

Biological Assessment  
of  
*Lampsilis rafinesquena* (Frierson, 1927)  
Neosho Mucket  
and  
*Quadrula c. cylindrica* (Say, 1817)  
Rabbitsfoot  
for  
AHTD Job Number BR0403  
Illinois River Structures and Approaches  
Benton County, Arkansas  
  
Terracon Consultants, Inc.  
25809 Interstate 30 South  
Bryant, Arkansas 72022

Introduction

Benton County is proposing to replace an existing bridge (Bridge 10591) on County Road 2 (Fisher Ford Road) crossing the Illinois River at Siloam Springs, Benton County, Arkansas (Figure 1). Bridge 10591 is currently rated as structurally deficient and has been closed to traffic since at least 2005. The new structure will be 228 feet in total length by 29 feet (69.5 m X 8.8 m) in total width and shifted slightly downstream of the existing bridge approximately 12 feet (3.7 m) center line to center line. Proposed construction plans are located in Appendix A.

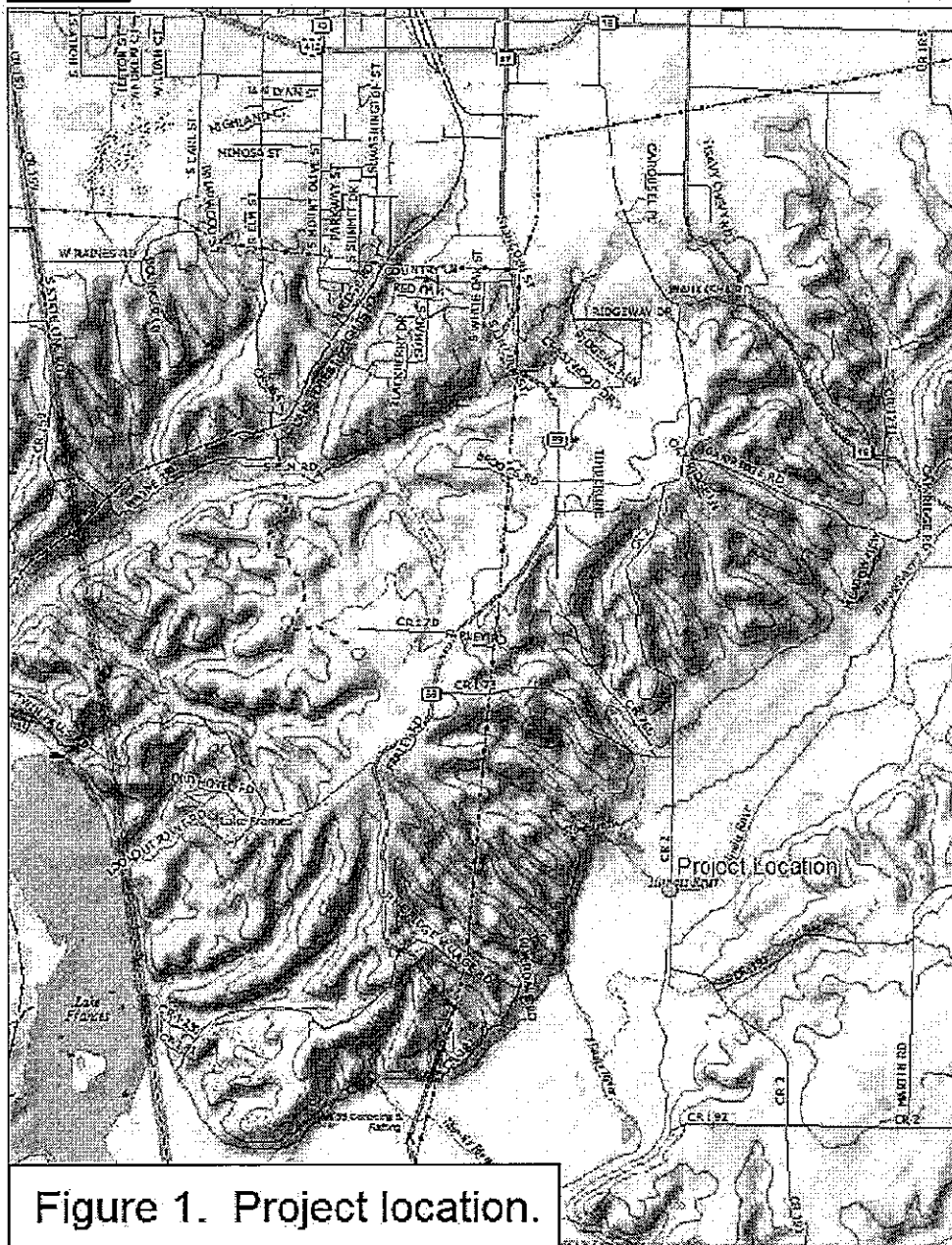
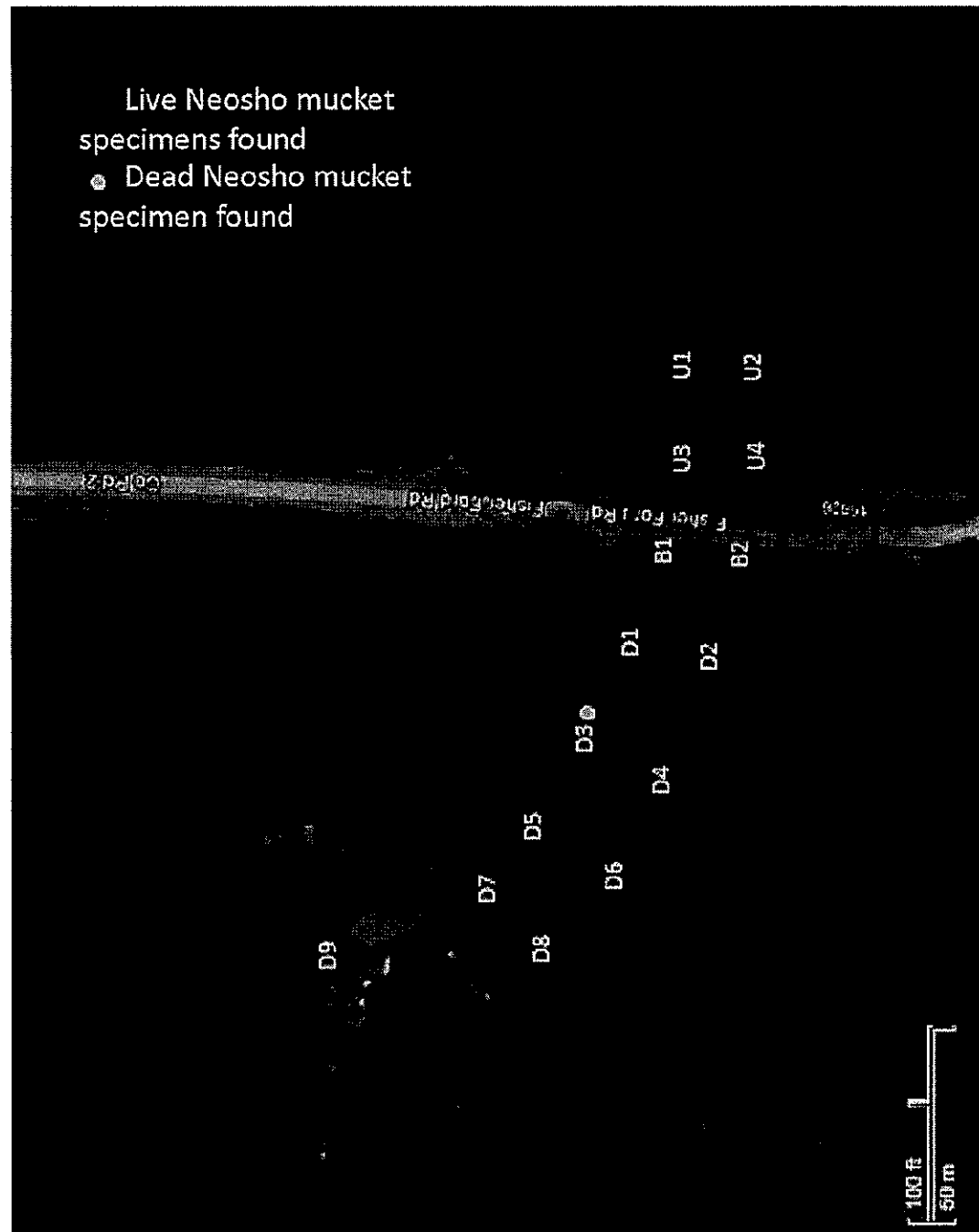


Figure 1. Project location.

**Figure 2.** Sketch of qualitative timed-search cell distribution within the survey area. U = Upstream, B = Bridge, D - Downstream.



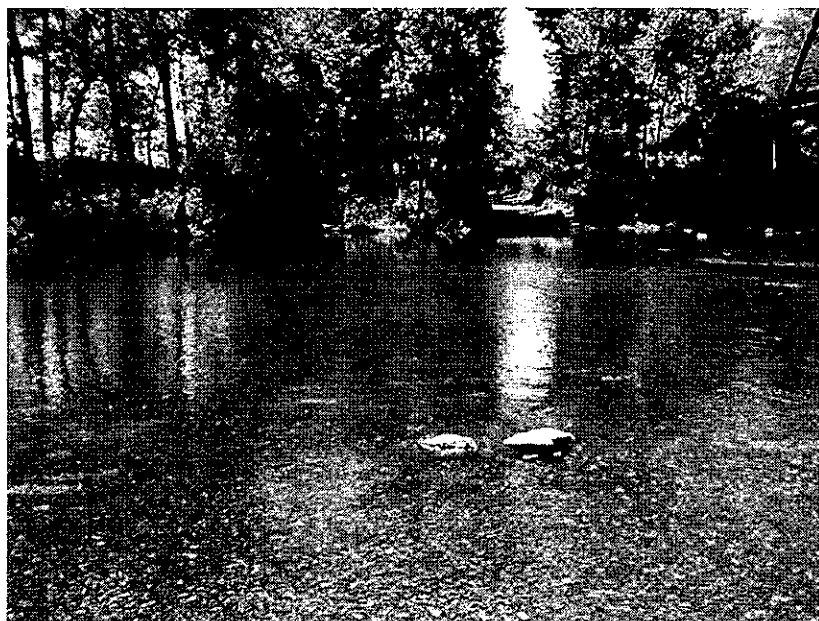


Figure 3. Top. Downstream survey area; *Jussiaea* islands center left, downstream run encompassing search cell Downstream 9 top right. Bottom. Upstream of county road crossing taken from right descending bank, bridge end at top right.

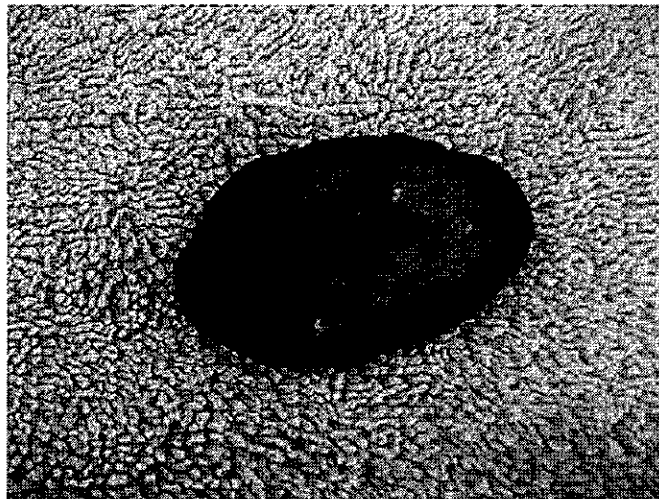
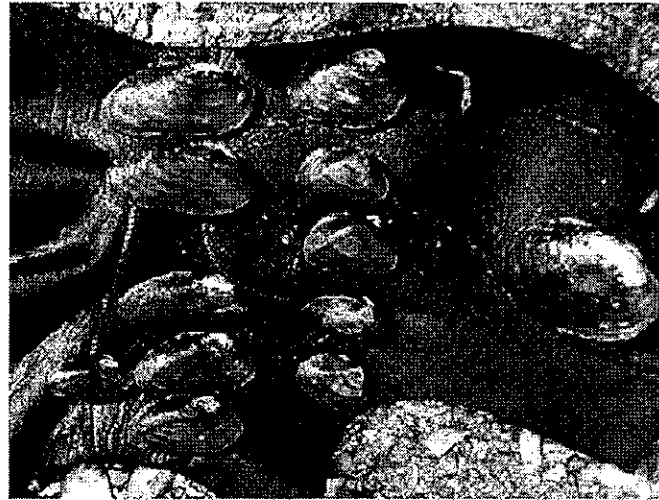
Each search cell, except Downstream 9, was surveyed by two individuals with one snorkeling (where water depth was adequate) and the other wading and

A total of 16 live specimens representing three native unionid species were collected during the qualitative timed-search survey, and three additional species were found as dead shells only (Table 2). In addition, the Asian clam (*Corbicula fluminea*) was found in low numbers as both live and dead specimens within each survey quadrat.

Table 2. Timed search results for 15 search cells within survey area.

Search Cell	Survey Time	<i>Amblema plicata</i>	<i>Elliptio dilatata</i>	<i>Fusconaia flava</i>	<i>Lampsilis rafinesqueana</i>	<i>Lampsilis siliquoidea</i>	<i>Pyganodon grandis</i>
Upstream 1	20 mins	0	0	0	0	0	0
Upstream 2	36 mins	0	1 live	0	0	0	0
Upstream 3	36 mins	0	0	0	0	0	0
Upstream 4	60 mins		5 live, 1 fresh dead	5 live	1 live	0	0
Bridge 1	42 mins	0	0	0	0	0	0
Bridge 2	40 mins	0	0	0	0	0	0
Downstream 1	54 mins	0	0	0	1 live	0	0
Downstream 2	42 mins	0	0	0	0	0	1 fresh dead
Downstream 3	38 mins	2 valves	0	0	1 relict	1 relict	0
Downstream 4	34 mins	0	1 live	0	0	0	0
Downstream 5	48 mins	1 valve	1 + 1 valve dead	0	0	0	0
Downstream 6	24 mins	0	0	0	1 live	0	0
Downstream 7	14 mins	1 relict	0	0	0	0	0
Downstream 8	12 mins	0	0	0	0	0	0
Downstream 9	17 mins	0	1 live	0	0	0	0
TOTAL	517 mins	0 live	8 live	5 live	3 live	0 live	0 live

Survey time for the qualitative effort totaled 8.6 person-hours. Length, height, and width measurements (mm) for the three Neosho mucket (*Lampsilis rafinesqueana*) specimens are: Upstream 4 - L 86.05, H 57.25, W 30.25; Downstream 1 - L 49.50, H 30.40, W 16.85; Downstream 6 - L 92.60, H 58.95, W 32.70, and these three specimens are shown in Figure 4. The only mussel concentration found was located in search cell Upstream 4.











October 28, 2013

U.S. Fish and Wildlife Service  
Division of Policy and Directives Management  
4401 N. Fairfax Drive, MS 2042-PDM  
Arlington, VA 22203

Re: USFWS Proposed Designation of Critical Habitat  
for the Neosho Mucket and Rabbitsfoot Mussels  
Docket ID: FWS-R4-ES-2013-0007

To Whom It May Concern:

The Arkansas Farm Bureau Federation welcomes the opportunity to submit comments on behalf of Arkansas' agriculture community and our more than 200,000 member families, especially those residing in the 31 affected counties where Critical Habitat is being proposed for the Neosho Mucket and Rabbitsfoot Mussels.

The Arkansas Farm Bureau supports the comments submitted by the Association of Arkansas Counties. IF the comments herein are in conflict, those comments shall take precedence.

While not specifically relevant to the designation of Critical Habitat the following paragraph is relevant to the process used to list the Neosho Mucket and Rabbitsfoot Mussels along with 372 additional species in the South and Southeast including 42 species in Arkansas alone. The Endangered Species Act (ESA) is inherently flawed. It allows non-governmental organizations (NGOs) to file third party lawsuits and then requires federal agencies to compensate these NGOs whether they prove their case or not. It allows secret negotiations, behind closed doors, that result in binding out-of-court settlements that do not allow the participation of the affected community. It is interesting to note that, depending on the issues at hand and the entities involved, our federal agencies claim that they do not have the budgets to defend lawsuits filed by environmental groups and use this as justification for these out-of-court settlements; however, no expense is too great when these same agencies want to make an example of private individuals, organizations, and companies. An assortment of environmental NGOs and the U.S. Fish & Wildlife Service (USFWS) have collaborated and conspired on a number of these secret behind closed doors stipulated settlement agreements. Similar tactics have been used by environmental NGOs and the Environmental Protection Agency. It has become quite obvious that the Endangered Species Act and the Clean Water Act are in need of substantive reform.

**Arkansas Farm Bureau • P.O. Box 31 • Little Rock, AR 72203-0031 • 501-224-4400**

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#### Small Businesses Were Not Consulted

The Regulatory Flexibility Act requires federal agencies to solicit information related to the financial impact on small businesses/entities. The proposed CHUs include entire watersheds. The economies in these watersheds are agriculture based. Almost all of the farms and ranches in these Critical Habitat Units (CHUs) would fall under the small business/entity description. To our knowledge, not a single member of the agriculture community was contacted in accordance with the provisions of the Regulatory Flexibility Act. If you believe otherwise please provide a list of who in the agriculture community was contacted.

#### Listing Should Not Encompass an Entire Geographic Area

The ESA expressly states that "Critical Habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species." In many cases the USFWS violates this express statutory limitation by including large geographical areas that have not been shown to be occupied by the species. Almost half (48%) of the proposed CHUs in all 12 states are in Arkansas, encompassing 31 counties and 42% of Arkansas' geographical area. The vast majority of these proposed CHUs appear to be arbitrary and are clearly an overreach of the USFWS authority under the ESA.

Local USFWS officials have stated that Arkansas has numerous listed threatened and endangered species and that these listings have had minimal or no impact on private landowners. However, one important aspect of these listings that have not been clearly explained is that they have not been accompanied by critical habit designations. The listing in unto itself does provide protection; however, the designation of critical habitat is crucial to implementation and enforcement. By the USFWS's own admission in a 2009 FWS revised fact sheet you state, "In areas where the species is not currently present there may be some project modification that would not have occurred without the Critical Habitat designation."

There are numerous examples of private landowners, businesses and companies in western states that have been bankrupted as a result of endangered and threatened species litigation, e.g. residential housing developments, agriculture in the San Joaquin Valley, silviculture in Oregon, etc. To imply these listings and their accompanying Critical Habitat designations will have minimal impact on private property owners is disingenuous. Litigation may not come directly from the USFWS itself, but the designation of Critical Habitat provides the mechanism for third party lawsuits. Ensuring that the Critical Habitat designation is limited to those areas which are essential for the protection of these species (occupied habitat) is crucial to also protecting private landowners, farmers and ranchers from unnecessary and extremely expensive third party litigation.

#### Flawed Economic Analysis

The USFWS estimates the total cost of Critical Habitat designation to be \$4.4 million dollars (\$220,000 per year) over a 20 year period for all 12 affected states. This estimate was performed using an incremental approach that only accounted for the cost of interagency consultations.

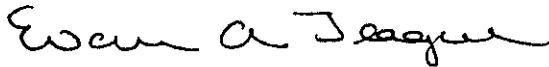
Based on the economic analysis performed by the Association of Arkansas Counties the absolute minimum cost of the proposed Critical Habitat in Arkansas alone will be over \$20 million. This is approximately five times the cost of \$4.4 million that was contained in the USFWS report for all 12 states and all rivers involved, yet the \$20 million figure only represents a small fraction of the total value of economic activity of the counties containing these CHUs. As mentioned above, the proposed CHUs include all or part of 31 counties. The value of agriculture production in these counties alone is nearly \$3 billion and represents more than 500,000 jobs.

The USFWS economic analysis fails to recognize any cost to private property and the impact Critical Habitat will have on their cost to operate their business or their property values. The USFWS estimate does not take into account the additional requirements imposed on farmers and ranchers seeking coverage under federal and state permits (EPA NPDES CAFO, COE Section 404, APCEC Regulation 5, etc.) or non-permitted activities (EPA Section 319, NRCS and FSA cost share programs, etc.)

Designation of Critical Habitat will significantly increase the numbers of consultations required for permitted activities as well as non-permitted activities. In the past consultations have not occurred and therefore insufficient data existed related to the cost of project delays; however, consultations are expected to significantly increase with the designation of Critical Habitat. These consultations are time consuming and will delay permit approvals, conservation practice implementation and have their own inherent costs. These costs have not been included in the economic analysis.

Again, thank you for the opportunity to provide input. Please feel free to contact us with any questions or comments. You can reach me at 501-228-1335 or at [evan.teague@arfb.com](mailto:evan.teague@arfb.com).

