and provide compatible buffers around/near existing targeted populations/habitats on protected lands.

Silvicultural practices such as clear cutting, short rotational cutting and conversion to sub-optimal pine negatively impact the RCW (Conner *et al* 2001)). Without management of the current and historic areas where RCW occur but are not afforded protection and conservation (participation of the HFRP), decline in populations have occurred or are expected. Although the presence of southern pine stands are prevalent in the project area, an overwhelming presence of pine plantations exist creating isolation between nesting colonies. Habitat maintained by landowner participation in HFRP will increase the optimal matrix of nesting/foraging habitat for the RCW thereby reducing potential isolation between clusters. Implementation of HFRP within the action area is expected to increase the amount and quality of suitable RCW habitat on private lands. While minimal net conservation benefits may be achieved in the early stages (first several years) of HFRP implementation, the long-term implementation and subsequent addition of HFRP enrolled lands are expected to further the RCW recovery goals.

Natural regeneration of pine stands will be promoted in order to obtain genetic biodiversity, and establishment of more open stands favored by RCW. Currently, the project area is dominated by industrial agro-forestry lands, therefore RCW may be utilizing off site pines for foraging and dispersal. Restoration of native pine stands is best achieved from restoration aimed at conversion of habitat patches rather than clear cut (Ferral 1998). The HFRP is designed to provide a mosaic of habitat, retention of forest cover, as well as the strategic recruitment of clusters within the landscape of the identified project area as a means of combating the negative effects of forest fragmentation. Implementation of the HFRP will also provide an opportunity to develop and test new management practices that may be applied to other areas for the conservation and recovery of threatened and endangered species.

Creation, restoration and enhancement of additional habitat may facilitate some offspring to either reoccupy previously abandoned lands/habitats, or may be used for relocation to land protected by longer-term easement arrangements. New populations and associated habitat components will be created which will contribute to the recovery of the species, as well as compensate for potential adverse effects resulting from catastrophic events to habitat such as wildfire and wind damage. Areas where new habitat creation is proposed, artificial inserts will be utilized in order to facilitate faster recruitment of nesting colonies. Implementation of the management practices described above may have a temporary impact to the RCW in the form of harm and/or harassment, specifically translocation of individuals to new sites. However, benefits from the creation, restoration

and maintenance of nesting/foraging habitat will outweigh any temporary impacts associated with the handling of this species.

In summary, implementation of HRPOs for RCWs are reasonably expected to result in protection, enhancement, and restoration of nesting and foraging habitat, maintenance and addition of cavities, and buffer existing populations; bald eagle are reasonably expected to protect existing nesting, roosting, and foraging habitat; aquatic species are reasonably expected to result in protection, enhancement, and restoration of instream habitat, improved water quality, reduce erosion and sedimentation, improved riparian habitat, and improved land use practices on enrolled properties during the period that the HRPO is valid and operating.

Pink mucket, winged mapleleaf, Ouachita rock pocketbook

The project area for the HFRP in Arkansas covers three primary watersheds. They are, Ouachita and Saline rivers, and Moro creek. The upper reaches (within the action area) of the Ouachita River is inhabited by the Ouachita rock pocketbook. The portion of the Saline River covered by HFRP is occupied by the pink mucket and winged mapleleaf. No mussel surveys of Moro Creek have been conducted, but the first comprehensive survey is scheduled for 2007. Numerous mussels inhabit Moro Creek and habitat appears suitable for winged mapleleaf (C. Davidson, Service pers. comm). Currently, without the HFRP, riparian forests may be susceptible to clear cutting or substandard forest practices that may adversely affect the aquatic community of these watersheds. Enrollment in the program will provide landowners with incentives to develop healthy forest practices and implement restoration and enhancement activities that may promote survivorship and reproduction of these species through improved water quality (physicochemical parameters) and maintain/enhance instream habitat by reducing sedimentation.
Water quality and land use changes within watersheds contribute, among other factors, to the fitness and survivorship of aquatic species. Because ownership within all three watersheds is mostly private, continued management and protection through easements may restore habitat sufficient to sustain viable populations of these species, possibly contributing to their recovery and eventual delisting.

Inadequate buffer strips, sediment loads, non-point pollution and agricultural practices are considered significant threats to freshwater mussels (Service 1997; CBSG 1998; Service 2004). Implementation of conservation measures such as cattle exclusion from streams and riparian habitats, establishment of riparian buffers, and nutrient management practices designed to enhance water quality and reduce sediment loads is expected to contribute to increased fitness, reproductive, and survival opportunities for aquatic species.

Small localized populations are susceptible to environmental stochasticity; therefore, conservation measures associated with the HFRP may restore populations through habitat improvements. This may include a reduction in silt, erosion and protection of water quality by slowing the timing of harvest rotations in bottomland hardwood communities, as well as establishing best management practices for adjacent mussel habitat that may be

impacted. Enhancement and restoration of the adjacent riparian forest is expected to increase habitat connectivity for freshwater mussels within the three watersheds.

Forest trails and landing will be located in such a manner as to minimize adverse offsite and onsite acceleration of erosion, riparian area degradation, stream channel and stream bank erosion, and hydrology modification all of which have direct impacts to fresh water mussels. Currently, riparian areas surveyed within the project area, adjacent to mussel habitat, are degraded from illegal foot traffic and ATV use. Fencing, annual site monitoring and enforcement of the terms and agreements defined in HRPOs will restore and enhance riparian buffers, reducing detrimental impacts associated with erosion and non-point source pollution.

Temperature influences on physiological and behavioral parameters can be lethal to mussels at either hot or cold extremes (Service 1997). Establishment of riparian buffers in adjacent forested stands, prairies, or pastures is proposed as a conservation measure for creating shade to lower or maintain water temperatures for mussels. Riparian buffers also will reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff that may adversely affect mussel habitat. The minimum width will be 660 feet for HFRP lands enrolled adjacent to the Ouachita and Saline rivers, and 330 feet for all other named streams (based on topographic maps), measured horizontally in a line perpendicular to the stream bank. The width may be extended in high nutrient sediment, and animal wastes areas, if deemed appropriate by both NRCS and the Service.

Translocation or re-introduction of fresh water mussels is not anticipated, so no direct handling of the species will occur. Rather, the HFRP is intended to conserve habitat on privately owned lands and provide a net conservation benefit to the species through the implementation of best management practices. Without this project, fresh water mussels may continue to decline through degradation of habitat and water quality.

In summary, implementation of HRPOs for the pink mucket, winged mapleleaf, and Ouachita rock-pocketbook are reasonably expected to result in protection, enhancement, and restoration of instream habitat, improved water quality, reduction in erosion and sedimentation, improved riparian habitat, and improved land use practices adjacent to named streams and rivers (based on topographic maps) in the lower Ouachita River basin, including the lower Moro Creek and Saline River watersheds.

Bald eagle, *Geocarpon minimum*, Pondberry

Surveys for these species will occur prior to implementation of a landowner's restoration plan. The presence of any of these species will require avoidance measures, particularly for any nesting bald eagles during the breeding season. Restoration and monitoring of these species is not expected to have any direct positive or negative effect. Rather, implementation of the conservation measures associated with HFRP will increase buffering of habitat for these species, indirectly providing benefits by maintaining their population through the enrollment of conservation easements, without further degradation to their habitats.

In summary, implementation of HRPOs for *Geocarpon minimum* and pondberry are reasonably expected to result in protection, enhancement, and restoration of natural vegetative communities for sandy-clay prairies on bare mineral soils of the Lafe or Wing Series (high in sodium and magnesium) and seasonally flooded wetlands characterized by forested, sandy depressions associated with due fields, respectively.

Practices that will be used in the Healthy Forest Reserve Program in Arkansas; their ecological impacts and effects on targeted threatened or endangered species.		
Practice	**Impact**	**Effect on Species**
Forest Stand Improvement	Control stands density by thinning mature trees and controlling hardwood midstory; control species composition; increase stand age	Ephemeral adverse impact during operations from disturbance; long-term increases in RCW nesting and foraging habitat
Prescribed Burning	Reduce hardwood midstory; reduce fuel loads; manipulate species composition	Potential adverse impact during operation; long-term increase in RCW nesting and foraging habitat
Fire Break	Exposes bare ground to control prescribed fire and protect from wildfire	Protect from wildfire
Use Exclusion	Excludes people and animals	Limits disturbance; improves water quality
Tree/Shrub Pruning	Increase bole height on trees by removing limbs	Increases nesting potential
Riparian Forest Buffer	Plant trees adjacent to water bodies; decrease erosion	Maintain/enhance suitable habitat and water quality
Tree/Shrub Establishment	Reforest pastures or fields by planting trees	Increases foraging and nesting potential; decreases forest fragmentation; improves water quality
Site Preparation	Competition control; ripping/subsoiling	Ephemeral adverse impact during operations from disturbance; erosion
Forest Trails and Landings	Establish skid trails, haul roads, log landings to facilitate forestry operations	Ephemeral adverse impact during operations from disturbance; erosion