Respectfully submitted,



Evan A. Teague, P.E.  
Environmental Specialist

Cc: ARFB Staff and Board of Directors



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**COMMENTS OF  
ASSOCIATION OF ARKANSAS COUNTIES**

**ON FWS PROPOSED DESIGNATION OF CRITICAL HABITAT  
FOR THE NEOSHO MUCKET AND RABBITSFOOT MUSSEL  
(50 C.F.R. Part 17)**

**Published at:  
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FWS-R4-ES-2013-0007  
RIN 1018-AZ30  
78 Fed. Reg. 52894 (August 27, 2013)**

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**Submitted on:  
October 28, 2013**

**To:  
U.S. Fish and Wildlife Service  
Division of Policy and Directives Management  
4401 N. Fairfax Drive, MS 2042-PDM  
Arlington, VA 22203**

**Via:  
<http://www.regulations.gov>  
Docket ID No. FWS-R4-ES-2013-0007**

**COMMENTS ON PROPOSED DESIGNATION OF CRITICAL HABITAT  
FOR THE NEOSHO MUCKET AND RABBITSFOOT MUSSEL  
(50 C.F.R. Part 17)**

**I. Executive Summary**

**A. Introduction**

On October 16, 2012, the U.S. Fish and Wildlife Service (the “Service”) published a proposed rule<sup>1</sup> listing the Neosho mucket (*Lampsilis rafinesqueana*) and rabbitsfoot (*Quadrula cylindrical cylindrical*) mussels (the “target species”) as endangered and threatened, respectively, and designating critical habitats for both under the Endangered Species Act of 1973 (ESA), as amended.<sup>2</sup> On September 17, 2013, the Service published its final rule<sup>3</sup> listing the Neosho mucket and rabbitsfoot mussels as endangered and threatened, respectively, but did not make a final determination on designation of critical habitat units for the target species. On August 27, 2013, the Service published a notice<sup>4</sup> that it was reopening the public comment period on the proposed designation of critical habitat units for the Neosho mucket and rabbitsfoot mussels. The Service’s proposed rule specifically requested, *inter alia*, comments concerning relevant data regarding threats to the species and regulations that may be addressing those threats; reasons why the Service should or should not designate critical habitat; what areas should be included in the designation and why; what areas are essential for the conservation of the species and why; foreseeable economic impacts that may result from designating any area that may be included in the final designations; and whether the Service’s approach to designating critical habitat could be improved or modified to provide for greater public participation. Pursuant to the Service’s notices of the proposed rulemaking, the Association of Arkansas Counties and the undersigned

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<sup>1</sup> 77 Fed. Reg. 63440.

<sup>2</sup> 15 U.S.C. § 1531 *et seq.*

<sup>3</sup> 78 Fed. Reg. 57076.

<sup>4</sup> 78 Fed. Reg. 52894.

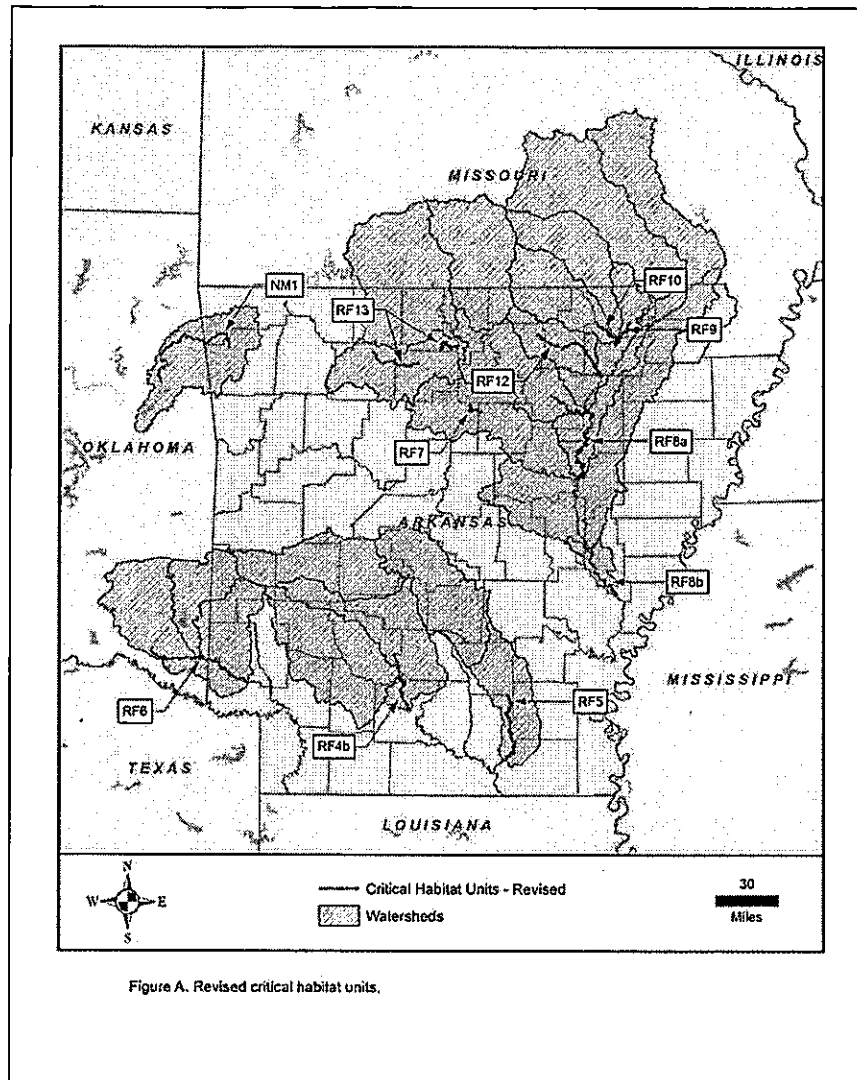
Commenters provide the following information and comments concerning the proposed designation of critical habitats for the Neosho mucket and rabbitsfoot mussels in Arkansas. The following comments address a number of the topics on which the Service requested additional information or comments.

The Service's proposed rule will designate a total of 769.2 river miles in Arkansas as critical habitat for Neosho muckets and rabbitsfoot mussels. The proposed critical habitat designations will directly impact 31 Arkansas counties, and, if finalized as proposed, the targeted watershed will cover approximately 42% of the entire geographical area of Arkansas.<sup>5</sup>

The Association of Arkansas Counties proposes that the Service reduce the critical habitat designations for the rabbitsfoot mussels as illustrated by the following map:

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<sup>5</sup> See *Review of Proposed Critical Habitat Designation for Rabbitsfoot Mussel and Neosho Mucket*, GBMc & Associates (Oct. 17, 2013) (Appendix A hereto).



## B. Commenters

The undersigned Commenters are associations and individual organizations that represent a broad cross-section of Arkansas stakeholders whose real property and property rights will be affected by the designation of critical habitat for the target species. Many of the association members and individual organizations have an ownership interest in the riparian lands adjacent to the areas proposed for critical habitat designation. Still more of the associations' members



and individual business organizations will be negatively impacted by the affect the critical habitat designations will have on the ability to obtain necessary State or federal permits or to conduct commercial, agricultural and recreational activities on private property.

**1. Association of Arkansas Counties**

The Association of Arkansas Counties (“AAC”) is an association that represents Arkansas’ seventy-five counties and county and district officials. Designation of critical habitats for Neosho mucklets and rabbitsfoot mussels will have a direct impact on Arkansas businesses and communities, which will, in turn, have an economic impact on employment, tax revenues, and overall quality of life throughout Arkansas. The AAC and its members have an interest in this rulemaking because the broad scope of the proposed critical habitat designation will result in costly and disruptive impacts that may or may not produce corresponding benefits, in part because so little is known about the specific habitat requirements for these species.

**2. Arkansas State Chamber of Commerce/Associated Industries of Arkansas**

The Arkansas State Chamber of Commerce and the Associated Industries of Arkansas, Inc. are independent non-profit corporations operated by a single staff in Little Rock, Arkansas. Combined, the AR State Chamber/AIA represents over 1250 businesses, manufacturers, business associations, local chambers of commerce and economic development corporations in all 75 counties in Arkansas. The mission of the AR State Chamber/AIA is to continually enhance the economic climate in Arkansas.

It is our strong belief that on overbroad designation of Critical Habitat for the rabbitsfoot mussel and Neosho mucket in Arkansas will have a significant negative impact on the overall economy of Arkansas. The direct economic impact on the economic operation of counties, cities, agricultural operations and many business and industrial operations is potentially very

costly. But the indirect economic impact of lost jobs, reduced or eliminated development and avoidance of necessary repairs and improvements greatly increases the negative impact on our state's economy. Additional damage to our economy will then follow in the form of lost tax revenue, increased unemployment claims, damage from unrepaired roads and bridges, increases in transportation costs. As local tax revenues are reduced and public assistance programs increase, tax increases will eventually be triggered that will not only have a direct negative impact on the state's economy but an even broader negative impact by reducing the state's economic competitiveness. Consequently the membership of the Arkansas State Chamber of Commerce and the Associated Industries of Arkansas, Inc. have a vested interest in the outcome this critical decision that will impact the economic vitality of Arkansas for many years to come.

### **3. Arkansas Environmental Federation**

Founded in 1967, the Arkansas Environmental Federation is non-profit association with more than 250 members, the vast majority of them businesses and industries that deal with environmental, safety, and health regulations on a day-to-day basis. The AEF focuses on development of practical, common-sense laws and regulations based on sound science; a teamwork approach to compliance; and waste minimization and pollution prevention. As such, AEF and its members have a strong interest in the proposed designation of critical habitat throughout the State.

### **4. Arkansas Association of Conservation Districts**

The Arkansas Association of Conservation Districts is a membership association, a 501 (c) 3 nonprofit), whose purpose and mission is to assist the 75 conservation districts of the state of Arkansas in their efforts to serve the soil and water conservation needs of the people of

Arkansas . The intent of the Arkansas Legislature when enacting the Conservation Districts Law in 1937, the first in the nation, was to “provide for the control and prevention of soil erosion, for the prevention of floodwater and sediment damages, and for furthering the conservation, development, and utilization of soil and water resources and the disposal of water, acquiring property or interests in land necessary to prevent and control sediment runoff, and . . . assist in the control of nonpoint source pollution, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.”<sup>6</sup> Ark. Code Ann. 14-125-105. This legislation was put into place to address natural resources issues such as drought and flooding, and remains relevant today for landowners, farmers, producers and ranchers dealing with drought, declining groundwater, and sediment and nutrient concerns. Conservation Districts Law established procedures for the formation of seventy five conservation districts which have all the powers and duties set out the Conservation Districts Law<sup>7</sup>. Conservation districts are local governments at work and their specific responsibility is management of our soil and water resources. The idea behind their formation is to keep decision making on soil and water conservation matters at the local level. Each district is governed by a board of five directors who serve without pay. Two directors are appointed by the Arkansas Natural Resources Commission and three are elected by resident landowners.

## **5. Arkansas Forestry Association**

The Arkansas Forestry Association (“AFA”) advocates for the sustainable use and sound stewardship of Arkansas’s forests and related resources to benefit members of the state’s forestry community and all Arkansans today and in the future. AFA strives to be the respected leader and credible information source for all issues related to forestry. AFA and its members work

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<sup>6</sup> Ark. Code Ann. § 14-125-105.

<sup>7</sup> Ark. Code Ann. § 14-125-106(1).

diligently to enhance and protect private property rights and facilitate programs and services that promote profitable forestry, sustainability and stewardship. The association has an interest in this rulemaking because the scope of the proposed critical habitat is overly broad and very little information is known to justify such a designation. If implemented as proposed, the critical habitat designation could have a significant, negative economic impact on the timber and forest products community. As important, delays in the ability of private landowners to implement effective, sustainable forestry practices could have a long-term impact on forest health in Arkansas.

#### **6. Arkansas Farm Bureau**

Arkansas Farm Bureau is an independent, voluntary organization of farm and ranch families united for the purpose of analyzing their problems and formulating action to achieve educational improvement, economic opportunity, social advancement and promote well-being. Arkansas Farm Bureau strives to be the voice of agricultural producers at all levels. The mission of Arkansas Farm Bureau is to advocate the interests of agriculture in the public arena. Arkansas Farm Bureau and its membership have an interest in this rulemaking because the proposed scope of this critical habitat designation is extremely broad and based on outdated science. If this critical habitat proposed is implemented, it will have an extremely detrimental economic impact on all agricultural practices with very little scientific data to support the cause. In addition to the following comments, Arkansas Farm Bureau is submitting a separate set of comments on the proposed rule.<sup>8</sup>

#### **7. Arkansas Timber Producers Association**

The Arkansas Timber Producers Association ("ATPA") is a non-profit trade organization

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<sup>8</sup> To the extent Farm Bureau's comments do not conflict or contradict those contained herein, the Commenters hereby adopt the comments of Arkansas Farm Bureau.

representing the logging and timber producing industry. The ATPA strives to enhance and improve the industry in the state of Arkansas on many fronts, and administers a national award-winning training program. The regulatory obligations imposed by the designation of critical habitat for the rabbitsfoot mussel will have a direct impact on the ATPA and its members.

#### **8. Arkansas Poultry Federation**

The Arkansas Poultry Federation promotes and protects all poultry interests relating to production, distribution, merchandising and consumption of poultry and poultry products; disseminates information relating to the various phases of the poultry industry in order to improve and expand markets; increases efficiency in production and marketing; encourages and supports research in production and marketing of poultry; and encourages and support youth programs in poultry work. The Poultry Federation has offices in Arkansas, Missouri and Oklahoma, and many of its members will be impacted by the proposed designation of critical habitat.

#### **9. Arkansas Independent Producers and Royalty Owners**

The Arkansas Independent Producers and Royalty Owners Association (“AIPRO”) is an association formed and established to represent all segments of Arkansas’ oil and natural gas production community. The exploration, development & production of these vital and important resources are carried out in approximately one-third of our state’s seventy-five counties. AIPRO and its members have an interest in the ongoing efforts to designate critical habitats for Neosho mucklets and rabbitsfoot mussels and are pleased to be an active and engaged part of a larger group of mutually impacted industries, communities and associations concerned and involved in this process.

## **10. Agriculture Council of Arkansas**

The Agricultural Council of Arkansas (“ACA”) is a non-profit trade association which has promoted agriculture and advocated on behalf of Arkansas farmers since 1939, and is committed to telling the story of row crop agriculture in Arkansas, advocating on behalf of the agriculture industry, and improving rural economies. The ACA’s membership is composed of family farms, agriculture related businesses, and others supportive of agriculture in Arkansas. ACA members strive to advance policies that will ensure the continued success of agriculture in our State. As such, ACA and its members have a strong interest in federal regulations which could impact private agricultural activities throughout the State, including the designation of critical habitat set forth in the proposed rule.

## **11. Camp Ozark**

Camp Ozark (the “Camp”) is a privately owned, residential summer camp in Mt. Ida, Arkansas. The Camp is located along the Ouachita River in Montgomery County. Serving 5,600 campers each summer, the Camp is one of the largest employers in the county, with seasonal and year-round staff, and it is a major economic driver for the region. The Camp’s total economic impact on Central Arkansas is estimated to be \$8.2 million annually. Originally founded in 1949, the Camp has operated in its current form for nearly 30 years. Designation of critical habitat for rabbitsfoot mussels will have a direct and adverse impact on operation of the Camp. The Ouachita River is an integral part of the Camp’s programs, allowing students the recreational opportunities to swim, fish, and canoe. While the Service has proposed a portion of the Upper Ouachita River, CHU RF4a, for critical habitat designation, it has not been shown that this stream section harbors populations of rabbitsfoot mussels.<sup>9</sup>

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<sup>9</sup> See Comment II.B.5.

## **12. Arkansas Cattlemen's Association**

The Arkansas Cattlemen's Association represents and supports the cattle industry within the State of Arkansas through producer education and representation on legislative and regulatory issues. The Arkansas Cattlemen's Association is the only voice that speaks solely for the cattlemen of Arkansas. The Arkansas Cattlemen's Association represents a variety of private interests throughout Arkansas that will be directly impacted by the designation of critical habitat for the Neosho mucket and rabbitsfoot mussels.

## **13. Energy and Environmental Alliance of Arkansas**

The Energy & Environmental Alliance of Arkansas ("EEAA") is an ad-hoc collaboration of Arkansas' investor-owned, co-operative, municipal, and independent electric utilities and other energy companies formed to advocate, communicate and encourage energy and environmental policies that promote sound and predictable regulation of Arkansas' utility industry and support an economically viable and environmentally secure future for all Arkansans, including access to reliable and affordable energy resources. EEAA members own and operate facilities throughout Arkansas that will be affected by the designation of critical habitat for the Neosho mucket and rabbitsfoot mussels. As such, EEAA and its members have a strong interest in the designation of critical habitat in Arkansas.

## **II. Comments**

### **A. The Service's Proposed Critical Habitat Unit Designations Fail to Comply with the Requirements of the Endangered Species Act.**

The Service proposes to designate a total of 769.2 river miles in Arkansas as critical habitat for the Neosho mucket and rabbitsfoot mussels in the following 31 counties: Arkansas, Ashley, Benton, Bradley, Clark, Cleburne, Cleveland, Dallas, Drew, Fulton, Grant, Hot Spring, Independence, Izard, Jackson, Lawrence, Little River, Marion, Monroe, Montgomery, Newton,

Ouachita, Randolph, Saline, Searcy, Sevier, Sharp, Van Buren, Washington, White and Woodruff. However, as discussed below, the Service's proposed rule fails to comply with the requirements of the ESA in several key respects.

Upon listing a species as endangered or threatened, the ESA mandates that the Secretary of the Service to promulgate a rulemaking to designate critical habitat for the species "to the maximum extent prudent and determinable."<sup>10</sup>

The ESA defines "critical habitat" for an endangered or threatened species as:

(i) the specific areas within the geographical area occupied by the species, at the time it is listed... on which are found those physical and biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed... upon a determination by the Secretary that such areas are essential for the conservation of the species.<sup>11</sup>

Thus, the ESA creates two separate limits on the Services' ability to designate critical habitats:

- for areas that the record reflects are actually occupied by the species at the time of the listing, the Service must limit critical habitat to only those areas with features that are both (a) essential to the conservation of the species and (b) require special management considerations or protection.
- for areas that the record reflects are not actually occupied by the species at the time of listing, the Service must limit critical habitat to those areas "essential to the conservation of the species."

Based on the record compiled by the Service, many areas have been proposed for critical habitat designation across almost half of the State of Arkansas where there have been no recent occurrences of the target species and/or where there is insufficient information to determine the

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<sup>10</sup> 16 U.S.C. §§ 1533(a)(3); (b)(6)(C)(ii).

<sup>11</sup> 16 U.S.C. § 1532(5)(A).



area is essential to the conservation of the species. Where even one historical occurrence was known from an entire river reach, the proposed rule states that the Service considered the entire reach between the uppermost and lowermost locations as occupied habitat, except lakes and reservoirs.<sup>12</sup> By designating entire stream reaches as critical habitat essential to the conservation of the species, the Service implies that critical habitat which is necessary for propagation of the species occurs throughout the entire stream reach. This approach is not consistent with the requirements for designation of critical habitat under the ESA, and the Service should not finalize the critical habitat unit designations as proposed.

Based on the record in the proposed rule, the Service's proposed rule designating critical habitats for Neosho mucklets and rabbitsfoot mussels fails to meet the ESA's requirements for lawful designation of critical habitat in a variety of respects. In some instances, the Service proposes to designate areas occupied by the target species as a critical habitat absent an appropriate determination that such areas include features that are essential to the conservation of the species and require special management considerations or protection. In other instances, the Service proposes to designate areas unoccupied by the target species as a critical habitat absent an appropriate determination that those areas are essential to the conservation of the species.

Further, the ESA expressly provides that "critical habitat shall *not* include the *entire* geographical area which *can* be occupied by the threatened or endangered species."<sup>13</sup> Indeed, in a House Report accompanying the bill that incorporated this mandate into the requirements for critical habitat, Congress cautioned that "the Secretary should be exceedingly circumspect in the designation of critical habitat outside of the presently occupied area of the species."<sup>14</sup> However, in many instances, the Service's proposed designation of critical habitat for Neosho mucklets or

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<sup>12</sup> 77 Fed. Reg. at 64475.

<sup>13</sup> 16 U.S.C. § 1532(5)(C) (emphasis added).

<sup>14</sup> H.R. Rep. 95-632, at 18 (1978).

rabbitsfoot mussels violates this express statutory limitation on the appropriate scope of a critical habitat unit designation by including large geographical areas that have not been shown to be occupied by the target species at the time of listing and which do not include the physical or biological features which are essential to their recruitment. In several instances detailed below, the Service proposes arbitrary and capricious critical habitat designations that bear little to no relation to the ESA's express statutory requirements.