Practices that will be used in the Healthy Forest Reserve Program in Arkansas; their ecological impacts and effects on targeted threatened or endangered species.		
Practice	**Impact**	**Effect on Species**
Upland Wildlife Habitat Management	Install artificial nest cavities	Increase nesting potential

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, private, or other non-federal entity activities on endangered and threatened species and their critical habitat that are reasonably certain to occur in the action area. Future federal actions unrelated to the proposed action are not considered in this section because they subject to consultation pursuant to section 7 of the ESA. Numerous non-federal actions that could affect listed species are reasonably certain to occur within the action area. These will typically include silviculture, mining, agriculture, and grazing activities and urban development. Each of these future activities could contribute to cumulative effects on listed species or their habitat in the action area.

Red-cockaded Woodpecker

The majority of RCW populations in south Arkansas occur on private lands. Factors negatively influencing these populations include demographic isolation, timber harvest followed by establishment of short-rotation pine plantation management in which trees do not reach a sufficient age and size for suitable habitat, loss of the natural fire regime across the landscape, encroachment and succession of hardwoods in the absence of frequent fire, and lack of suitable cavities. Although short rotation silviculture practices, agriculture, and urbanization by non-federal entities in the action area will likely continue, these activities, in conjunction with the proposed action, are not likely to significantly affect the continued survival of the RCW.

Bald Eagle

Non-federal actions that may negatively influence bald eagle populations include timber harvest, recreation, construction of buildings, roads, and other infrastructure associated with urban development and natural gas exploration/extraction. Although these activities are likely to continue in conjunction with the proposed action, they are not likely to significantly affect the continued survival of the bald eagle.

Pink Mucket

Water quality degradation caused by forest harvest, agriculture, and urbanization by private individuals in the general vicinity of the project area will likely continue. However, the Service feels that these activities in conjunction with the proposed action

are not likely to significantly affect the continued survival of the pink mucket. Furthermore, it is likely that any future road and bridge construction or other major construction project in the vicinity of the proposed project would have a federal component and require separate Section 7 consultation.

Winged Mapleleaf

Water quality degradation caused by forest harvest, agriculture, and urbanization by private individuals in the general vicinity of the project area will likely continue. However, the Service feels that these activities in conjunction with the proposed action are not likely to significantly affect the continued survival of the Winged Mapleleaf. Furthermore, it is likely that any future road and bridge construction or other major construction project in the vicinity of the proposed project would have a federal component and require separate Section 7 consultation.

Ouachita Rock-Pocketbook

Water quality degradation caused by forest harvest, agriculture, and urbanization by private individuals in the general vicinity of the project area will likely continue. However, the Service feels that these activities in conjunction with the proposed action are not likely to significantly affect the continued survival of the Ouachita rock-pocketbook. Furthermore, it is likely that any future road and bridge construction or other major construction project in the vicinity of the proposed project would have a federal component and require separate Section 7 consultation.

Geocarpon minimum

Geocarpon minimum populations may be negatively effected by habitat degradation caused by conversion of natural vegetation to pasture, row crops, silviculture and road expansion. Although these activities are likely to continue in conjunction with the proposed action, they are not likely to significantly affect the continued survival of the plant.

Pondberry

Pondberry populations may be negatively effected by habitat degradation caused by conversion to pasture, agriculture, silviculture, road expansion and alteration of natural hydrology. Although these activities are likely to continue in conjunction with the proposed action, they are not likely to significantly affect the continued survival of the plant.

CONCLUSION

After reviewing the current status of the bald eagle, RCW, *Geocarpon minimum*, pondberry, pink mucket, winged mapleleaf, and ouachita rock-pocketbook, the environmental baseline for the action area, the effects of the proposed action and the

cumulative effects, it is the Service's biological opinion that the HFRP is not likely to jeopardize the continued existence of the bald eagle, RCW, *Geocarpon minimum*, pondberry, pink mucket, winged mapleleaf, and ouachita rock-pocketbook. No critical habitat has been designated for these species in Arkansas; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which included, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out of an otherwise lawful activity. Under terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NRCS so that they become binding conditions of any grant, contract, or permit issued to parties conducting activities under the auspice of the HFRP, as appropriate, for the exemption in section 7(o)(2) to apply. NRCS has a continuing duty to regulate the activity covered by this incidental take statement. If NRCS (1) fails to assume and implement the terms and conditions or (2) fails to require contractors or other parties conducting work on behalf of NRCS to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, contract, or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NRCS must monitor and report land use trends, habitat conditions, and HRPOs to the Service as specified in this PBO.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

All RCWs in excess of baseline conditions could be taken as an incidental consequence of land use activities that return the property from restored and enhanced habitat conditions to baseline conditions. The precise number of RCWs subject to incidental take can not be enumerated because of the demographic and environmental stochasticity and uncertainty that underlie predictions of the precise number that will increase above the baseline in response to voluntary management to benefit this species. Incidental take of RCWs above baseline conditions would be in the form of harm and/or harassment. The amount or extent of take incidental to a return to baseline conditions would not involve, however, any individuals associated with baseline habitat conditions.

The precise number of pink mucket, winged mapleleaf, and Ouachita rock-pocketbook subject to incidental take can not be enumerated because of the demographic and environmental stochasticity and uncertainty that underlie predictions of the precise number of individuals that currently inhabit the Ouachita and Saline rivers and that will increase in response to voluntary management to benefit this species. Baseline conditions for these three species are based on amount and quality of riparian habitat. Riparian habitat in excess of baseline conditions could be taken as an incidental consequence of land use activities that return the property from restored and enhanced habitat conditions to baseline conditions. Therefore, incidental take of pink mucket, winged mapleleaf, and Ouachita rock-pocketbook above baseline conditions would be in the form of harm. The amount or extent of take incidental to a return to baseline conditions would not involve, however, any individuals associated with pre- or post-baseline riparian habitat conditions.

No take of bald eagle, *Geocarpon minimum* and pondberry is anticipated to occur as a result of HFRP implementation.

NRCS and the Service acknowledge that any take of targeted species will be following the implementation of net conservation benefit standard and/or at the time upon which the landowner may exercise her/his rights to return to the original baseline conditions after the HFRP HRPO expires for that specific landowner. It is important to note that such taking may or may not ever occur. It also is imperative to emphasize that it is unlikely that the targeted species would use the habitat involved if not for the voluntary management activities of the participating landowners. These voluntary management activities undertaken through HFRP will likely increase the number, extent and duration of the species and increase the amount and quality of habitat. The only habitat that may be lost due to incidental take is habitat that does not currently exist, is unoccupied at the time a landowner enrolls, or is replaced as discussed in Baseline Adjustment section of the Description of the Proposed Action.

EFFECT OF THE TAKE

In the accompanying PBO, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes that with effective NRCS and Service cooperation and coordination as outlined in the PBO, implementation of the proposed HFRP does not require reasonable and prudent measures and terms and conditions since all components of the HFRP are considered as part of the proposed action.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse impacts of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. A primary goal of HFRP is to promote recovery of listed species. No additional conservation recommendations are necessary due to the inherent benefits that will occur during implementation of HFRP and the associated HRPOs.

REINITIATION NOTICE

This concludes formal consultation pertaining to NRCS actions involving HFRP activities. As provided in 50 CFR Sec 402.16, reinitiation of formal consultation is required where discretionary NRCS involvement or control over the action has been retained (or is authorized by law) and if:

1. the amount or extent of taking specified in the incidental take statement is exceeded;

2. new information reveals effects of NRCS' action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3. NRCS' action is subsequently modified in a manner that was not considered in the PBO; or

4. a new species is listed, or critical habitat designated that may be affected by the action.