**1. Where the Service Lacks Sufficient Information to Make Accurate Critical Habitat Designations, the Service Should Not Designate a Critical Habitat.**

The Service's proposed rule arbitrarily extends the areas designated as critical habitat units to include stream segments which have not been demonstrated to harbor populations of Neosho mucklets or rabbitsfoot mussels. Some examples include the following:

- The Black River, CHU RF9, where there are no documented occurrences of rabbitsfoot mussels from the Black River downstream of Black Rock, Arkansas—CHU RF9 nevertheless includes the Black River downstream to the mouth of the Strawberry River.
- The Spring River, CHU RF12, where there are no documented occurrences of rabbitsfoot mussels upstream of Ravenden, Arkansas—nevertheless CHU RF 12 includes the Spring River upstream to Hardy, Arkansas.
- The upper Ouachita River, CHU RF4a, where the only record is from 1988, including single collections at the upstream most boundary and downstream-most boundary of proposed CHU RF4a, with no occurrences in between and no occurrences before or after the collections in 1988—CHU RF4a nevertheless includes the entire reach of the upper Ouachita River.

Many of the proposed critical habitat units include long distance stream segments, large portions of some of which have not been documented to harbor and/or support Neosho mucklets or rabbitsfoot mussels. Portions of the proposed critical habitat units also have conditions, such as hypolimnetic releases and year-round reduced water temperatures, which are not conducive to mussel population development and are not supportive of the target species. Some examples include the following:

- The Spring River, CHU RF12, from Hardy downstream to Ravenden, Arkansas, where a natural ground water source, Mammoth Spring, results in cold waters inhibiting population development.
- The Ouachita River, CHU RF4b, from Interstate 30 downstream to the mouth of the Little Missouri River, where hypolimnetic releases from Remmel Dam and DeGrey Lake Dam, on the Caddo River, prevent population development within this reach of the proposed critical habitat unit.

The ESA specifically provides that for areas not occupied by the species at the time of listing, critical habitat must be limited to those areas that are “essential to the conservation of the species,” and further provides that “critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.” By including large geographical areas that the record does not show to be occupied by rabbitsfoot mussels and which do not include the conditions that are conducive to development and support of the species, many of the proposed critical habitat designations for the rabbitsfoot mussel do not comply with the requirements of the ESA.

Additionally, the Service admits that its record for the proposed rule does not include sufficient information for the Service to determine the critical habitat features which are essential to the conservation of the species. The Service’s own description of the physical or biological features of the critical habitat for the target species states “little is known of the specific habitat requirements for the Neosho mucket and rabbitsfoot”<sup>15</sup> and “the ranges of many water quality parameters that define suitable habitat conditions for the Neosho mucket and rabbitsfoot have not been investigated or are poorly understood.”<sup>16</sup> That so little is known about the specific habitat requirements for the target species is a strong indication that the proposed critical habitat units are overly broad and unnecessary for preservation and propagation of the target species.

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<sup>15</sup>, US Fish and Wildlife Service, 2013. Draft environmental assessment for designation of critical habitat for Neosho Mucket and Rabbitsfoot mussels, 3.

<sup>16</sup> 77 Fed. Reg. at 63474.

**2. The Service Should Limit Critical Habitat Designations to Areas Where Successful Host Species and Rabbitsfoot Mussels Coexist.**

The Service relied on studies in support of the proposed rule which show that the preferred hosts for the rabbitsfoot mussel are the *Cyprinella galacturus*, *Cyprinella venustus*, *Cyprinella spilopterus*, and *Hybopsis amblops*.<sup>17</sup> Distribution of these host species is predominantly limited to waters in the northern portion of Arkansas.<sup>18</sup> The Service acknowledges that the presence and abundance of host fish species is essential to recruitment of Neosho mucklets and rabbitsfoot mussels, but the record does not reflect that the Service knows if there is presence and abundance of those host fish species.<sup>19</sup> Because (a) the presence and abundance of host fish species is essential to recruitment of the target species and (b) the Service does not know those there is a presence and abundance of such hosts, the Service should limit the proposed critical habitat unit designations to those reaches where successful host fish species and rabbitsfoot mussels are known to coexist in the northern portion of the State. Without supporting data in the record for the presence of host fish species for rabbitsfoot mussels, any critical habitat designation by the Service would be arbitrary and capricious.

**3. The Service Should Remove Streams that are Impacted/Controlled by Hypolimnetic or Other Cold Water Releases because Those Streams are Not Preferred Habitats.**

Several of the proposed critical habitats are located within the influence of hypolimnetic (cold water) discharges from reservoirs or spring dominated flows. Some examples include the following:

- The Spring River, CHU RF12, from Hardy downstream to Ravenden, Arkansas, where a

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<sup>17</sup> Yeager, B.L. and R.J. Neves, 1986. Reproductive cycle and fish hosts of the Rabbitsfoot mussel, *Quadrula cylindrical staigillata* (Mollusa:Unionidae) in the upper Tennessee River drainage The American Midland Naturalist 329-340; Fobian, T.B. 2007. Reproductive biology of the Rabbitsfoot mussel (*Quadrula cylindrical* (Say, 1817)) in the upper Arkansas River system, White River system and the Red River system. Unpublished M.S. thesis, Missouri State University, Springfield. 104.

<sup>18</sup> Robinson H.W. and T.M Buchanan, 1988. The Fishes of Arkansas, U of A Press, 536.

<sup>19</sup> 77 Fed. Reg. at 63474.

natural ground water source, Mammoth Spring, results in cold waters inhibiting population development.

- The Ouachita River, CHU RF4b, from Interstate 30 downstream to the mouth of the Little Missouri River, where hypolimnetic releases from Remmel Dam and DeGrey Lake Dam, on the Caddo River, prevent population development within this reach of the proposed critical habitat unit.

The Service failed to consider the extinction gradients downstream of impoundments that contributed the reduction to altered flow regimes and reduced water temperatures, which are not conducive to successful propagation of the target species.<sup>20</sup> That is, the record, and reality, reflects that rabbitsfoot mussels cannot and do not live in cold water. The critical habitats proposed in the stream reaches that are impacted/controlled by hypolimnetic or other cold water releases are not preferred habitats for rabbitsfoot mussels, and the Service should remove those reaches from the proposed critical habitat unit designation.

**4. The Service should Limit Some Designations Because the Target Species Do Not Naturally Occupy Entire Reaches Proposed for Critical Habitat Designation.**

According to the status report and the Service Assessment Form, the Service proposes designation of critical habitats for rabbitsfoot mussels due to its declining status. The Service bases this conclusion on the historical range of the species. The characterization of the species as in a declining status is based in large part on the condition of patchy distributions of individual populations that are highly fragmented and restricted to short reaches.<sup>21</sup> However, the Service often demonstrates such patchy distribution as collections of rabbitsfoot mussels in clustered sites, to the exclusion of all others within the individual critical habitat unit. The record relied on by the Service indicates that rabbitsfoot mussels are habitat specialists (*i.e.*, being very selective

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<sup>20</sup> Vaughn, C.C. and C.M. Taylor. 1999. Impoundments and the decline of freshwater mussels, a case study of an extinction gradient. *Conservation Biology* 13:912-920.

<sup>21</sup> 77 Fed. Reg. at 63455.

in the habitat they select) as opposed to being habitat generalists as proposed in the species status report. This natural habitat selectivity by rabbitsfoot mussels indicates that it occupies habitats that allow it to remain in the same general location throughout its life cycle. Although patches of stable habitat may be important for rabbitsfoot mussels,<sup>22</sup> the patchy distribution of rabbitsfoot mussels is not necessarily an indication of declining population status, but instead actually a function of the species' natural habitat selection. Stream reaches that are not naturally preferred habitat for the target species are not appropriate for proposed critical habitat designation and should be removed from the final rule.

**B. The Service Should Modify Specific Proposed Critical Habitat Units to Comply with the Requirements of the Endangered Species Act.**

**1. Saline River Proposed Critical Habitat Unit RF5**

The Service proposes to designate 179.2 river miles of the Saline River in Ashley, Bradley, Cleveland, Dallas, Drew, Grant, and Saline Counties from Interstate 30 near Benton, in Saline County, to the Snake Creek confluence north of the northern boundary of Felsenthal National Wildlife Refuge northwest of Crossett, Arkansas ("Unit RF5") as critical habitat for rabbitsfoot mussels<sup>23</sup>. According to the proposed rule, **private interests own approximately 92% of the adjacent riparian lands in Unit RF5**. Proposed Unit RF5 includes large areas where no living or dead occurrences of the species has been demonstrated with supporting records in the last twenty years. A rigorous study completed in 2004<sup>24</sup> identified 26 live specimens from 13 of 230 sites surveyed from the Saline River. The furthest upstream specimen identified in that study was located within the 2-mile reach above Highway 15 in Bradley

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<sup>22</sup> See 77 Fed. Reg. at 63472.

<sup>23</sup> See 77 Fed. Reg. at 63507.

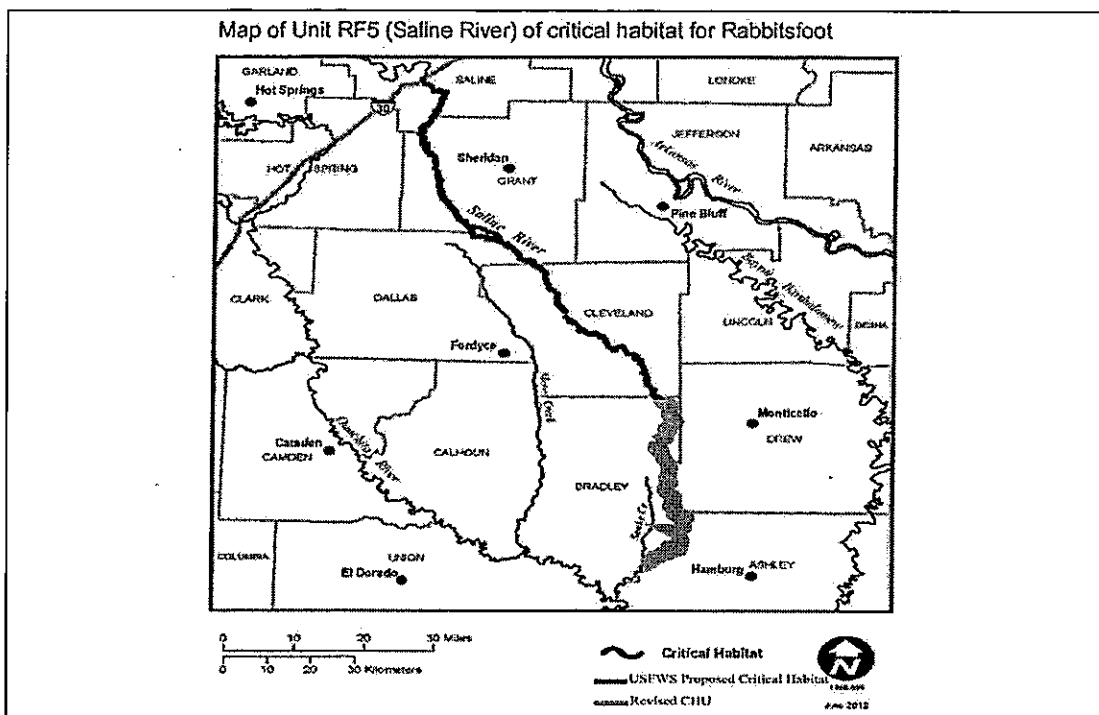
<sup>24</sup> Davidson, C.L. and S.A. Clem.2004. The freshwater mussel resources in a selected segment of the Saline River: location species composition, and status of mussel beds. Addendum 2. Arkansas Hwy 15 to the Felsenthal National Wildlife Refuge. Final Report. Little Rock (AR): The Nature Conservancy and the Arkansas Game and fish Commission, 23.

County, approximately 129 river miles below the uppermost reach of proposed Unit RF5. Other specimens were sporadically located throughout the stream reach at seven locations downstream of Hwy. 15 in Bradley County. A 2005 survey<sup>25</sup> identified 24 live specimens from the same three primary sites where occurrences had previously been reported by the 2004 survey. The Service's proposed designation of critical habitat above that reach where specimens were identified in the 2004 and 2005 surveys appears to be based on the purported occurrence of one live specimen near the Saline/Grant County line in 2006 according to the Arkansas Game and Fish ("AGF") mussel database. However, there is no specific documentation to support the record from the AGF database, and the Service should not rely on just that one instance to designate 179.2 river miles as Unit RF5. As such, the record contains inadequate information to determine that the uppermost reach of Unit RF5 is actually, currently occupied by the target species.

The ESA limits critical habitat to those areas that are "essential to the conservation of the species," and the Service failed to demonstrate that (a) the uppermost reach of Unit RF5 is occupied by rabbitsfoot mussels and (b) that those areas are essential to the conservation of the species. The Service, therefore, should reduce the critical habitat for Unit RF5 to account for the area where the target species has been identified. The Service should reduce Unit RF5 from 179.2 river miles to approximately 50 river miles beginning approximately 2 miles upstream of Arkansas Highway 15, downstream to the Snake Creek confluence north of the northern boundary of Felsenthal National Wildlife Refuge northwest of Crossett, Arkansas, as shown here:

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<sup>25</sup> Harris, J.L., 2006 *Quadrula fragosa* population estimates at 10 sites in the Ouachita River drainage, Arkansas. Final Report. Conway, AR: U.S. Fish and Wildlife Service, Field Office. 14p.+ Appendix I.



## 2. Ouachita River Lower Reach Proposed Critical Habitat Unit RF4b

The Service proposes to designate 98.1 river miles of the Ouachita River in Clark, Hot Spring and Ouachita Counties: From Interstate 30 at Malvern, Hot Spring County, downstream to U.S. Highway 79 at Camden, Arkansas (“Unit RF4b”) as critical habitat for rabbitsfoot mussels.<sup>26</sup> According to the proposed rule, **private interests own 100% of the adjacent riparian lands in Unit RF4b.** The Service’s record reflects that no live specimens of the rabbitsfoot mussel have been collected from the Ouachita River in Clark or Hot Spring Counties. According to the AGF database, the only reported occurrences of the target species in Clark and Hot Spring Counties was in 1983 and were of old, relic shells, not live specimens.<sup>27</sup> This information is inadequate for the Service to determine the entire reach of Unit RF4b is occupied by the target species, and the Service has not determined that designation of these unoccupied areas is essential to the conservation of the species.

<sup>26</sup> See 77 Fed. Reg. at 63506.

<sup>27</sup> Posey, 2013.



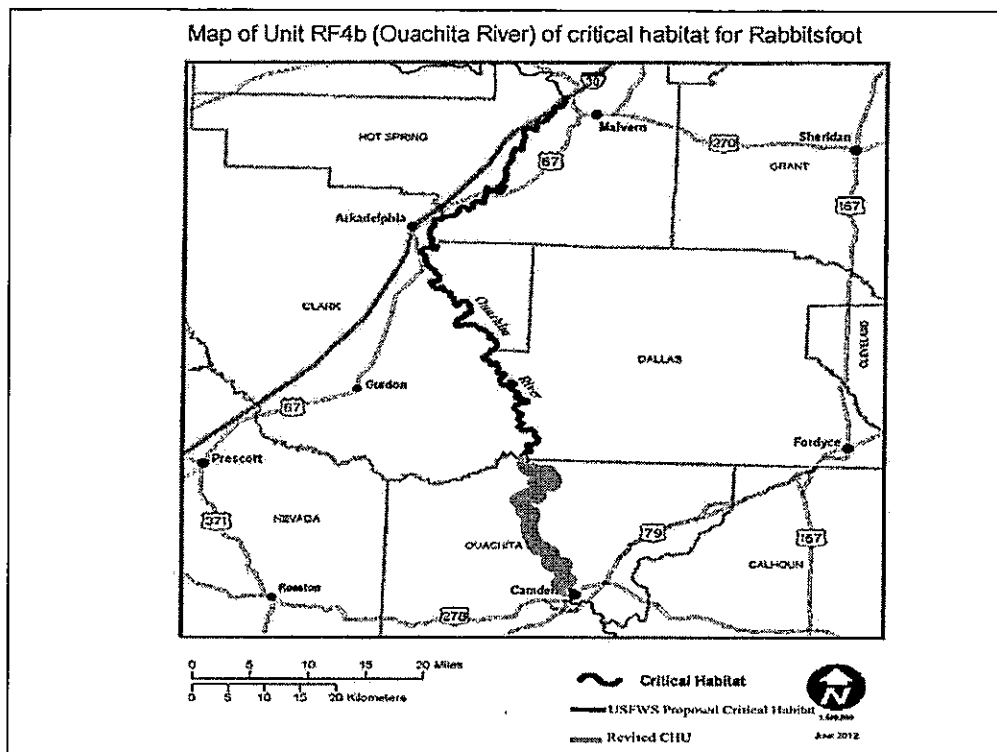
Moreover, because rabbitsfoot mussels are warm water organisms, the cold water hypolimnetic releases from the 3 main stem Ouachita River reservoirs<sup>28</sup> limit the potential development of rabbitsfoot mussel in that area. Research has identified mussel extension gradients downstream of hypolimnetic releases.<sup>29</sup> These extension gradients are attributed to modified hydrology reduced water temperatures that negatively impact the water quality (oxygen depletion) and reproductive efficiency of the individual mussels, and limits the presence of the host fish species. As noted above, the ESA expressly provides that “critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.”<sup>30</sup> By including large geographical areas that have not been shown to be occupied by the rabbitsfoot mussel and which do not include the features essential to the propagation of the species, the proposed designation for Unit RF4b does not comply with this express limitation on the geographical scope of critical habitat unit designations. As such, the Service should modify the critical habitat of this reach to include the Ouachita River from the mouth of the Little Missouri River at Tates Bluff downstream to Camden at U.S. Highway 79, as shown on the following page:

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<sup>28</sup> Coldwater tailwaters are reinforced by releases from Lake DeGrey (Caddo River impoundment) which enter the Ouachita River at Arkadelphia, Arkansas.

<sup>29</sup> Vaughn, C.C. and C.M. Taylor. 1999

<sup>30</sup> 16 U.S.C. § 1532(5)(C).

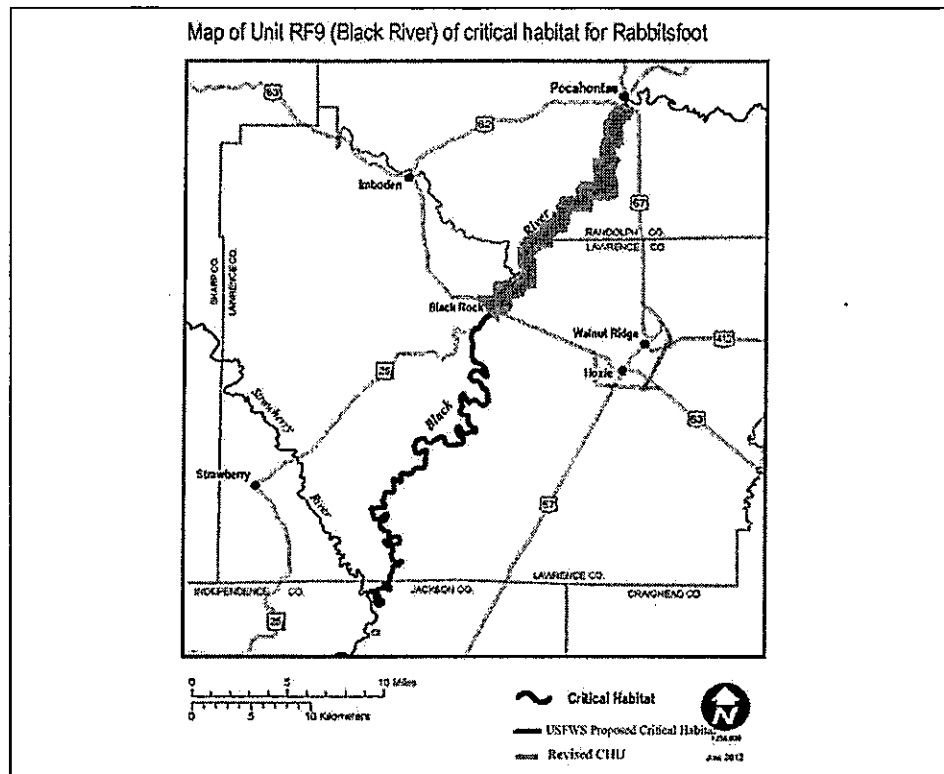


### 3. Black River Proposed Critical Habitat Unit RF9

The Service proposes to designate 57.3 river miles of the Black River in Lawrence and Randolph Counties from U.S. Highway 67 at Pocahontas, Randolph County, downstream to the Strawberry River confluence southeast of Strawberry, Arkansas (“Unit RF9”) as critical habitat for rabbitsfoot mussels.<sup>31</sup> According to the proposed rule, **private interests own approximately 89% of the adjacent riparian lands in Unit RF9.** The record reflects no documentation of any existing populations in the Black River downstream of Black Rock within over 20 years. For areas not occupied by the species at the time of listing, the ESA provides that critical habitat is limited to those areas that are “essential to the conservation of the species,” and that “critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.” The Service has not shown that large areas of Unit RF9 are actually occupied by the rabbitsfoot mussel, nor has it demonstrated that those areas are essential

<sup>31</sup> See 77 Fed. Reg. at 63512.

to the conservation of the species. By including large geographical areas that have not been shown to be actually occupied by the rabbitsfoot mussel and which do not include the features essential to the propagation of the species, the proposed designation for Unit RF9 does not comply with the requirements of the ESA. Accordingly, the Service should modify Unit RF9 to only include the Black River from Pocahontas downstream to Black Rock, as shown here:



#### 4. Spring River Proposed Critical Habitat Unit RF10

The Service proposes to designate 39 river miles of the Spring River in Lawrence, Randolph and Sharp Counties from U.S. Highway 412 at Hardy, Sharp County, downstream to the confluence with the Black River east of Black Rock, Arkansas (“Unit RF10”) as critical habitat for rabbitsfoot mussels.<sup>32</sup> According to the proposed rule, **private interests own approximately 99% of the adjacent riparian lands in Unit RF10.** The record reflects that the uppermost location of documented collection of rabbitsfoot mussels in Unit RF10 from the past

<sup>32</sup> See 77 Fed. Reg. at 63513.