Programmatic Biological Assessment Approval

8/28/06

Kalven Trice, State Conservationist
Natural Resources Conservation Service

Programmatic Biological Opinion Approval

Margaret Harney, Acting Field Supervisor
U. S. Fish and Wildlife Service

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APPENDIX 1

Arkansas HFRP Application 2006 Priority Ranking Form

And

Arkansas HFRP 2006 Self Assessment Form

Arkansas HFRP Application 2006 Priority Ranking

Landowner Name _____ **Tract ID** _____

County _____ **Date** _____

POINTS

1. How many of the following federally listed or candidate species occur on the property? Check all that are present. (5 points per species). _____

Red-cockaded Woodpecker* _____
Bald Eagle _____
Pink mucket _____
Winged mapleleaf _____
Ouachita rock pocketbook _____
Geocarpon minimum _____

2. How many contiguous acres offered? _____

20 to 74 acres (5 pts) _____
75 to 160 acres (10 pts) _____
Greater than 160 acres (20 pts) X

3. Are the offered acres within 5 miles of Felsenthal National Wildlife Refuge, Crossett Experimental Forest, Warren Prairie Natural Area, or an established or proposed Red-cockaded woodpecker conservation area (refer to Map 1)? If yes, 30 pts. _____

4. Do the offered acres provide at least the standard for Red-cockaded Woodpecker managed stability (refer to private lands guidelines)? _____

Existing desirable habitat (15 pts) _____
Potential desirable habitat during agreement term (10 pts) _____
Establishment of potential desirable habitat which will not be realized during the agreement term (5 pts) _____

5. Is landowner willing to allow the NRCS and/or FWS to establish Red-cockaded Woodpecker nesting habitat in the form of recruitment clusters with artificial nest structures? If yes, 30 pts. _____

6. Are the offered acres adjacent to a stream, bayou, or river in the lower Ouachita River basin in Arkansas (refer to Map 2)? If yes, 30 pts. _____

7. What is the duration of conservation benefits? _____

10 year restoration only (5 pts) _____

30 year easement (10 pts) _____

99 year easement (20 pts) _____

TOTAL ENVIRONMENTAL POINTS _____

8. Environmental Points are adjusted by a Cost Effective Factor that improves as points increase, or costs decrease.

Cost Effectiveness Factor (CEF) = Total Environmental Points / Estimated Restoration Cost/Acre.

_____	/	_____	=	[ ]
Environmental Points (EP)		Est. Restoration Cost Per Acre		Multplier

FINAL SCORE
EP * (1+CEF) [ ]

This ranking form is to be signed by the employee completing the ranking. It should be reviewed with the applicant and the applicant should sign the completed form.

NRCS Employee Signature _____

Applicant Signature _____

* Red-cockaded woodpeckers may be counted if suitable foraging habitat is available on the property and a nest cavity exists within a half mile of the property.

Arkansas Healthy Forest Reserve Program Application 2006 Self-Assessment

Landowner Name:_____ Tract ID:_____ County:_____

1. Do Red-cockaded woodpeckers or cavity trees occur on the offered acres (refer to photos)? If yes, please attach map or sketch of tract with suspected location.

   Circle one: Yes No

2. Are the offered acres within a half mile of Felsenthal National Wildlife Refuge, Crossett Experimental Forest, Warren Prairie Natural Area, or an established or proposed Red-cockaded woodpecker conservation area (refer to RCW conservation area map)?

   Circle one: Yes No

3. Are the offered acres adjacent to a perennial stream, bayou, or river in the lower Ouachita River basin in Arkansas (reference USGS topographic map)?

   Circle one: Yes No

4. Check any of the Arkansas Forestry Commission recommended forestry best management practices for water quality being used on the offered acres.

   a) Riparian Forest Buffers (or Streamside Management Zones) are maintained during harvest operations_____.
   b) Logging decks, road banks, and/or firebreaks and skid trails are seeded after use_____.
   c) Water bars, diversion ditches, or culverts are properly installed on access roads, skid trails, logging decks, or firebreaks_____.
   d) Stabilization/vegetation of inactive roads is done_____.
   e) Stream crossings are installed in a manner that does not degrade water quality_____.

5. Are pine trees at least 30 years old on a minimum of 75 acres?

   Circle one: Yes No

6. Does a majority of the pine stand on the tract have sparse hardwood midstory (7 feet or taller)?

   Circle one: Yes No

7. Are you practicing prescribed burning on a 3 to 5 year interval?

   Circle one: Yes No If Yes, how may burns were conducted during the last ten years?_____.

8. Are you willing to establish Red-cockaded woodpecker nesting habitat and/or recruitment clusters (artificial cavities) on offered acres?

   Circle one: Yes No

By my signature I acknowledge that the information given above is correct to the best of my knowledge.

_____ _____

Applicant Signature Date

This form must be returned to your local NRCS office by the close of business on Monday, July 17, 2006.

APPENDIX 2

Habitat Restoration Plans of Operation (HRPO) Template

---------- Habitat Restoration Plan ----------

Landowner Name and Address:	County:	Easement Number
_____	_____	88-7103-__-_____
_____		
_____		

_____

Restoration Plan Goal

[Clearly state and define HRPO goals and objectives]

Net Conservation Benefit

NRCS reasonably expects that this HRPO will result in protection, enhancement, and restoration of [***insert covered species name***], and improved land use practices on the enrolled property during the term of this HRPO. For as long as management activities set forth herein are carried out or the habitat created by these activities persists, the enrolled property will benefit the conservation of the covered species. With this cooperative effort, the management of landowner's property for the covered species is assured for the foreseeable future. Therefore, the cumulative impact of this HRPO and the activities it covers, which are facilitated by the authorization of incidental take, will provide a net conservation benefit to covered species.

Conservation Measures

The primary objective of this HRPO is to protect, enhance, restore habitat [***and water quality***] and thereby promote the continued existence or reestablishment of the covered species population(s) in the [***insert location***]. In order to accomplish this, it is essential that the landowner, the NRCS and Service work together to provide good habitat and positive stewardship for the covered species. Management activities that are undertaken through this HRPO will result in improving habitat quantity and quality for the covered species in the [***insert location***]. The net effect of conservation activities will be to increase the likelihood that viable populations of the covered species will persist in the [***insert location***] and inhabit unoccupied habitat that is within its historic range.

The conservation recommendations necessary to meet the net conservation benefit for this property are set at, as specified below in this HRPO:

[***insert a list of <u>specific</u> conservation measures necessary to the net conservation benefit on this property(acres, river miles, management practices, linear feet for fencing, increases in riparian habitat quality/quantity for <u>each</u> of the covered species***].

The boundaries of the enrolled property and covered species habitat are shown on the attached map [***reference map attached to this HRPO***].

Restoration Plan Duration

[Insert start and end dates]

Site Description

Enrolled Property Location

The following property is covered by this HRPO: [**include legal description**] in [**County**], Arkansas. This property ("enrolled HFRP property") contains habitat that is inhabited or may be used by the covered species [**or that is important to maintaining healthy streams inhabited by the covered species**]. The enrolled property lies within the [**insert location and watershed**]. NRCS will enroll [**# of acres**] of this property under the HRPO, as shown on the attached property map [**reference map attached to this HRPO; map will include property boundary, total acreage being enrolled, existing habitats, dimensions of riparian buffers, maps for covered species should be at an appropriate scale to depict location and habitat types; i.e., stand composition, RCW foraging partitions, cavity tree locations, etc**.]

Physical Conditions

Wildlife and Ecological Trends

Landowner Protection

Baseline Conditions and Responsibilities

[**Describe the extent and current condition of the enrolled property and their acreage (e.g., major plant communities or habitat types, soils, hydrology, etc.) in terms of appropriate habitat for the covered species. Describe how the conservation recommendations required to meet the net conservation benefits were determined, when and how baseline surveys were conducted, or whether baseline was established with current information or other factors and attach a map showing the boundaries of the property.**]

Existing conditions and those necessary to meet the net conservation benefit for [species] may be expressed as [**describe existing conditions necessary to meet net conservation benefit**].

The baseline responsibilities/constraints of the landowner are to maintain existing [**describe habitat, number of individuals, nesting habitat, conservation practices, best management practices] as determined by the baseline survey and as set forth in**

this HRPO. Specifically, the landowner's baseline responsibilities are to: [List each baseline responsibility (be specific)].