25 years is at Ravenden, Arkansas<sup>33</sup>, approximately 20 river miles downstream of the proposed uppermost reach of Unit RF10. Occurrences of rabbitsfoot mussels have been routinely documented downstream of Ravenden, Arkansas, but not upstream of that point. For areas not actually occupied by the species at the time of listing, the ESA provides that critical habitat is limited to those areas that are “essential to the conservation of the species,” and that “critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.” The Service has not shown that large areas of Unit RF10 are occupied by rabbitsfoot mussels, nor has it demonstrated that those areas are essential to the conservation of the species. By including large geographical areas that have not been shown to be occupied by the rabbitsfoot mussel and which have not been shown to be essential to conservation of the species, the proposed designation for Unit RF10 does not comply with the requirements of the ESA.

Regardless of whether these areas are known to be occupied by rabbitsfoot mussels, Unit RF10 is subject to existing regulatory mechanisms and requirements that are sufficient to preserve the physical and biological features that are essential to the conservation of the target species. Specifically, the subject waters are designated as Extraordinary Resource Waters and Ecologically Sensitive Waterbodies under Arkansas Pollution Control and Ecology Commission Regulation No. 2, which provides for a higher level of protection of water quality from point source and non-point source discharges. The proposed rule is based in part on the Service’s determination that existing regulatory mechanisms are inadequate for protection of the target species.<sup>34</sup> However, the proposed rule fails to acknowledge the protections afforded to these areas under State regulations or consider whether those existing mechanisms are sufficient to

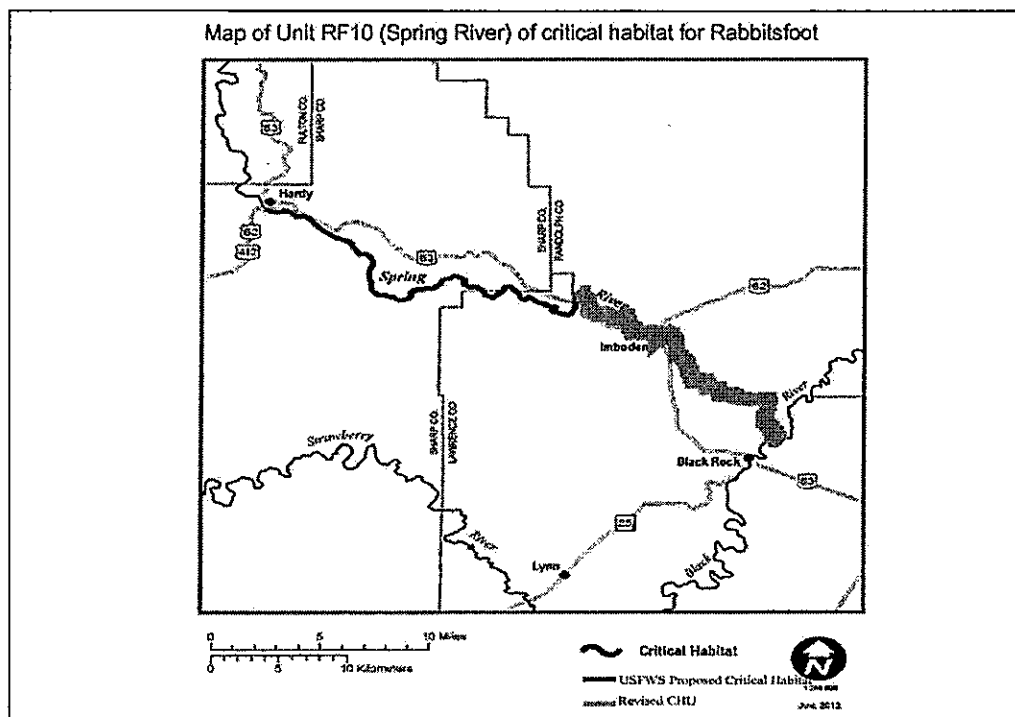
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<sup>33</sup> Posey, W.R. 2013, personal communication. Arkansas Game & Fish Mussel Database.

<sup>34</sup> See 77 Fed. Reg. 63440, 63455, 63463, 63466.

preserve the features essential to the conservation of the target species. By not considering these existing regulatory requirements and mechanisms, the proposed rule does not adequately address the factors required by the ESA.<sup>35</sup>

Moreover, water temperatures in the Spring River upstream of Ravenden, Arkansas are not supportive of propagation of rabbitsfoot mussels. The water temperature of the Spring River is controlled by a natural, spring-fed source, and the reduced water temperature adversely impacts the reproduction and development of warm water mussel species.<sup>36</sup> Areas that are not supportive of propagation of the species are not essential to the conservation of the species, and are not appropriate for designation as critical habitat. For all of these reasons, the Service should modify Unit RF10 to include only the reach of the Spring River from Ravenden, Arkansas, downstream to the confluence with the Black River, as shown here:



<sup>35</sup> See 16 U.S.C. § 1533

<sup>36</sup> Vaughn, C.C. and C.M. Taylor. 1999. Impoundments and the decline of freshwater mussels, a case study of n extinction gradient. *Conservation Biology* 13: 912-920.

## 5. Ouachita River Upper Reach Proposed Critical Habitat Unit RF4a

The Service proposes to designate 13.6 river miles of the Ouachita River in Montgomery County from Arkansas Highway 379 south of Oden, Arkansas, downstream to Arkansas Hwy. 298 east of Pencil Bluff, Arkansas (“Unit RF4a”) as critical habitat for rabbitsfoot mussels.<sup>37</sup> According to the proposed rule, **private interests own approximately 82% of the adjacent riparian lands in Unit RF4a.** Occurrences of rabbitsfoot mussels in this unit are only reported from two collections: one just below Hwy. 379 and one just above Hwy. 298.<sup>38</sup> According to the Arkansas Game and Fish database these collections consisted of one relic shell and three live specimens in 1988. As discussed above, for areas not occupied by the species at the time of listing, the ESA provides that critical habitat is limited to those areas that are “essential to the conservation of the species,” and that “critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.” The Service has not shown that Unit RF4a is occupied by rabbitsfoot mussels, nor has it demonstrated that the unoccupied areas proposed for critical habitat listing are essential to the conservation of the species. By including a large geographical area that has not been shown to be occupied by the rabbitsfoot mussel and which is not essential to conservation of the species, the proposed designation for Unit RF4a does not comply with the requirements of the ESA.

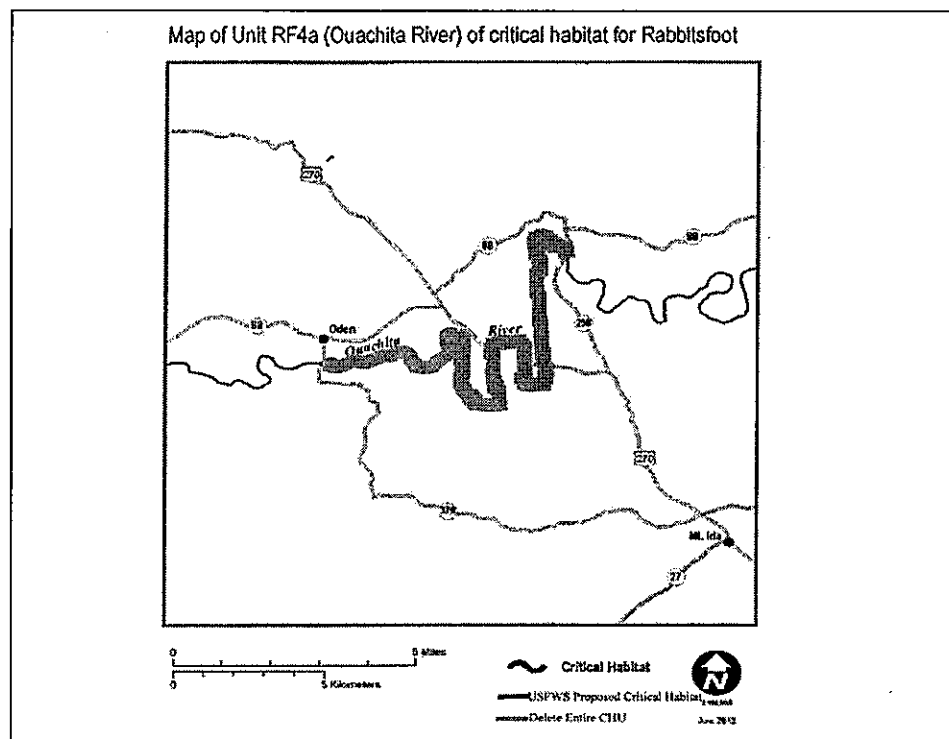
Regardless of whether these areas are known to be occupied by rabbitsfoot mussels, Unit RF4a is subject to existing regulatory mechanisms and requirements that are sufficient to preserve the physical and biological features that are essential to the conservation of the target species. Specifically, the subject waters are designated as Extraordinary Resource Waters and Ecologically Sensitive Waterbodies under Arkansas Pollution Control and Ecology Commission

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<sup>37</sup> See 77 Fed. Reg. at 63505.

<sup>38</sup> Arkansas Game and Fish Mussel Database, Posey, 2013 personal communication.

Regulation No. 2, which provides for a higher level of protection of water quality from point source and non-point source discharges. The proposed rule is based in part on the Service's determination that existing regulatory mechanisms are inadequate for protection of the target species. However, the proposed rule fails to acknowledge the protections afforded to these areas under State regulations or consider whether those existing mechanisms are sufficient to preserve the features essential to the conservation of the target species. By not considering these existing regulatory requirements and mechanisms, the proposed rule does not adequately address the factors required by the ESA.<sup>39</sup> For these reasons, the Service should eliminate Unit RF4a from the final designation of critical habitat for rabbitsfoot mussels, as shown here:



<sup>39</sup> See 16 U.S.C. § 1533

## 6. South Fork Spring River Proposed Critical Habitat Unit RF11

The Service proposes to designate 10.2 river miles of the South Fork Spring River in Fulton County: From Fulton County Road 198 north of Heart, Arkansas, downstream to Arkansas Hwy. 289 at Saddle, Arkansas (“Unit RF11”) as critical habitat for rabbitsfoot mussels.<sup>40</sup> **Private citizens own 100% of the adjacent riparian lands in Unit RF11.** Initial documentation of rabbitsfoot mussels in Unit RF11 in 2002 reported dead relics only, no live specimens. An intensive survey in 2003 failed to document any presence of the rabbitsfoot mussel.<sup>41</sup> The Service’s status report found that the status of the species and its viability is unknown, but listed the current status as “declining” despite that no living mussels have been collected for the proposed critical habitat unit.<sup>42</sup> As discussed above, for areas not occupied by the species at the time of listing, the ESA provides that critical habitat is limited to those areas that are “essential to the conservation of the species,” and that “critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.” The Service has not shown that Unit RF11 is occupied by the rabbitsfoot mussel, nor has it demonstrated that the unoccupied areas proposed for critical habitat designation are essential to the conservation of the species. By including a large geographical area that has not been shown to be occupied by rabbitsfoot mussels and which is not essential to conservation of the species, the proposed designation for Unit RF11 does not comply with the requirements of the ESA. The Service should eliminate Unit RF11 in the final rule based on the lack of documentation of the presence of the species despite multiple surveys within the proposed critical habitat unit, as shown here:

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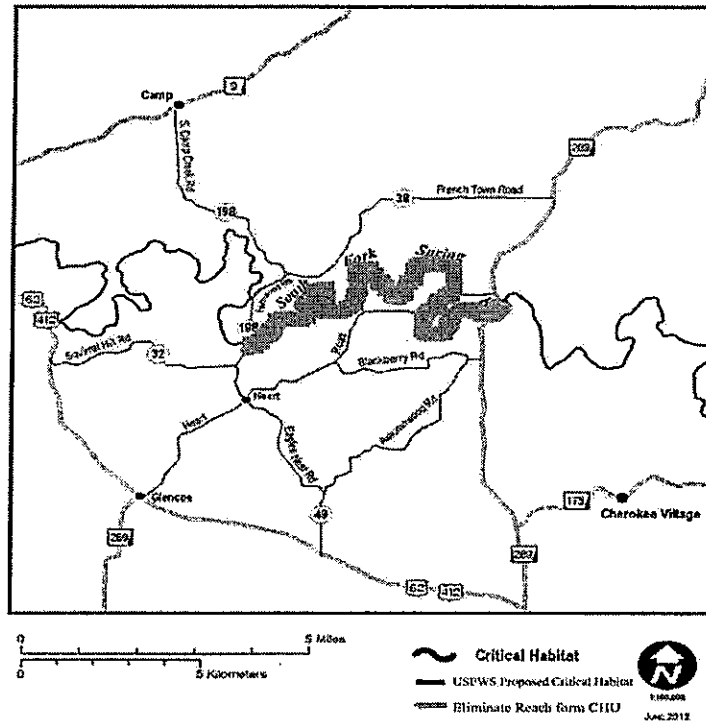
<sup>40</sup> See 77 Fed. Reg. at 63514.

<sup>41</sup> Marten, *et. al* 2009

<sup>42</sup> Butler, R. S., 2005. Status assessment report for the Rabbitsfoot, *Quadrula cylindrical cylindrical*, a freshwater mussel occurring in the Mississippi River and Great Lakes Basins. Unpublished report, U.S. Fish and Wildlife.



Map of Unit RF11 (South Fork Spring River) of critical habitat for Rabbitsfoot



**C. The Service’s Economic Analysis Fails to Account for the Actual Direct and Indirect Economic Impact to Arkansas Counties and Private Businesses.**

**1. The Proposed Rule Fails to Consider the Full Extent of the Economic Impacts Resulting from the Critical Habitat Designation.**

In designating critical habitat, the ESA requires the Service to consider the “economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat.”<sup>43</sup> The Service’s economic analysis supporting the proposed designation of the critical habitat for the Neosho mucket and rabbitsfoot mussels predicts the cost of critical habitat designation at a total of 4.4 million dollars (\$220,000 per year) over a 20 year period for all 10 affected states.<sup>44</sup> These costs are vastly understated because the Service’s economic analysis utilizes an incremental economic impact approach that only estimates the

<sup>43</sup> 16 U.S.C. § 1533(b)(2).

<sup>44</sup> U.S. Fish & Wildlife Service, Draft Economic Analysis of Critical Habitat Designation for Neosho Mucket and Rabbitsfoot (Feb. 6, 2013) (“Economic Analysis”).

likely cost of agencies consulting with each other, but does not consider the actual costs to businesses, state and local governments and other private property owners related to the required consultations.

In addition, although the economic analysis recognizes that “timber, agriculture, and grazing activities have the potential to significantly degrade water quality,<sup>45</sup>” the economic analysis describes an “informal programmatic” consultation between the Arkansas Natural Resource Conservation Service.<sup>46</sup> The result of that informal consultation was that “over 50 practices” “may affect listed species and will require separate consultation between the Service and NRCS.” The economic analysis then stated that two such new conditions would be “(a) a 180 foot buffer along stream, discharge zones, and karst features and (b) use methods to prevent soil erosion and runoff.”<sup>47</sup> The economic analysis then predicts that “consultations with the Service on Farm Bill activities in the Arkansas study area will increase significantly in the future,” which the economic analysis recognizes will increase costs to private landowners, however “because there has not yet been a consultation with a landowner under this new system, *cost data for conservation efforts undertaken as part of Farm Bill program participation are unavailable.*” (emphasis added). When discussing how that fact is accounted for in the projections, the economic analysis refers the reader to Chapter 3.<sup>48</sup> But, when Chapter 3 is read, Chapter 3 refers the reader back to Chapter 4 for details.<sup>49</sup> This circularity means to the extent that future NRCS consultations leads to an increased rate of Section 7 consultation on Farm Bill programs, “[the economic analysis] may underestimate the incremental impacts to these

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<sup>45</sup> Economic Analysis, paragraph 102, p 3-13.

<sup>46</sup> Economic Analysis, paragraph 160, p 4-11.

<sup>47</sup> Economic Analysis, paragraph 160, p 4-11.

<sup>48</sup> Economic Analysis, paragraph 161, p 4-11.

<sup>49</sup> Economic Analysis, paragraph 104, p 3-13.

**activities of critical habitat designation.”<sup>50</sup>** (emphasis added). Because the economic analysis admits that Section 7 consultations will increase in Arkansas and that the Service has no way to predict the incremental costs to private landowners, the economic analysis improperly assumes that in Arkansas, a mainly privately owned, agricultural state, *over the next 20 years*:

- zero formal consultations will occur,
- only 627.3 informal consultations<sup>51</sup> will occur, and
- only 120 technical consultations will occur.

These numbers are grossly underestimated, given that the NRCS and the economic analysis predict that the number of consultations “will increase significantly in the future”<sup>52</sup> and that “cost data for conservations efforts” are “unavailable.” The economic analysis, therefore, by its own terms admits that the projected incremental cost for at least Arkansas’s timber management, agricultural, and grazing uses is entirely made up and not based on any actual economic data.

The Service’s economic analysis also completely fails to recognize the substantial economic impacts associated with obtaining a State or federal permit, project delays to undertaking a capital investment or infrastructure project, or implementing the conservation measures deemed necessary in the areas proposed for designation as critical habitat. As noted above, the vast majority of the riparian ownership of the areas proposed for critical designation is held by private interests. For instance, the Northeast Arkansas Public Water Authority, a small government jurisdiction in Arkansas, just last month had to spend \$2,825 to obtain a “Survey for Mussels” as a condition to obtaining a Section 404 Permit for bank erosion controls to be

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<sup>50</sup> Economic Analysis, paragraph 105, p 3-13.

<sup>51</sup> Economic Analysis, Exhibit 3-6, p 3-14. Those numbers include the total projected consultations for 5 Units that hold land in Arkansas and another state, which is a false assumption, but the Economic Analysis does not provide sufficient granularity to separate those totals.

<sup>52</sup> See Footnote 46.

constructed at its existing water treatment plant.<sup>53</sup> This failure to realistically consider the actual costs to public and private interests associated with the designation of critical habitat renders the Service's economic analysis fundamentally flawed and useless as a practical matter.

**2. Actual Economic Impacts of the Critical Habitat Designation Far Exceed Those Estimated in the Proposed Rule.**

As discussed above, the Service's economic analysis focuses primarily on the costs of inter-agency consultation and does not incorporate the concept of "opportunity costs" associated with the actual restrictions associated with critical habitat unit designations. These latter costs represent a variety of business and economic development projects that are vital to the well-being of the many communities and rural areas that may be affected by restrictions on the use of rivers and their watersheds that harbor the target species. Public and private activities potentially impacted by the proposed critical habitat designation include road and bridge improvements; timber and agricultural uses; recreational uses; water treatment and water quality investments; and mining, oil and gas, and other uses. In an effort to estimate the true costs associated with the proposed critical habitat designations, AAC undertook an independent economic analysis utilizing additional research and data regarding local business conditions and pending economic developments that will be impacted by restrictions on the use of area rivers and their surroundings.<sup>54</sup> Considering even this limited scope of data, the independent economic analysis concluded that the total costs to the affected Arkansas counties would approach 20 million dollars. This is more than five times the cost of \$4.4 million that was contained in the Service's economic analysis for the entire twelve states and all rivers involved, yet the \$20 million figure only represents a small fraction of the present value of the total amount of economic activity that

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<sup>53</sup> Personal communication with Matthew Dunn, Crist Engineers, engineer for Northeast Arkansas Public Water Authority, October 25, 2013.

<sup>54</sup> Economic Analysis of Proposed Designation of Critical Habitat for Rabbitsfoot Mussels and Neosho Mucket in Arkansas (Sept. 2013) (Appendix B hereto).

needs to be considered before the two mussels areas are protected. Before finalizing the critical habitat designations, the Service should undertake a good-faith economic analysis that considers the true economic impact of the critical habitat unit designations, and should afford the affected public an opportunity to review and comment on that analysis.

**3. The Service's Economic Analysis Fails to Consider the 1000s of Small Entities Whose Land Use Does Not Fall Into the Arbitrary Categories.**

The economic analysis only studied arbitrary land use categories and failed to consider the incremental cost to land uses other than those that fell into those categories. For instance, Camp Ozark, a signatory to these Comments, which is a private small business riparian landowner. Camp Ozark is a children's summer camp that has served generations of children over several decades. Its land use does not fall into one of the categories, but its land use will be regulated under the proposed critical habitat. Camp Ozark's land use will be inhibited under the proposed critical habitat designation, but the incremental potentially devastating economic impact on Camp Ozark, and other private landowners like it, has not been considered at all in the economic analysis.

**4. The Service's Economic Analysis Failed to Conduct a Sufficient Analysis under the regulatory Flexibility Act.**

The Regulatory Flexibility Act (RFA) requires that if the proposed rule is likely to have a significant economic impact on a substantial number of small entities, the Service must look for alternatives that accomplish main objectives of the rule while minimizing the impact on small entities. The RFA defines a "small business" by reference to the Small Business Act and defines "small government jurisdiction" as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Of the 31 counties in Arkansas that will be in either the study area or the proposed critical habitat, 20 are small governmental jurisdictions, and there are hundreds of smaller governmental entities, such as the

Northeast Arkansas Public Water Authority mentioned above, that will be impacted by the proposed designation. The purported RFA analysis then admits that “potential financial impacts to local government agencies and private landowners *are not estimated* as a proportion of annual revenue due to a lack of data.”<sup>55</sup> Therefore, the economic analysis admits that it does not contain an actual consideration of whether or not the proposed critical habitat would have a substantial impact on local government jurisdictions, which comprise over half of the proposed study area and critical habitat designation area, many of which are very small local entities like the Northeast Arkansas Public Water Authority. That flaw alone renders the RFA analysis incomplete, and the Service should not rely on it in certifying that the proposed final rule will not have a significant impact on a substantial number of small governmental jurisdictions.

Additionally, for private land used for timber management, agricultural, and grazing uses, the purported RFA analysis relies on the flawed assumptions in Chapter 3 of the economic analysis to conclude that there will be no significant impact to small entities operating in the timber management, agricultural, and grazing industries in Arkansas<sup>56</sup> when the economic analysis clearly states that the Service had no data with which to predict future incremental costs that will be borne by private landowners in consultations with the Service under the as of yet undefined and unimplemented “new program” between the Service and NRCS related to landowners’ participation in the farm Program. The Service would be acting arbitrarily and not meeting the requirements of the RFA if it relied on data that it knows to be incomplete and inaccurate to find that there would be no significant impact on a substantial number of small entities engaged in timber management, agricultural, and grazing operations in the proposed study area and critical habitat areas in Arkansas.

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<sup>55</sup> Economic Analysis, App A, paragraph 217, p A-4 (emphasis added).

<sup>56</sup> Economic Analysis, App A, paragraph 222, p A-10.

The economic analysis fails to conduct such an investigation, and, the Service should not adopt the draft economic analysis as the final economic analysis supporting the proposed rule. The Service should either instruct Industrial Economics to undertake a more thorough and accurate study of the potential incremental economic impact of the proposed rule on small entities or modify the proposed rule to not govern the actions of small entities in the proposed critical habitats.

### **III. Conclusion**

The Association of Arkansas Counties and the undersigned Commenters sincerely appreciate the Service's consideration of the comments and additional information provided herein.

Respectfully submitted,

Association of Arkansas Counties  
*(signature pages follow)*

*Association of Arkansas Counties*



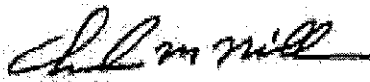
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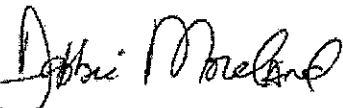
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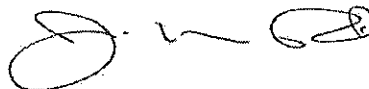
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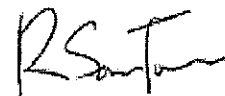
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Kirk H. Ross  
Director





**Arkansas Association of Counties**  
**Review of Proposed Critical Habitat**  
**Designation for Rabbitsfoot Mussel**  
**(*Quadrula cylindrical cylindrica*) and Neosho**  
**Mucket (*Lampsilis rafinesqueana*)**

---

**October 17, 2013**

**Review of Proposed Critical Habitat Designation for Rabbitsfoot  
Mussel (*Quadrula cylindrical cylindrical*) and Neosho Mucket  
(*Lampsilis rafinesqueana*)**

---

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**October 17, 2013**

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## EXECUTIVE SUMMARY

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The US fish and Wildlife Service (Service) proposed critical habitat for the Rabbitsfoot Mussel (*Quadrula cylindrical cylindrical*) and the Neosho Mucket (*Lampsilis rafinesqueana*) on October 16, 2012. The comment period for the proposed action was extended and reopened for an additional 60 day comment period to end October 28, 2013. The proposed critical habitat for the Rabbitsfoot Mussel included 1,654 river miles across 15 states. The proposed action designating critical habitat for these two mussel species proposed 13 habitat units across Arkansas covering approximately 800 river miles (48% of the total proposed).

The streams included in the critical habitat units directly impacts 30 counties (28 Rabbitsfoot Mussel and 2 Neosho Mucket). Should all the proposed critical habitat units be adopted as proposed, the targeted watersheds cover approximately 42% of the geographical area of Arkansas.

This review provides an overview of the proposed action and provides recommendations for modifications to the proposed critical habitat units (CHU).

Critical Habitat is defined in Section 3 of the ESA as:

- 1) The specific areas within the geographical area occupied by the species, **at the time it is listed** (emphasis added) in accordance with the ACT, on which are found those physical or biological features:
  - a) **ESSENTIAL** (emphasis added) to the conservation of the species; and
  - b) Which may require special management considerations or protection.
- 2) Specific areas outside the geographical area **occupied by the specie at the time it is listed** (emphasis added), upon a determination that such areas are **ESSENTIAL** (emphasis added) for the conservation of the species.

In the determination of critical habitat units, the Service chose to extend the definition of critical habitat as provided in the proposed listing (77 FR63475) the Service provides that:

"Therefore, where one occurrence record was known from a river reach, we considered the entire river reach between the uppermost and lowermost locations as occupied habitat except lakes and reservoirs."

These definitions and their application in the determination of the proposed CHU raised three primary considerations that are not supported including:

- The proposed CHU includes long distance stream segments, large portions of some of which have not been documented to harbor and/ or support the target species,
- Portions of selected CHU demonstrate conditions (e.g. hypolimnetic releases and year round reduced water temperatures) that are not conducive to mussel population development and are not supportive of the target species considered in this proposal, and

- That the entire river reach provides critical habitat **ESSENTIAL** to the conservation of the individual species implies that critical habitat identified as necessary for Rabbitsfoot Mussel (both substrate and flow refugia) occurs in the entire proposed reach.

In describing the required habitat types, the proposed critical habitat descriptions provide that:

"Although little is known of the specific habitat requirements for the Neosho Mucket and the Rabbitsfoot Mussel it can be determined that they require flowing water, geomorphically stable river channels and banks with suitable substrate, adequate food, the presence and abundance of fish hosts, adequate water and sediment quality, and few or no competitive or predaceous invasive (nonnative) species" (page 3 of Draft Environmental Assessment).

**Comment:** If little is known about the specific habitat requirements for these species, critical habitat designations may be too broad. There is simply not enough information to make an accurate critical habitat designation.

Preferred hosts of the Rabbitsfoot Mussel based on Yeager and Neves (1986) and Fobian (2007) are *Cyprinella galacturus*, *Cyprinella venustus*, *Cyprinella spilopterus*, and *Hybopsis amblops*.

**Comment:** As illustrated in the *Fishes of Arkansas* (Robinson and Buchanan, 1988) species distribution of these fish species is predominately relegated to the northern portion of the state. While populations of the Rabbitsfoot Mussel exist in the Saline, Ouachita, and Little Rivers, it seems most appropriate to designate critical habitat in areas where successful host species and the Rabbitsfoot Mussel coexist in the northern portions of Arkansas.

Several of the proposed critical habitats are located within the influence of hypolimnetic (cold water) discharges from reservoirs or spring dominated flows. Vaughn and Taylor (1999) reported extinction gradients downstream of impoundments, contributing this reduction of mussels to altered flow regimes and reduced water temperatures.

**Comment:** The critical habitats proposed in streams that are impacted/controlled by hypolimnetic or other cold water releases are not preferred habitats for the Rabbitsfoot Mussel and should be removed for the proposed critical habitat units.

The Service is proposing to name 12 CHU for the Rabbitsfoot Mussel in Arkansas (Figure 1). Of the total 1,654 river miles proposed as critical habitat for the Rabbitsfoot, approximately 48.3 percent are located in Arkansas. Should **ALL** of the proposed CHU be adopted as proposed, the watersheds of those stream segments would cover approximately 42% of the land area of Arkansas.

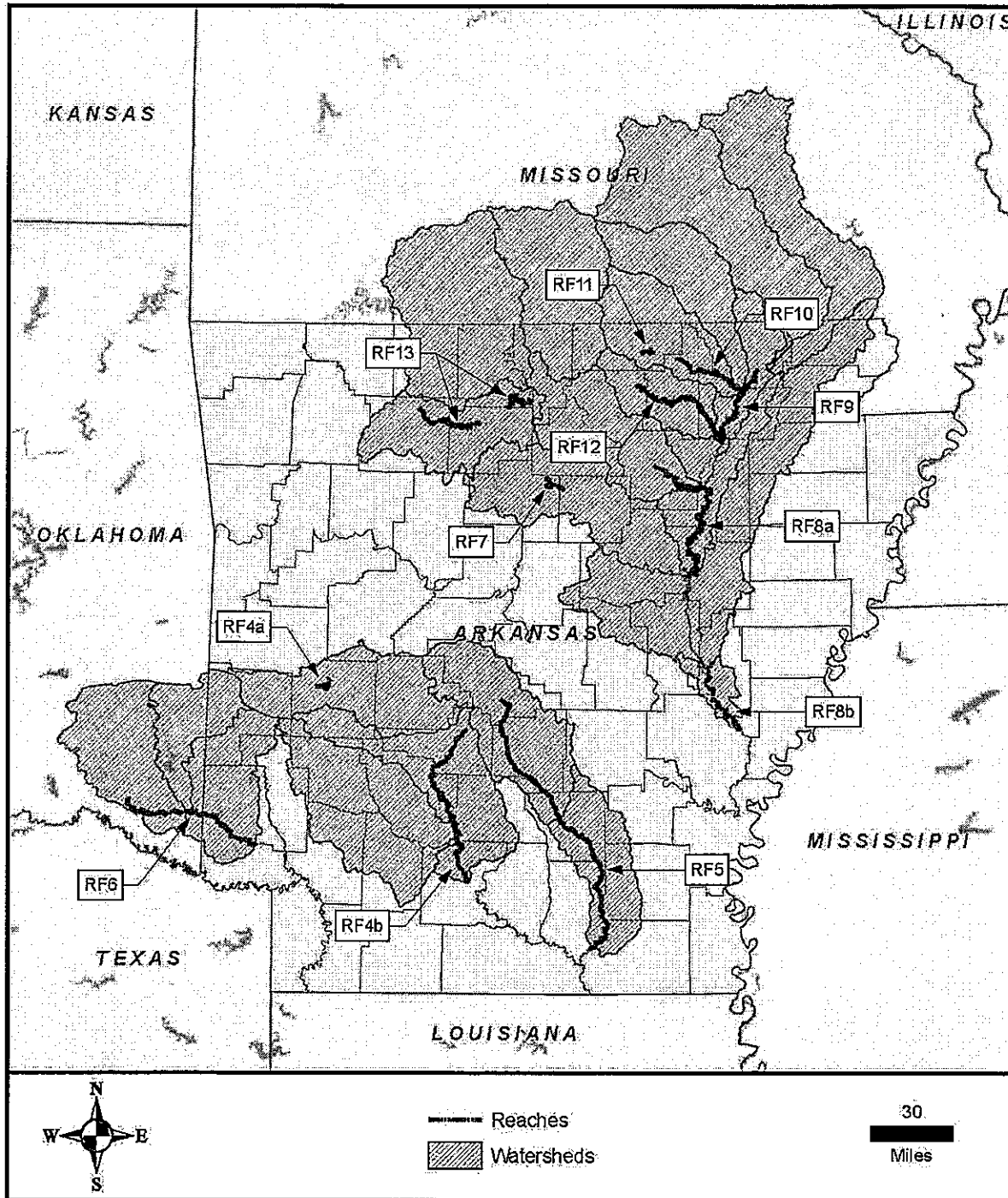


Figure 1. Proposed critical habitat units in Arkansas, also depicting included watersheds.

The Rabbitsfoot Mussel is fairly widespread in Arkansas streams. Several “robust” populations are found throughout Arkansas: the White River, Black River, Spring River, Ouachita River, Saline River, and Little River. According to Harris et al. (2009), there are large populations in the Spring and Black Rivers.

After review of the basis for the proposed designation of the 12 CHU, comments are provided to modify six of the 12 proposed CHU including:

• Saline River	Proposed CHU RF5	Reach length	179.2 river miles
• Ouachita River	Proposed CHU RF4b	Reach length	98.1 river miles
• Black River	Proposed CHU RF9	Reach length	57.2 river miles
• Spring River	Proposed CHU RF10	Reach length	39 river miles
• Ouachita River	Proposed CHU RF4a	Reach length	13.6 river miles
• SF Spring River	Proposed CHU RF11	Reach length	10.2 river miles

There are no comments related to the other 6 CHU.

In addition to the 12 proposed CHU, the Service considered other potential streams as CHU but were not proposed as critical habitat for Rabbitsfoot Mussel. These included:

- Illinois River,
- Current River,
- Cassatot River,
- Little Missouri River, and
- War Eagle Creek.

One of the major threats to the conservation of the species discussed in the proposed critical habitat is the inadequacy of existing regulatory mechanisms. Several of the proposed CHU have increased protection due to specific use designation in Regulation No. 2, the Arkansas Water Quality Standards (APCEC, 2007). In addition, there are several dischargers into the proposed CHU that are regulated through the National Pollutant Discharge Elimination System (NPDES) permit system as administered by ADEQ. There are 29 direct discharges and 91 indirect dischargers into the proposed CHU. These discharge permits will be subjected to an increased level of regulation, including potential need for formal and/or informal consultation with the Service to determine the potential for effects on the listed species and the critical habitats.

**Comment: While the draft economic assessment (DEA) takes into account potential costs to small businesses for consulting and permitting purposes, the proposed critical habitat designation does not take into account the full cost of project delays due to permit issues and modifications or the cost for implementing conservation measures determined necessary by the Service.**



## 1.0 INTRODUCTION

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The Endangered Species Act (ESA) defines the threatened and endangered species as follows:

- Threatened species - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range; and
- Endangered species - Any species which is in danger of extinction throughout all or a significant portion of its range.

As stipulated in the ESA, the U.S. Fish and Wildlife Service (Service) is required to identify Critical Habitat required to support the designated species. Critical Habitat is defined in Section 3 of the ESA as:

- 1) The specific areas within the geographical area occupied by the species, **at the time it is listed** (emphasis added) in accordance with the ACT, on which are found those physical or biological features:
  - a) **ESSENTIAL** (emphasis added) to the conservation of the species; and
  - b) Which may require special management considerations or protection.
- 2) Specific areas outside the geographical area **occupied by the specie at the time it is listed** (emphasis added), upon a determination that such areas are **ESSENTIAL** (emphasis added) for the conservation of the species.

In addition, the Service stipulates as provided in the proposed action (77 FR63474), "In summary, we find that the areas we are proposing as critical habitat that are occupied at the time of listing contain the features **ESSENTIAL** (emphasis added) to the conservation of the Neosho Mucket and the Rabbitsfoot Mussel.

## 2.0 BACKGROUND

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The Service Species Assessment and Listing Priority Assignment Form are used by the Service to evaluate the species being proposed for action under the Endangered Species Act (ESA). The form for the Rabbitsfoot Mussel was approved on June 4, 2008 by the Regional Director and concurred by the Acting Director on October 29, 2009. This document provides a summary of information related to the distribution, biology, threats to the species, rational for proposed listing and a ultimately a "listing priority" number.

The Rabbitsfoot Mussel was first identified as candidate in November 15, 1994 (59 FR58982). At which time the species was assigned a category 2 until 1996 (61 FR7596) when the listing was discontinued due to lack of information. The Rabbitsfoot Mussel was added to the candidate list again in the November 9, 2009 (74FR57804) with a Listing Priority Number (LPN) of 9 (out of 12), indicating threats determined to be moderate magnitude but imminent overall. The notice dated November 10, 2010 (75FR69222) again listed the Rabbitsfoot Mussel as candidate species and again with a LPN of 9. Even with the additional information developed after Butler (2006) from 2006 -2010, there was no change in the priority ranking of 9 out of 12, with a LPN of 1 being the most urgent listing priority.

According to the Service Assignment form an LPN of 9 indicates threats of a moderate magnitude; some of the threats are non-imminent, most are ongoing, and the threats are imminent overall. An LPN of 9 is the lowest in the imminent category. A LPN of 10 would indicate non-imminent condition. This listing is rather subjective and has resulted due to the "reduction in range and most of its extant populations are declining and /or isolated" (77 FR63476). This assessment was based largely on Butler (2005), the status report for the Rabbitsfoot Mussel. This status report ultimately categorized the condition of populations throughout the multistate range of the Rabbitsfoot Mussel often as an opinion comparing limited qualitative data to determine population status. Butler (2005) categorized extant populations based on "qualitative information" comparing recent survey data, post 2000, to largely qualitative descriptors provided in the historical documentation.

The Neosho Mucket was first identified as candidate species on May 22, 1984 (49FR21664) status 2 category until 1996. The designation was discontinued due to lack of information. It was relisted as a candidate in October 30, 2001 (66FR54808). The 2001 listing priority assigned was 5 (out of 12). Listing priority was reassessed in 2010 and changed from 5 to 2, indicating threats to the conservation of the species were imminent and high in magnitude.

### **3.0 OCCUPIED HABITAT**

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In the determination of critical habitat units, the Service chose to extend the definition of critical habitat to include stream segments which had not been demonstrated to harbor populations of the target species (Rabbitsfoot Mussel and Neosho Mucket). As provided in the proposed listing (77 FR63475) the Service provides that:

"Therefore, where one occurrence record was known from a river reach, we considered the entire river reach between the uppermost and lowermost locations as occupied habitat except lakes and reservoirs."

These definitions and their application in the determination of the proposed Critical Habitat Units (CHU) raised three primary considerations that are not supported including:

- The proposed CHU includes long distance stream segments, large portions of some of which have not been documented to harbor and/or support the target species,
- Portions of selected CHU demonstrate conditions (e.g. hypolimnetic releases and year round reduced water temperatures) that are not conducive to mussel population development and are not supportive of the target species considered in this proposal, and
- That the entire river reach provides critical habitat **ESSENTIAL** to the conservation of the individual species implies that critical habitat identified as necessary for Rabbitsfoot Mussel (both substrate and flow refugia) occurs in the entire proposed reach.

## 4.0 PHYSICAL OR BIOLOGICAL FEATURES OF CRITICAL HABITAT FOR THE RABBITSFOOT MUSSEL

---

In describing the required habitat types, the proposed critical habitat descriptions provide that:

"Although little is known of the specific habitat requirements for the Neosho Mucket and the Rabbitsfoot Mussel it can be determined that they require flowing water, geomorphically stable river channels and banks with suitable substrate, adequate food, the presence and abundance of fish hosts, adequate water and sediment quality, and few or no competitive or predaceous invasive (nonnative) species" (page 3 of Draft Environmental Assessment).

**Comment:** If little is known about the specific habitat requirements for these species, critical habitat designations may be too broad. There is simply not enough information to make an accurate critical habitat designation.

Preferred hosts of the Rabbitsfoot Mussel based on Yeager and Neves (1986) and Fobian (2007) are *Cyprinella galacturus*, *Cyprinella venustus*, *Cyprinella spilopterus*, and *Hybopsis amblops*.

**Comment:** As illustrated in the Fishes of Arkansas (Robinson and Buchanan, 1988) species distribution of these fish species is predominately relegated to the northern portion of the state. While populations of the Rabbitsfoot Mussel exist in the Saline, Ouachita, and Little Rivers, it seems most appropriate to designate critical habitat in areas where successful host species and the Rabbitsfoot Mussel coexist in the northern portions of Arkansas.

Several of the proposed critical habitats are located within the influence of hypolimnetic (cold water) discharges from reservoirs or spring dominated flows. Vaughn and Taylor (1999) reported extinction gradients downstream of impoundments, contributing this reduction of mussels to altered flow regimes and reduced water temperatures.