Baseline Adjustment

Force majeure events such as tornados, rainstorms, severe drought, fires, or insect/disease epidemics are beyond the reasonable control of the landowner, and could either extirpate the covered species from the enrolled HFRP property or render the covered species' habitat on the enrolled HFRP property unsuitable for continued occupation or result in a degradation of [**define habitat**]. These events may reduce the covered species numbers or habitat below existing conditions or those conditions necessary to meet the net conservation benefit through no fault or negligence of the landowner. If the covered species habitat ceases to exist on an enrolled HFRP property, the landowner will not be held responsible for the loss of such baseline habitat conditions or individuals provided such cessation was not the result of the landowner or landowner's agent(s) action(s). In such circumstances the landowner, NRCS, and Service may agree to revise the conservation recommendations of this HRPO to reflect the new circumstances that are necessary to meet the standard for the HFRP.

Responsibilities of NRCS, Service, and Landowner

The landowner, NRCS, and Service agree to carry out certain responsibilities under this HRPO, as specified below.

[**Specifically state the landowner, NRCS, and Service responsibilities under this HRPO**]

Emergency Situations

If a landowner discovers the covered species on his/her property or believes it to be present, the landowner will inform the NRCS or Service of the [**insert covered species**] presence within a reasonable amount of time. The landowner will also allow the Service to access the property to survey for [**insert covered species**]. The Service may choose, under certain circumstances, to relocate individuals of the covered species to other portions of the property or to remove them from the property. Specific management actions that will be implemented once [**insert covered species**] colonizes a landowner's property are detailed under "Responsibilities of the Landowner". Nothing in this HRPO prevents the landowner from implementing land management activities not described in the HRPO, including improving habitat for the [**insert covered species**], as long as such actions meet the HRPO's standard. As long as the landowner implements the agreed upon conservation measures the landowner may develop, farm, ranch, harvest timber, or make any other lawful use of the enrolled HFRP property.

Emergency situations arising from natural disasters (e.g., tornados, fire, excessive rainfall, extreme drought, insect infestations, or epidemic disease) may require the initiation of certain land management actions that may result in take of the covered

species. The landowner will notify the NRCS or Service and make reasonable accommodations for survey and/or relocation [**insert covered species**] prior to initiation of the land management action in such an event. If prior notification is not possible, the landowner will take into account known locations of [**insert covered species**] and avoid impacts to the maximum extent possible during his/her emergency actions. The Cooperator will notify the NRCS or Service within ten working days of taking such action, including the measures taken to avoid impacts to [**insert covered species**].

Incidental Take

Under the terms of this HRPO, the landowner is authorized to make use of his/her enrolled property in any manner that does not result in reducing the population and/or quantity and quality of habitat for [**insert covered species**] such that the HRPO's standard is no longer met. Such activities that could result in a lawful take, may include, but are not limited to: driving vehicles, building or fence construction, grazing of livestock, gardening, forestry, hunting, farming, mowing, or cultivation of agricultural crops. The Cooperators may continue current land-use practices, undertake new ones, or make any other lawful use of the property, even if such use results in the take [**insert covered species**] or loss and/or degradation of habitat in excess of the HRPO's standard. [***Describe level of take that may potentially occur on the enrolled property based on property acreage, habitat types, and current distribution and population status of (insert covered species)***.]

Suspension or Revocation of Landowner Protections

NRCS and the Service may suspend or revoke a landowner's protections if a landowner has breached his/her obligations under a HRPO and has failed to cure the breach in a timely manner, and the effect of the breach is to diminish the likelihood that the HRPO will achieve its goals.

Property Access

The landowner will, with acceptable advance notification, allow access onto the enrolled HFRP property by the NRCS and Service to manage or monitor the covered species and for purposes of ascertaining compliance with this HRPO.

<u>Management Prescriptions</u>

Pine Stands

Hardwood Stands

Healthy Forest Reserve Program Habitat Restoration Plan

Practice 1
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 2
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 3
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 4
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 5
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 6
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 7
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 8
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 9
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Practice 10
Description

Field	Planned Amount	Month	Year	Applied Amount	Date
1					
Total:					

Certification of Participants

Landowner	Date
NRCS Area Forester	Date
US Fish and Wildlife Service	Date

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APPENDIX 3

Habitat Restoration Plans of Operation (HRPO)

*HRPOs will be appended to the PBO as they are developed for HFRP applicants