**Comment:** The critical habitats proposed in streams that are impacted/controlled by hypolimnetic or other cold water releases are not preferred habitats for the Rabbitsfoot Mussel and should be removed for the proposed critical habitat units.

Additionally, Butler (2005) often used the condition of patchy distribution of individual populations as a reason to characterize the status as declining. This apparent patchy distribution does occur and is routinely reported in survey results, often demonstrated as collections of the Rabbitsfoot Mussel in clustered sites and excluded from long reaches within the proposed CHU. The "patchy distribution" reflects the natural selection by the Rabbitsfoot Mussel to selectively occupy habitats that allow "rabbitsfoot to remain in the same general location throughout their entire lives. These patches of stable habitat may be highly important for the rabbitsfoot since it is typically does not burrow, making it more susceptible to displacement into unsuitable habitat" (77FR63472). Therefore, the patchy distribution is not an indication of population status but actually a function of habitat selection by the Rabbitsfoot.

Lastly, Butler (2005), and the public notice of proposed critical habitat relied extensively and quoted frequently personal opinions in the assessment of current population conditions which cannot be substantiated.

According to the status report (Butler, 2005) and the Service Assessment Form, the critical habitats for the Rabbitsfoot Mussel are being proposed due to the following conditions:

- Extirpated from 64% of historical range,
- Only 51 of 140 historical populations remain,
- Only 11 populations characterized as viable,
- 23 populations at risk of extirpation,
- 17 populations with limited recruitment,
- extirpated from 2 states of its historical range,
- 1,654 river miles proposed as critical habitat,
- Proposed listing in 15 states, and
- Present in 28 counties in Arkansas.

## **5.0 CRITICAL HABITAT UNITS (CHU) PROPOSED FOR ARKANSAS (LISTED FROM LONGEST TO SHORTEST)**

---

The Service is proposing to name 12 CHU for the Rabbitsfoot Mussel in Arkansas (Figure 1). Of the total 1,654 river miles proposed as critical habitat for the Rabbitsfoot, approximately 48.3 percent are located in Arkansas. Should **ALL** of the proposed CHU be adopted as proposed, the watersheds of those stream segments would cover approximately 42% of the land area of Arkansas.

The Rabbitsfoot Mussel is fairly widespread in Arkansas streams. Several “robust” populations are found throughout Arkansas: the White River, Black River, Spring River, Ouachita River, Saline River, and Little River. According to Harris et al. (2009), there are large populations in the Spring and Black rivers.

The following section provides a summary of each proposed CHU. The summary provides percent ownership of riparian habitats, an overview of the stated basis for the designation as proposed critical habitat, and comments justifying any proposed modifications to the individual CHU, where appropriate.

## 5.1 Saline River Proposed CHU RF5 Reach Length - 179.2 River Miles

- Proposed CHU includes Saline River from 130 downstream to just above Felsenthal National Wildlife refuge;
- 92 percent of riparian areas privately owned;
- Call, 1895 considered the Rabbitsfoot as "abundant" but relative to what (a qualitative measure);
- 1993 2 dead at Saline/Grant County line: no other reported occurrence: no indication of sample effort (AGF Mussel database);
- 2002-2004 26 live from 13 of 230 sites;
  - Upstream most in 2003-2004 survey within 2 mile reach above Hwy 15 (Bradley County).
  - Sporadic throughout rest of proposed critical habitat reach downstream at seven locations.
- 2005 Harris (2007) identified 24 live from three primary sites where previously reported by Posey and Clem (2004), also confirmed recruitment;
- 2006 1 live - Saline/Grant County line: (AGF Mussel database), no documentation supporting AGF records: no specific location identified and no indication of sample effort; and
- Butler (2009) categorized Saline River population as small and declining, despite evidence of recent recruitment as provided by Harris (2007).

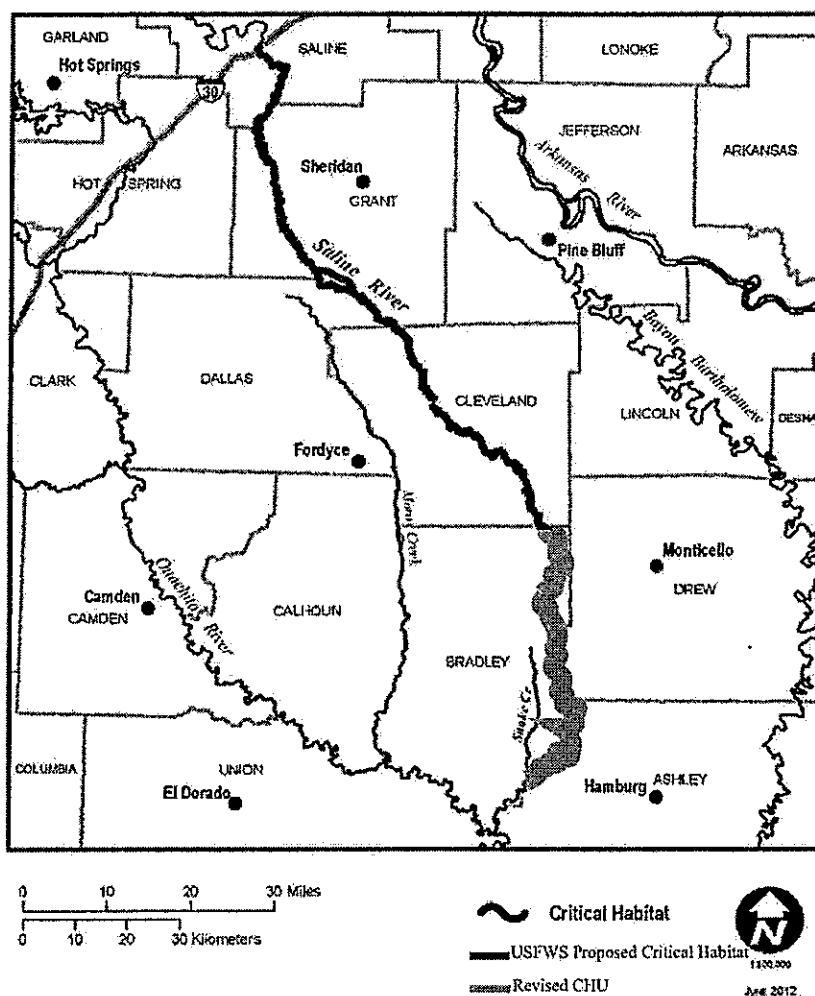
**Comment:** Critical habitat should be reduced to account for the area where populations identified with supporting documentation, not individuals. Results in reduction of the Saline River critical habitat unit modified from 179.2 river miles to approximately 50 river miles, from 2 miles upstream AR Hwy 15 (now US Hwy 278), downstream to Snake Creek (Figure 2).

## 5.2 White River - Proposed CHU RF8b Reach Length - 117 River Miles

- Reach includes White River from Batesville dam downstream to mouth of Little Red River;
- 94 % of riparian habitat privately owned;
- "Historical abundance data are scarce" (Butler, 2005);
- Population appears to be a "stable" component of the White River in this section (Butler, 2005);
- NOTE: Absent from White River downstream of main stem reservoirs and downstream of mouth of Little Red River, hypolimnetic (cold) tail water releases negatively impact species development. (Butler, 2005); and
- Records sporadic but distributed throughout the proposed CHU.

**Comment:** No basis to request reduction in critical habitat unit.

Map of Unit RF5 (Saline River) of critical habitat for Rabbitsfoot



(11) Unit RF5: Saline River- Ashley, Bradley, Cleveland, Dallas, Drew, Grant, and Saline Counties, Arkansas.

(i) Unit RF5 includes 288.4 rkm (179.2 rmi) of the Saline River from Interstate

30 near Benton, Saline County, Arkansas, downstream to Snake Creek confluence north of Felsenthal National Wildlife Refuge's northern border

located northwest of Crossett, Ashley and Bradley Counties, Arkansas.

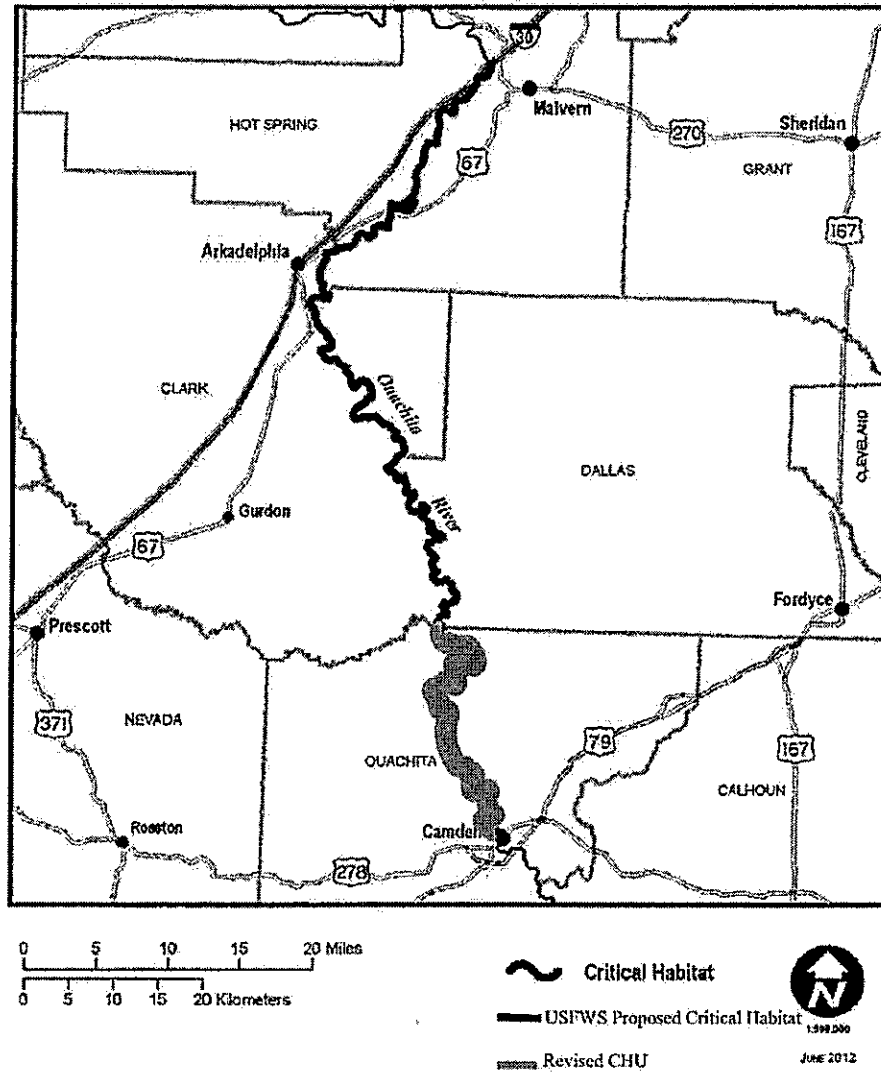
(ii) Note: Map of Unit RF5 (Saline River) of critical habitat for rabbitsfoot above.

### 5.3 Ouachita River Lower Reach - Proposed CHU RF4b - Reach Length 98.1 River Miles

- Proposed CHU reach includes Ouachita River from Malvern (I30) downstream to just upstream of Camden;
- 100 % of riparian habitat privately owned;
- 1992-2005: Although exact location not confirmed, 38 individuals reported from 8 sites in Clark, Hot Spring and Ouachita counties, none collected from Ouachita River in Clark or Hot springs counties only Ouachita County;
- Only old relic shells reported from Hot Springs and Clark County. No live specimen referenced in AGF mussel database;
- Cold water releases from USCOE impoundments on Ouachita River and Caddo River limits the habitat potential of the Ouachita River above the mouth of the Little Missouri River;
- Populations in the Ouachita River likely limited due to cold tail water releases upstream mouth of Little Missouri River;
- Estimated population (1,456) reported from a 10 mile reach (Posey, 1997), recorded from lower portion of Ouachita River just upstream of Camden; and
- Butler (2005) --- characterized population as small but stable population, based on OLD qualitative narrative (Wheeler, 1918) "...in nearly every mussel bed in the river..." and Call, 1895 as "...abundant..." (pre impoundment conditions).

**COMMENT:** The hypolimnetic (cold water) releases from the 3 mainstem Ouachita River reservoirs, (that is reinforced by releases from Caddo River impoundment entering Ouachita River at Arkadelphia) limits the development of the Rabbitsfoot Mussel and does not represent critical habitat for the Rabbitsfoot Mussel. Therefore the critical habitat of this reach should be modified to include the Ouachita River from the mouth of Little Missouri River at Bates Bluff (33°48'17.88"N, 92°53'47.58"W) downstream to Camden at US Hwy 79 crossing. This represents the reach of the Ouachita River where populations of the Rabbitsfoot Mussel have been quantified (Figure 3).

Map of Unit RF4b (Ouachita River) of critical habitat for Rabbitsfoot



(10) Unit RF4b: Ouachita River-Clark, Hot Spring, and Ouachita Counties, Arkansas.

(i) Unit RF4b includes 1573.9 rkm (98.1 mi) of the Ouachita River from

Interstate 30 at Malvern, Hot Spring County, Arkansas, downstream to U.S. Highway 79 at Camden, Ouachita County, Arkansas.

(ii) Note: Map of Unit RF4b (Ouachita River) of critical habitat for rabbitsfoot above.

Figure 3. Modification of Service proposed CHU to section from mouth of Little Missouri River downstream to Camden, AR. See Section 5.3 for justification.



## 5.4 Strawberry River - Proposed CHU RF13 - 76.9 River Miles

- Proposed CHU Reach includes Strawberry River from Ar. Hwy 56 to confluence with Black River;
- 100 % of riparian habitat privately owned ;
- Designated as Extraordinary Resource Waters and Natural and Scenic waterway and Ecologically Sensitive Waterbody by ADEQ, providing for an already high level of protection from water quality and discharge perspective;
- Butler (2005) categorized population as sizable;
- Harris et.al.(2007) results of survey reported Rabbitsfoot from 20 sites, distributed throughout the proposed CHU; and
- Strawberry River population considered sizable with documented recruitment.

**COMMENT:** Documented throughout proposed CHU. Given the current designated uses as an ERW, NSW and ESW would not recommend modification to the designation of this proposed CHU.

## 5.5 Buffalo River - Proposed CHU RF13 - 70.6 River Miles

- Reach includes two sections of Buffalo River both downstream of AR HWY 7;
- 100 % of riparian habitat federally owned (National Park Service Buffalo National River);
- Designated as Extraordinary Resource Waters and Natural and Scenic Waterway by ADEQ, high level of protection already exists;
- Collected in recent history only between Hwy 7 and Hwy 65, the upper section included in the proposed CHU;
- Butler (2005) categorized as small, declining and very susceptible to extirpation based on Davidson,2011 pers comm; and
- Only very old collections from downstream section of proposed CHU, no recent information to document continued extant presence in the lower proposed section, Hwy 14 downstream to mouth with White River.

**COMMENT:** Due to public ownership of 100% of riparian habitat, and the status as ERW and NSW, would not recommend modification to the designation of this proposed CHU.

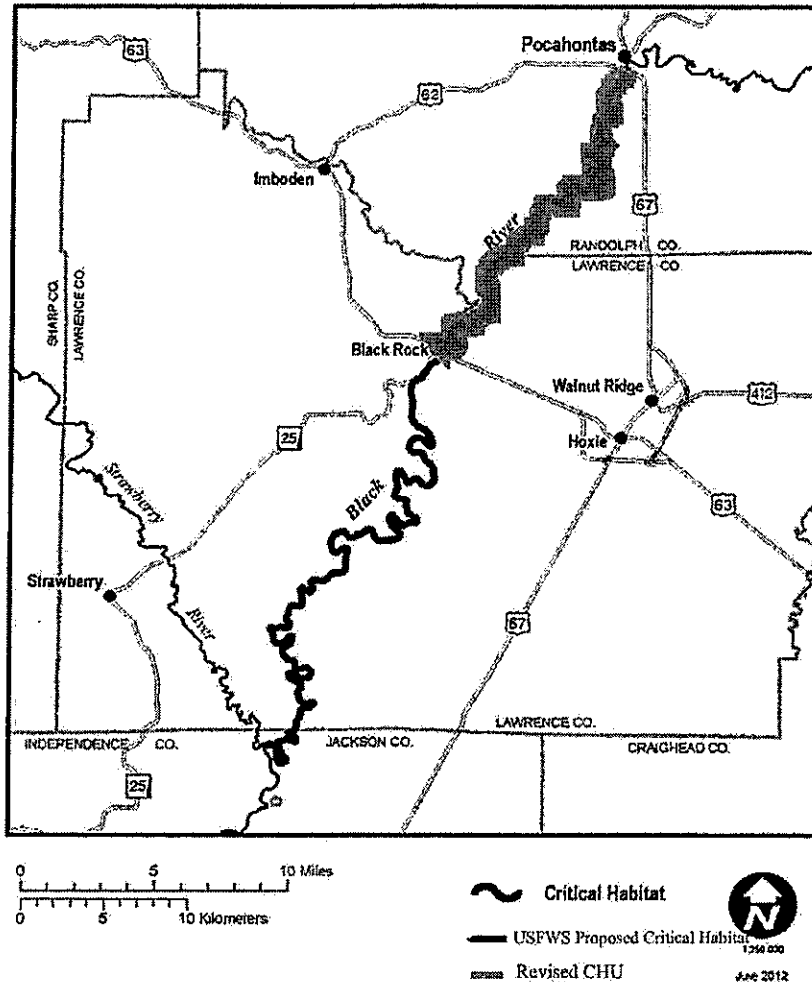
## 5.6 Black River - Proposed CHU RF9 - 57.2 River Miles

- Proposed CHU Reach includes Black River from Pocahontas Ar. downstream to the mouth of the Strawberry River;
- 86 % of riparian habitat privately owned;
- Historical data qualitative characterized as "abundant"...but no quantitative data;
- Rust, 1993 - Surveyed 48 sites on Black River, live mussels at 4 of 48 sites. Estimated population of the 4 sites as 1503 individuals in 12 mile reach (rm65-77);
- 2005 25 live from 1 river mile above Black Rock; (AGF mussel data base);
- Documented to occur in large numbers, but limited to proposed CHU between Pocahontas AR. and Black Rock;
- No documentation downstream of Black Rock, AR. (AGF mussel database);

- Black River population is considered one of the largest remaining range-wide. (Butler, 2005).

**Comment:** Documentation of existing populations in the Black River downstream of Black Rock does not exist; therefore, the CHU should be modified to include the Black River from Pocahontas downstream to Black Rock (Figure 4).

Map of Unit RF9 (Black River) of critical habitat for Rabbitsfoot



(16) Unit RF9: Black River- Lawrence and Randolph Counties, Arkansas.

(i) Unit RF9 includes 92.2 rkm (57.3 rmi) of the Black River from U.S. Highway 67 at Pocahontas, Randolph

County, Arkansas, downstream to the Strawberry River confluence southeast of Strawberry, Lawrence County, Arkansas

(ii) Note: Map of Unit RF9 (Black River) of critical habitat for rabbitsfoot above.

Figure 4. Modification of Service proposed CHU to include Black River from Pocahontas, AR downstream to Black Rock, AR. See Section 5.6 for justification.

## 5.7 White River - Proposed CHU RF8b - 42 River Miles

- Reach includes White River from Hwy 79 downstream to Hwy 1 at St. Charles;
- 16% of riparian habitat privately owned;
- "Historical abundance data are scarce" (Butler, 2005);
- Population appears to be a "stable" component of the White River (Butler, 2005);
- Records sporadic but distributed throughout the proposed critical habitat; and
- Proposed reach includes state and federal owned riparian habitat (84%).

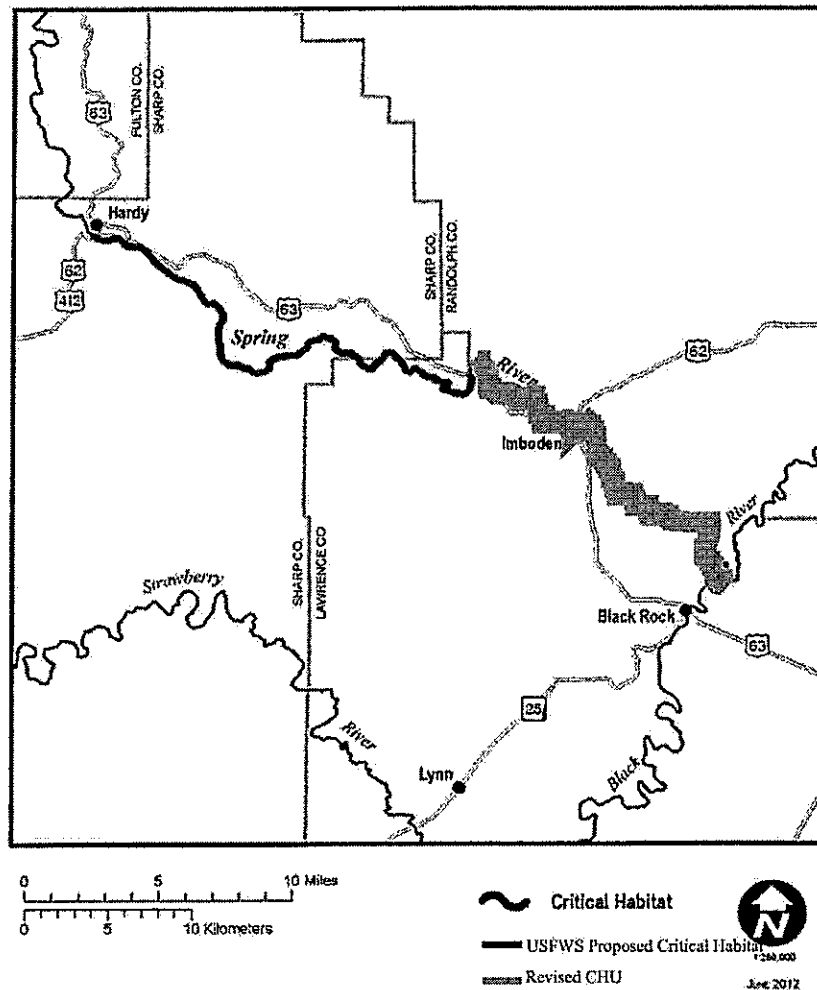
**Comment:** No basis for modifications to the proposed CHU.

## 5.8 Spring River - Proposed CHU RF10 - 39 River Miles

- Proposed Reach encompasses Spring River from Hardy downstream to confluence with Black River;
- Riparian Habitat 100% privately owned;
- Designated as Extraordinary Resource Waters (ERW) and Ecologically Sensitive Waterbody (ESW) by ADEQ, providing for an already high level of protection from water quality and discharge perspective;
- Pre 1986 records from 14 sites, all downstream of mouth of South Fork Spring River;
- Pre 1986 records only qualitatively characterized as "relatively common" (not sure what that means);
- Butler (2005) categorized the population as a small declining population;
- Harris, et al 2007, indicated the populations "... appears to be recruiting..." ;
- Uppermost location of collections at Ravenden, AR (36°13'59.32"N 91°15'03.80"W) (Harris et. al, 2007) and AGF mussel database;
- Rabbitsfoot routinely documented in Spring River downstream of Ravenden, AR. but not upstream of that point; and
- Water temperatures of Spring River controlled by spring fed source (reduced temperature adversely impacts reproduction/development of warm water mussel species). Water temperatures and flow conditions not supportive of species upstream of Ravenden, AR.

**Comment:** Due to decreased water temperatures resulting for the spring fed source and 2007 survey that identified upstream extent of populations, the CHU for the Spring River should be modified to include the Spring River beginning at Ravenden and then downstream to the confluence with the Black River (Figure 5).

Map of Unit RF10 (Spring River) of critical habitat for Rabbitsfoot



(17) Unit RF10: Spring River - Lawrence, Randolph, and Sharp Counties, Arkansas.

(i) Unit RF10 includes 62.8 rkm (39.0 rmi) of the Spring River from U.S.

Highway 412 and 62 at Hardy in Sharp County, Arkansas, downstream to its confluence with the Black River east of Black Rock, Lawrence, and Randolph Counties, Arkansas.

(ii) Note: Map of Unit RF10 (Spring River) of critical habitat for rabbitsfoot above.

Figure 5. Modification of Service proposed CHU, to include Spring River from Ravenden, AR downstream to confluence with Black River. See Section 5.8 for justification.

## **5.9 Little River - Proposed CHU RF6 – Approx - 35.5 River Miles in Arkansas**

- Reach includes Little River from state line downstream to US HWY 71 (above Millwood Reservoir);
- 100% of riparian habitat privately owned;
- Designated as Ecologically Sensitive Waterbody;
- Designation in AR based on 2006-2008. Collected from 13 sites from OK-AR state line downstream to Hwy 71, 89 live specimens. (AGF mussel database), information not confirmed; and
- Population sizable and characterized as stable in AR reach of Little River (Butler, 2005 based on pers. Comm. with Davidson, 2011).

**COMMENT: No basis to propose modification to proposed CHU RF6.**

## **5.10 Middle Fork Little Red River - Proposed CHURF7 - 14.5 River Miles**

- Proposed Reach encompasses Middle Fork Little Red River from upstream of Shirley, AR. downstream to Greers Ferry Reservoir point of inundation;
- Riparian Habitat 100% privately owned;
- Designated as Extraordinary Resource Waters (ERW) and Ecologically Sensitive Waterbody (ESW) by ADEQ, providing for an already high level of protection from water quality and point source discharge perspective; and
- Designated as Critical Habitat for Yellow Cheek Darter.

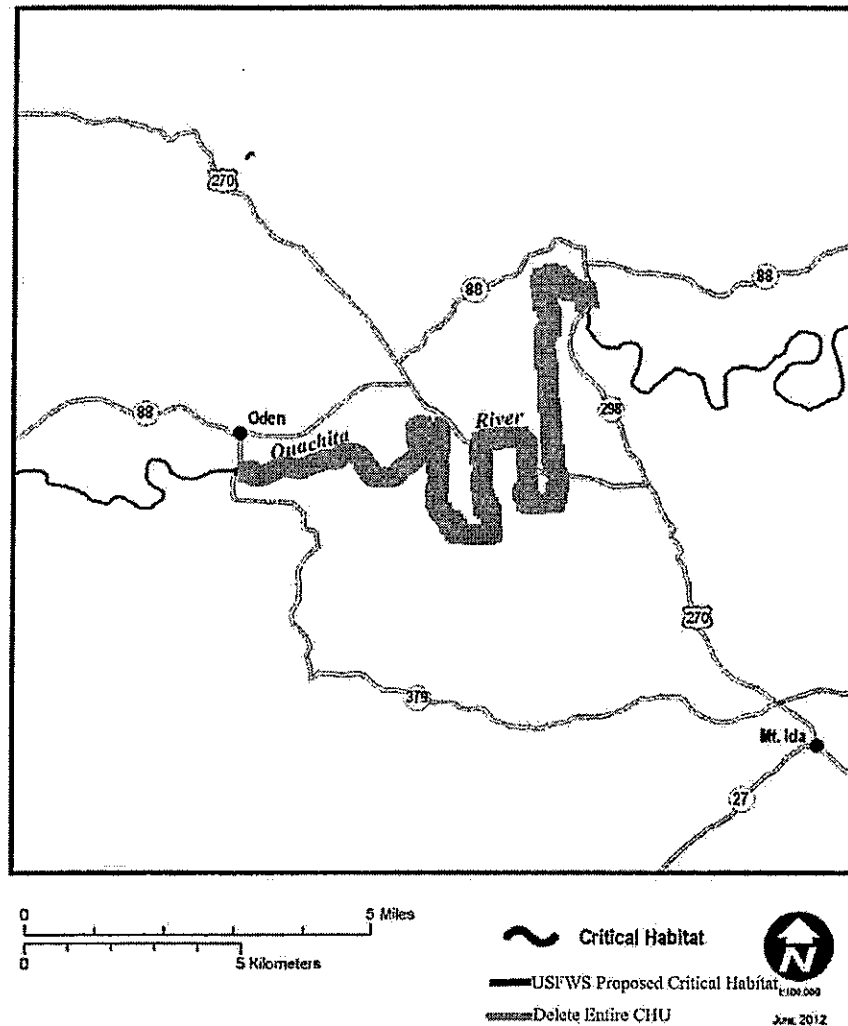
**Comment: No modification to proposed Critical Habitat Unit.**

## **5.11 Ouachita River - Upper Reach - Proposed CHU RF4a - 13.6 River Miles**

- Proposed Reach encompasses Ouachita River from AR Hwy 379 (south of Oden) downstream to AR Hwy 298 (east of Pencil Bluff);
- Riparian Habitat approximately 82% privately owned;
- Designated as Ecologically Sensitive Waterbody (ESW) by ADEQ, providing for a high level of protection from water quality and point source discharge perspective;
- Only reported from two collections, one just below AR Hwy 379 and one just above AR Hwy 298, nothing in between;
- AGF mussel database indicated three listed collections from 1988 (one relic shell and 3 live mussels) nothing before or after;
- No other documented occurrence;
- 13.6 river mile CHU not essential for the conservation of the species, and not confirmed as present at listing;

Comment: CHU should be eliminated based on lack of documentation, limited population, not documented at time of listing, and isolation by main stem reservoirs (Figure 6).

Map of Unit RF4a (Ouachita River) of critical habitat for Rabbitsfoot



(9) Unit RF4a: Ouachita River-Montgomery County, Arkansas.

(i) Unit RF4a includes 21.9 rkm (13.6 rmi) of the Ouachita River from Arkansas Highway 379 south of Oden,

Montgomery County, Arkansas, downstream to Arkansas Highway 298 east of Pencil Bluff, Montgomery County, Arkansas

(ii) Note: Map of Unit RF4a (Ouachita River) of critical habitat for rabbitsfoot above.

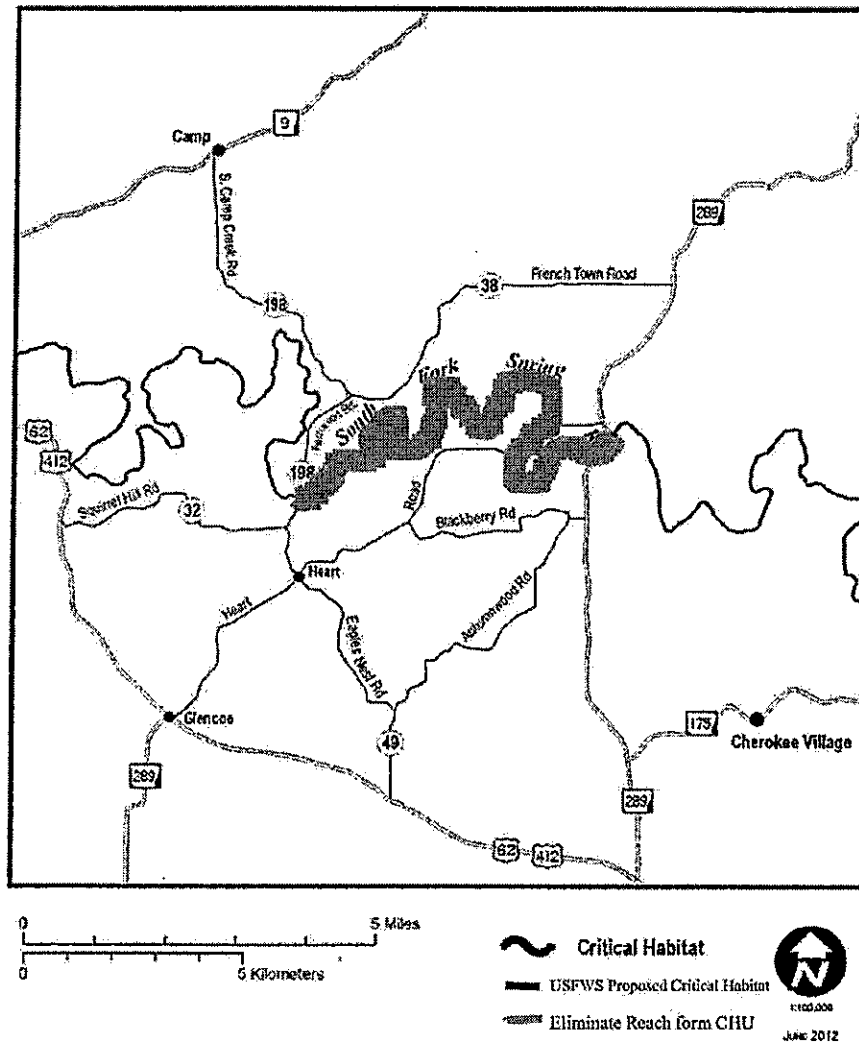
Figure 6. Proposed CHU RF4a, entire CHU should be deleted from designation based on detailed review. See Section 5.11 for justification.

## **5.12 South Fork Spring River - Proposed CHU RF11 - 10.2 River Miles**

- Reach includes short reach from Fulton County Rd 198 to Ar. Hwy 289 Fulton County Ar.;
- 2002 initial documentation dead and relics only, no live mussels;
- 2003 intensive survey failed to document presence (Marten, et.al, 2009);
- Butler (2005) status and viability unknown, but listed current status as declining, although no living mussels collected for proposed CHU;
- Single live specimen identified just upstream AR Hwy 289 (Harris, 2007 et.al); and;
- Small watershed and limited reach size (10.2 river miles) and lack of documented population prevents this CHU from meeting the “essential for conservation of the species” requirement for being adopted as a CHU.

**Comment: The CHU RF11 should be eliminated from further consideration. This recommendation based on the limited information (only one live) despite multiple surveys within the proposed CHU, small size of the proposed reach, and single live mussel likely part of metapopulation with Spring River (Figure 7).**

Map of Unit RF11 (South Fork Spring River) of critical habitat for Rabbitsfoot



(18) UNIT RF11: South Fork Spring River - Fulton County, Arkansas.

(i) Unit RF11 includes 16.4 rkm (10.2 rmi) of the South Fork Spring River

from Fulton County Road 198 north of Heart, Arkansas, downstream to Arkansas Highway 289 at Saddle, Fulton County, Arkansas.

(ii) Note: Map of Unit RF11 (South Fork Spring River) of critical habitat for rabbitsfoot above.

Figure 7. Modification of Service proposed CHU, deleting South Fork Spring River as critical habitat for the Rabbitsfoot Mussel. See Section 5.12 for justification.



## **6.0 CONSIDERED BUT NOT PROPOSED AS CRITICAL HABITAT FOR RABBITSFOOT MUSSEL**

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The following waterbodies were evaluated as potential critical habitats for the Rabbitsfoot Mussel, however they were not included in the proposed action for various reasons, typically due to lack of information regarding the current status of the species within the respective waterbody.

### **6.1 Illinois River**

Although not included in critical habitat for the Rabbitsfoot Mussel, it is being proposed as critical habitat for the Neosho Mucket.

### **6.2 Current River**

Few records exist for current review, the most recent 1994. Butler (2005) categorized as marginal, only because lack of information.

### **6.3 Cassatot River**

Although multiple collections have documented the presence of individual mussels, Butler (2005) considered population small, isolated, and marginal. No comprehensive survey has been conducted, therefore not proposed as a critical habitat unit.

### **6.4 Little Missouri River**

A single specimen documented from 1996. Butler (2005) classified Rabbitsfoot population as declining based on a SINGLE record. Considered part of metapopulation with Ouachita River population.

### **6.5 War Eagle Creek**

A single live mussel documented in 1979. Only other data includes two fresh dead in 2004, No other records and no survey information, therefore not included in proposed action.

## **7.0 NEOSHO MUCKET**

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The Neosho Mucket is estimated to be extirpated from approximately 62 percent of historical range with only 9 of 16 historical populations remaining, and only one of those listed as the remaining large viable population.

The proposed critical habitat units are proposed for 4 four states including a total of 484 river miles, approximately 30 miles of which include the Illinois River in Benton and Washington Counties, Arkansas.

Considered a declining population based on stream survey results. The last date of observation in Illinois River in AR was 2008, when survey collected at 9 of 15 sites. Few historical records prior to 1970s, Gordon,et al (1979) only list sites where found but no numbers. Harris (1998) found Neosho Mucket in 19 of 22 sites and characterized it as the 3<sup>rd</sup> most abundant species collected.

Surveys in 2008 reported reductions in both numbers and sites when compared to Harris, (1998).

**Comment: No proposal to modify the proposed CHU.**

## 8.0 FACTORS AFFECTING THE SPECIES

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The proposed critical habitat provided an overview of factors that might affect the continuation of the species. These included:

- Destruction of habitats
  - Impoundments;
  - Channelization;
  - Sedimentation;
  - Chemical contaminants;
  - Mining; and
  - Oil and gas development
- Overutilization for commercial, recreational, and/or scientific purposes (determined that there is no evidence as current or future threat);
- Disease and/or predation (determined that there is no evidence of current or future threat);
- Inadequacy of existing regulatory mechanisms, provides that ..."we conclude that the CWA is inadequate to reduce or remove threats to the Neosho Mucket and Rabbitsfoot Mussel throughout **ALL** (emphasis added) of their range"; and
- Other natural or manmade factors affecting their continued existence (determined that there is no evidence of current or future threat and "unable to predict" impact of natural factors).

Although one of the major threats discussed in the proposed critical habitat units designation is the inadequacy of existing regulatory mechanisms, several of the proposed CHU have increased protection due to specific use designation in Regulation No. 2, the Arkansas Water Quality Standards (APCEC, 2007) including:

- Extraordinary Resource Waters;
  - Middle Fork Little Red River;
  - Buffalo River;
  - Saline River;
  - Strawberry River;
  - Spring River and; and
  - South Fork Spring River.
- Natural and Scenic waterways
  - Buffalo River;
  - Saline River; and
  - Strawberry River.
- Ecologically Sensitive Waterbodies.
  - Ouachita River, upstream of Lake Ouachita;
  - Ouachita river downstream of Arkadelphia;
  - Little River upstream of Millwood Reservoir;
  - Saline River;
  - Black River downstream of Spring River;

- Strawberry River; and
- Spring River.

In addition, there are several dischargers into the proposed CHU that are regulated through the National Pollutant Discharge Elimination System (NPDES) permit system as administered by ADEQ. As provided in Table 1, there are 29 direct discharges and 91 indirect dischargers into the proposed CHU. Additional details of the individual dischargers are provided in Tables 2 and 3. As a result of the designation of the CHU, these discharge permits will be subjected to an increased level of regulation, including potential need for formal and/or informal consultation with the Service to determine the potential for effects on the listed species and the critical habitats.

**Comment:** While the draft economic assessment (DEA) takes into account potential costs to small businesses for consulting and permitting purposes, the proposed critical habitat designation does not take into account the full cost of project delays due to permit issues and modifications or the cost for implementing conservation measures determined necessary by the Service.

Table 1. Summary of NPDES discharges to proposed Critical Habitat Map Units.

CH Unit	Waterbody	# of Direct NPDES Discharges	# of Indirect NPDES Discharges
RF4a	Ouachita River	0	1
RF4b	Ouachita River	11	20
RF5	Saline River	1	32
RF6	Little River	0	6
RF7	Mid .Fk. Little Red River	0	0
RF8a	White River	7	12
RF8b	White River	2	0
RF9	Black River	2	4
RF10	Spring River	3	6
RF11	So. Fork Spring River	2	0
RF12	Strawberry River	0	3
RF13	Buffalo River	1	3
NM1	Illinois River	0	4

Table 2. Direct NPDES discharges to proposed Critical Habitat Units (CHU) for Rabbitsfoot Mussel (*Quadrula cylindrica*) and the Neosho Mucket (*Lampsilis rafinesqueana*).

CH Unit	Waterbody	Plan-Seg.	Facility Name	NPDES Permit #	County
RF4b	Ouachita River	2F	City of Arkadelphia	AR0020605	Clark
			Shields Wood Products, Inc.	AR0047856	Clark
			Reynolds Metals Co- Gum Springs	AR0000531	Clark
			City of Donaldson	AR0048020	Hot Spring
			Kgen Hot Spring, LLC	AR0049417	Hot Spring
			City of Donaldson	AR0048020	Hot Spring
			City of Malvern <sup>*US</sup>	AR0034126	Hot Spring
			Entergy Arkansas- Rammel Dam <sup>*US</sup>	AR0048763	Hot Spring
			Hot Spring Power Co., LLC <sup>*US</sup>	AR0049611	Hot Spring
			Arkansas Electrical Cooperative- McClellan	AR0000841	Ouachita
			City of Camden	AR0022365	Ouachita
RF5	Saline River	2C	City Warren Water and Sewer	AR0043427	Bradley
RF8a	White River	4F	City of Batesville WWTP	AR0020702	Independence
			City of Newark	AR00210229	Independence
			City of Oil Trough	AR0047597	Independence
			Futurefuel Chemical Company	AR0035386	Independence
			Entergy Service, Inc- Independence	AR0037451	Independence
		4C	Arkansas Electric Coop- Carle <sup>*DS</sup>	AR0000400	Woodruff
			City of Augusta <sup>*DS</sup>	AR0034738	Woodruff
RF8b	White River	4A	City of Clarendon	AR0021644	Monroe
			City of St. Charles	AR0049310	Arkansas
RF9	Black River	4G	City of Pocahontas	AR0034835	Randolph
			City of Portia	AR0040355	Lawrence
RF10	Spring River	4H	City of Hardy	AR0037991	Sharp
			NEA Public Water Authority- WWTP	AR0051616	Randolph
			AR Game & Fish Comm- Jim Hinkle <sup>*US</sup>	AR0002879	Fulton
RF11	So. Fork Spring River	4H	City of Salem	AR0034789	Fulton
			Cherokee Village Sewer, Inc <sup>*DS</sup>	AR0034282	Sharp
RF13	Buffalo River	4J	USDINPS- Buffalo Natl River <sup>*DS</sup>	AR0034941	Marion

Table 3. Indirect NPDES discharges to proposed Critical Habitat Map Units for Rabbitsfoot Mussel (*Quadrula cylindrical*) and Neosho mucket (*Lampsilis rafinesqueana*).

CHU	Waterbody	Plan Seg.	Facility Name	NPDES Permit #	County
RF4a	Ouachita River	2F	Camp Ozark, Ozark Interests, Inc.	AR0048275	Montgomery
RF4b	Ouachita River	2F	USA-COE Iron Mt- Degray	AR0020222	Clark
			USA-COE Alpine Ridge- Degray	AR0035459	Clark
			USA-COE Arlie Moore- Degray	AR0036013	Clark
			USA-COE Spillway- Degray Lake	AR0036021	Clark
			Arkadelphia Human Dev Ctr	AR0036749	Clark
			Shields Wood Products, Inc	AR0047856	Clark
			City of Sparkman	AR0035939	Dallas
			Brazeale Lumber Co.	AR0046612	Dallas
			Ray White Lumber Co.	AR0047139	Dallas
			Garland Gastan Lumber Co	AR0049026	Dallas
			City of Caddo Valley	AR0043354	Hot Spring
			Hot Spring Co- Jones Mill WWTF	AR0000868	Hot Spring
			USA-COE Shouse Ford- Degray	AR0020231	Hot Spring
			USA-COE Caddo Drive Recreation	AR0035432	Hot Spring
			Ark Parks Lake Catherine	AR0038121	Hot Spring
			Acme Brick Company- Perla Facility	AR0043354	Hot Spring
			Halliburton Energy Services	AR0049794	Hot Spring
			Bismark School District	AR0051098	Hot Spring
			Rogers Lumber Company, Inc	AR0048046	Ouachita
			Anthony Timberlands, Inc	AR0049891	Ouachita
RF5	Saline River	2C	City of Fountain Hill	AR0042421	Ashley
			Potlatch Land and Lumber LLC- Warren Lumber	AR0000914	Bradley
			Johnsville Company, LLC	AR0047830	Bradley
			Oasis Trading Co., LLC	AR0050300	Bradley
			City of Banks	AR0050601	Bradley
			City of Hermitage	AR0051055	Bradley
			City of Kingsland	AR0043672	Cleveland
			Woodlawn School District #6	AR0048569	Cleveland
			City of Wilmar	AR0040096	Drew
			City of Monticello	AR0021822	Drew
			J.P. Price Lumber Co.	AR0047732	Drew
			West Fraser, Inc.	AR0046698	Grant
			H.G. Toler & Son Lumber Company	AR0047902	Grant
			City of Poyen WWTP	AR0048445	Grant
			City of Sheridan- WWTF	AR0034347	Grant
			Glen Rose School District	AR0046698	Hot Spring
			City of Benton	AR006498	Saline

Table 3. (cont)

CHU	Waterbody	Plan. Seg.	Facility Name	NPDES Permit #	County
			JJ's Truck Stop, Inc.	AR0042889	Saline
			City of Haskell	AR0044547	Saline
			Church of God in Arkansas d/b/a/ Pathway Campground	AR0047431	Saline
			Central Arkansas Utility Services- Reunion	AR0050326	Saline
			Central Arkansas Utility- Crossroads	AR0050563	Saline
			City of Haskell- North WWTP	AR0051713	Saline
			City of Bryant	AR0034002	Saline
RF5	Saline River	2C	Bryant Public Schools- Salem Elem.	AR0035955	Saline
			Timber Ridge Ranch Neurorehab <sup>*US</sup>	AR0041416	Saline
			Pawnee Village POA	AR0042277	Saline
			Saline Co. Prop. Improv. Dist #37	AR0049328	Saline
			Freds Store/Commercial Park	AR0049522	Saline
			Bauxite, AR WWTF	AR0049786	Saline
			Destined to Win/Family Outreach	AR0050202	Saline
			Almatis, Inc.	AR0050270	Saline
RF6	Little River	1C	Tyson Foods, Inc- Grannis Proc. Facility <sup>*US</sup>	AR0003018	Polk
			City of Horatio	AR0035785	Sevier
			Weyehaeuser Co- Dequeen Wood	AR0002909	Sevier
			City of Dequeen	AR0021733	Sevier
			Trinity Materials, Inc.	AR0048593	Sevier
			Cossatot Rock, LLC	AR0049034	Sevier
RF8a	White River	4C	Galloway Sand and Gravel	AR0001589	Independence
			Norandal USA, Inc	AR0001481	Jackson
			City of Tuckerman	AR0020001	Jackson
			Arkansas Steel Assoc	AR0034550	Jackson
			City of Swifton	AR0034860	Jackson
			City of Newport- WWT	AR0037044	Jackson
			City of Diaz	AR0041033	Jackson
			City of Newport- Airport/Indus	AR0045225	Jackson
			City of Alicia	AR0039675	Lawrence
			City of Walnut Ridge WWTP	AR0046566	Lawrence
			City of Russell	AR022217	White
			City of Bradford	AR0050911	White
RF9	Black River	4G	City of Reyno	AR0022209	Randolph
			Maclean-Esna	AR0036820	Randolph
			City of Black Rock	AR0037508	Lawrence
			AR Parks and Tourism- Lake Charles State Park	AR0038199	Lawrence
RF12	Strawberry River	4G	City of Horseshoe Bend	AR0035254	Izard



Table 3. (cont)

CHU	Waterbody	Plan. Seg.	Facility Name	NPDES Permit #	County
			City of Oxford	AR0049701	Izard
			Western Lawrence Co. WWT Dist.	AR0048488	Lawrence
RF10	Spring River	4H	City of Imboden	AR0021628	Lawrence
			City of Ravenden	AR0041254	Lawrence
			Vulcan Construction Materials- Black Rock Quarry	AR0047198	Lawrence
			Martin Marietta Materials- Black Rock Quarry	AR0047198	Lawrence
			Town of Ravendon Springs	AR0048712	Randolph
			City of Mammoth Spring <sup>*US</sup>	AR0023850	Fulton
RF13	Buffalo River	4J	Marble Falls SID	AR0034088	Newton
			City of Jasper	AR0034584	Newton
			USDINPS- Buffalo National River- Buffalo River State Park	AR0034959	Marion
NM1	Illionois River	3J	City of Springdale	AR0022063	Benton
			NW AR Conservation Authority	AR0050024	Benton
			Wal-Mart Stores, Inc- East Data Center	AR0050652	Benton
			USDAFS-Lake Wedington Rec Area	AR0033910	Washington

<sup>\*US</sup> denotes an NPDES outfall that discharges into an upstream tributary upstream of the proposed map unit.

## 9.0 LITERATURE REVIEWED AND/OR REFERENCED

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APCEC, 2007. Regulation No. 2, Regulation establishing water quality standards for surface waters of the State of Arkansas.

Butler, R.S., 2005. Status assessment report for the Rabbitsfoot, *Quadrula cylindrical cylindrical*, a freshwater mussel occurring in the Mississippi River and Great Lakes Basins. Unpublished report, U.S. Fish and wildlife.

Call, R.E., 1895, A study of the Unionidae of Arkansas, with incidental references to their distribution in the Mississippi Valley. Transactions of the Academy of Science of ST. Louis 7:1-65.

Christian, A.D., 1995. Analysis of the commercial mussel beds in the Cache and White Rivers in Arkansas. [MS thesis]. State university Arkansas. Arkansas State University.162pp.

Christian, A.D., J.L. Farris and J.L. Harris, 2007. Life history and population biology of the state special concern Ouachita Creekshell, *Villosa arkansasensis* (I.Lea, 1862). Final Report. Perrytown (AR):Arkansas Game and Fish Commission. 67p.

Christian, A.D. and J.L. Harris, 2004. Status survey for the Pink Mucket (*Lampsilis abrupt* (Say, 1831)), winged mapleleaf (*Quadrula fragosa* (Conrad, 1835))and Ouachita rock pocketbook (*Arkansia wheeleri* Ortman and Walker, 1912) in the Little Missouri River, Arkansas. Final Report Perrytown (AR): Arkansas Game and Fish Commission 19p + Appendices I-II.

Davidson, C.L., 1997. Analysis of mussel beds in the Little Missouri and Saline Rivers, Blue Mountain, Ozark and Dardanelle lakes, Arkansas (MS thesis). State University (AR): Arkansas State University.156pp.

Davidson, C.L. and S.A. Clem, 2002. The freshwater mussel resources in a selected segment of the Saline River: Location Species composition and status of mussel beds. Unpubl. Report submitted to the Nature Conservancy - Arkansas Field Office and Arkansas Game and Fish Commission. 49pp.

Davidson, C.L. and S.A. Clem, 2004. The freshwater mussel resources in a selected segment of the Saline River: location species composition, and status of mussel beds. Addendum 2. Arkansas Hwy 15 to the Felsenthal National Wildlife Refuge. Final Report. Little Rock (AR): The Nature Conservancy and the Arkansas Game and fish Commission. 23p.

Fobian, T.B., 2007. Reproductive biology of the Rabbitsfoot mussel (*Quadrula cylindrical* (Say, 1817)) in the upper Arkansas River system, White River system and the Red River system. Unpublished M.S. thesis, Missouri State university, Springfield. 104pp.

Gordon, M.E., 1980. Recent Mollusca of Arkansas with annotations to systematic and zoogeography. Arkansas Academy of Science Proceedings Volume XXXIV: 58-62.

Harris, J.L., 1996. The freshwater mussel resources of the buffalo National River, Arkansas: Phase 1 qualitative survey: location species composition and status of mussel beds. Final Report, U.S. Department of Interior, Buffalo National River, Harrison (AR) 19p.

Harris, J.L., 1998. Status Survey of *Lampsillis rafinesqueana* Frieson, the Neosho Mucket, in Arkansas. Revised Draft final report. Jackson (MS): U.S. Fish and Wildlife Service, endangered species Office. 6+p.

Harris, J.L., 2006 *Quadrula fragosa* population estimates at 10 sites in the Ouachita River drainage, Arkansas. Final Report. Conway (AR): U.S. Fish and Wildlife Service, Field Office. 14p.+ Appendix I.

Harris, J.L., and A.D. Christian, 2000. Current status of freshwater mussel fauna of the White River, Arkansas River miles 10-255. Final Report Memphis (TN): Department of the Army Memphis District Corps of Engineers. No pagination.

Harris, J.L., J.L. Farris, and A.D. Christian, 2007, Status of *Epioblasma florentina curtisii* (Frieson and Utterback), 1916. Curtis Pearlymussel, in Arkansas, Final Report. Columbia (Mo): U.S. Fish and Wildlife Service, Field Office. 37p+appendices.

Harris, J.L., and M.E. Gordon, 1987. Distribution and status of rare and endangered mussels (Mollusca: Margaritiferidae, Unionidae) in Arkansas. Proceedings Arkansas Academy of Science XXXI (1987): 49-56.

Harris, J.L., W.R. Posey II, C.L. Davidson, J.L. Farris, S.R. Oetker, J.N. Stoeckel, B.G. Crump, M.S. Barnett, H.C. Marten, M.W. Matthews, J.H. Seagraves, N.J. Wentz, R. Winterringer, C. Osborne, and A.D. Christian, 2009. Unionoida (Mollusca: Margaritiferidae, Unionidae) in Arkansas, Third Status Review. Journal of the Arkansas Academy of Science, Vol 63: 50-78.

Harris, J.L., P.J. Rust, A.D. Christian, W.R. Posey II, C.L. Davidson, and G.L. Harp. 1997 Revised status of rare and endangered Unionacea (Mollusca: Margaritiferidae, Unionidae) in Arkansas. Journal of the Arkansas Academy of science 51:66-89.

Marten, H.C., J.L., Harris, A.D., Christian, 2009. A Qualitative Fresh Water Mussel Survey of the South Fork Spring River, Missouri and Arkansas. Journal of the Arkansas Academy of Science, Vol 63, 2009. 106-112

Matthews, M.W., 2007. Freshwater bivalve (Mollusca: Unionidae, Corbiculidae) assemblages in an Ozark river: structure and role in the nutrient recycling [MS thesis]. State University (AR) Arkansas State University.

Mathews, M.F., E.L. Usery, S.W. Hodges, J.L. Farris, and A.D., Christian, 2009. Species Richness, Distribution and Relative abundance of freshwater mussels (Bivalvea: Unionidae) of the buffalo National River, Arkansas. Journal of Arkansas Academy of Science, Vol. 63; 113-130.

Posey II, W.R., 1977. Location, species composition and community estimates for mussel beds in the St Francis and Ouachita rivers in Arkansas [MS Thesis]. State University (AR) Arkansas State University.

Robinson, H.W., and T.M. Buchanan, 1988. Fishes of Arkansas. The University of Arkansas Press. Fayetteville, AR. 536pp

Rust, J., 1993 Analyses of the Commercial Mussel beds in the Black, Spring, Strawberry and Current Rivers in Arkansas, Masters Thesis, 93pp.

Service, for the Ohio River Valley ecosystem Team Mollusk subgroup, Ashville, NC. 208pp.

Vaughn, C.C., and C.M. Taylor, 1999. Impoundments and the decline of freshwater mussels, a case study of n extinction gradient. Conservation Biology 13:912-920.

Wheeler, H.E., 1918. The Mollusca of Clark County Arkansas. The Nautilus 31 (4):109-125.

Yeager, B.L. and R.J. Neves. 1986. Reproductive cycle and fish hosts of the rough Rabbitsfoot mussel, *Quadrula cylindrical strigillata* (Mollusca: Unionidae) in the upper Tennessee River drainage. American Midland Naturalist 116:329-340.

**Economic Analysis of Proposed Designation of Critical Habitat for  
Rabbitsfoot Mussels and Neosho Mucket in Arkansas**

Prepared for:  
Arkansas Association of Counties  
Little Rock, AR

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## 1. Introduction

In October 2012, the U.S. Fish and Wildlife Service (FWS) proposed a protection rule for two river mussels in the Mid-South, the Neosho Mucket and the Rabbitsfoot Mussel. The Service commissioned a report to understand the economic impacts such a designation may bestow upon the areas, whether positive or negative. HISTECON Associates, Inc. was asked by the Association of Arkansas Counties to conduct its own state analysis after finding significant deficiencies in the Service's report, and to submit comments to the Service during its reopened period for "public comment."

The new report reviews information on the economic impacts of the proposed endangered and threatened designation of these mussels, respectively. Using data supplied through additional research and local contacts, it develops an analysis of the current economic projections and an independent set of economic impact projections for groups of Arkansas counties totaling about 30 counties.

In order to perform this analysis, the HISTECON study team contacted county officials and others with knowledge of local business conditions to learn about pending economic developments in their area in the near future that could be threatened by restrictions on the use of area rivers and their surroundings. These could be projects such as:

- road improvements, including proposed routes for I-69 and I-49;
- bridges;
- timber and agricultural uses;
- recreational uses;
- water treatment and water quality investments; and
- mining, oil and gas, and other uses.

## **2. Previous Economic Assessments of Proposed Critical Habitat Units: Errors and Omissions**

The currently available Economic Assessment (EA) focuses primarily on the costs of Sec. 7 consultation and does not incorporate the concept of “opportunity costs” associated with the possible restrictions from critical habitat unit (CHU) designations. These latter costs represent a variety of business and economic development projects that are vital to the well-being of the many communities and rural areas that may be affected by restrictions on the use of rivers and their watersheds that harbor the mussels.

The EA prepared by Industrial Economics, Inc. evaluated the consultation costs at \$4.4 million over a 20-year period, or about \$290,000 per year.<sup>1</sup> These numbers cover the entire area of the proposed critical habitat units in parts of ten states, not just in Arkansas. When compared to the actual cost of lost business and economic activity that may occur from these CHU designations, however, this figure is clearly underestimated. As an example, this report shows that the closing of one summer camp on the Ouachita River alone would cost the local economy of Montgomery County more than \$8 million annually.

Two major flaws (and a third technical weakness) in the IEI study explain why its cost estimates are so low. First, the report uses an “incremental analysis” that focuses primarily on the limited costs that governmental agencies will bear if these designations cause additional consultation work for the FWS, the US Army Corps of Engineers, and other agencies. The actual cost to local economies for delayed or prohibited economic development is not a major factor in these estimates, yet as this report will demonstrate repeatedly, the cost of one cancelled natural-gas drilling exploration or one county-road bridge would approach the total 20-year estimate of \$4.4 million.

For example, the IEI report states that the main component of its estimate of \$4.4 million in costs is \$1.4 million over 20 years in the transportation and utilities sectors. However, simply the direct cost of just one delayed or prohibited bridge in Benton County amounts to \$700,000 to \$1 million, plus the indirect economic benefits that would be lost and the increased productivity and commuting convenience of one of these bridges. The multiplied effect of several of these lost projects in 2013-2014 would exceed the IEI

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<sup>1</sup> Industrial Economics, Inc. (2013). As demonstrated below, these figures are based on an unrealistic discount rate of seven percent. A more reasonable figure based on three percent annual interest rates would be \$5.9 million and \$390,000 per year, as reported in IEI’s Appendix B.



estimate for the entire 20-year period. It is illogical and patently unrealistic to base economic impact projections on such specious expectations. Bridgework (and county road improvement) is a regular budgetary category for Benton, Washington, and many other counties in the affected regions and this activity will likely continue throughout the next 20 years.

Second, the IEI study limits the physical scope of its enquiry to riparian watersheds and only the Census tracts that they include. In other words, regardless of the threat to economic activity that a particular CHU designation may cause elsewhere – where workers may commute from anywhere in the region and local market centers (e.g., county seats) are the locales for shopping, banking, recreation, etc. – their “incremental analysis” almost completely ignores the economic consequences of these actions. However, the reality is that modern economies are interconnected in many ways, both within and across county boundaries, and any attempt to limit the estimated effects to small-area Census tracts is doomed to failure and gross underrepresentation.

#### Statement about Economic Impact Analysis

The current approach being used by the U.S. Fish and Wildlife Service to analyze the economic impacts of critical habitat designation is based on Census-tract boundaries that include the affected areas. As discussed above, such limited areas are overly narrow in their focus and cannot incorporate the many business and community interactions that are impacted by potential restrictions that may be imposed under the ESA.

For this reason, for decades the standard practice for economic impact analysis has been to use county boundaries or a defined local market area as the basis for any comprehensive evaluation of the costs and benefits of new laws or regulations.

In light of this, the justification is unclear for using such narrow boundaries and excluding important business centers (e.g., county seats) from the FWS assessment of economic impacts in the areas surrounding proposed critical habitat designations. In contrast, the HISTECON approach is a structural economic model that analyzes the “cause-and-effect” of policy scenarios using mainstream economic theory. As other writers have observed:

“...there are often real opportunity costs to society from protecting Threatened and Endangered (T&E) species and their habitats in the form of higher costs of production or valuable uses foregone. As such, economic

benefits and costs must be defined and measured in a commensurate fashion.”<sup>2</sup>

Thus, we believe that an economic impact analysis is a superior approach than IEI model for evaluating economic impacts from the proposed CHU designations.

### **Technical Note: Interest Rates and Social Discount Rates**

During times of economic turmoil like the period following the Great Recession of 2007-2009, economists find it particularly difficult to adopt a proper rate of interest to use for future monetary projections. Yet it is critical for the calculation of present values (PV) of a future stream of income, costs, or benefits to employ a reasonable rate of interest in the standard formula. One result is certain, however; the higher the interest rate chosen, the lower will be the resulting PV of the future dollars.

Here we find a third, albeit technical, error of the IEI report. The authors claim that OMB has promulgated two interest rates for use in the PV formula – three and seven percent. However, throughout the report the authors use the higher percentage and produce lower cost estimates of \$4.4 million total and \$290,000 annually for the CHU designations. Only in Appendix B does the report complete the exercise and use the lower – and in today’s low rate environment the more reasonable – interest figure of three percent. Accordingly, the PV rises by 34 percent to \$5.9 million and the annual cost rises to \$390,000.

(The seven-percent rate is OMB’s estimate of the average rate of return for private investments. The three-percent rate is the rate of return for the average consumer. However, it is more common for economists to use a discount rate of three to five percent when evaluating social programs.)

One can only guess about why IEI chose, during a period when bank and Treasury bond rates linger in the area of one to two percent, to utilize an archaic rate of seven percent for its main presentation and conclusions. Most economists have argued since the Great Recession that discount rates of five percent or less are more appropriate in this low-rate environment. Yet IEI presented its economic assessment based on a surprisingly high interest rate and achieved the predictable result: all of its projected cost estimates are disturbingly low by more than one-third, and unfairly favor the designation of the new CHU throughout the region.

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<sup>2</sup> Loomis and White (1996).

### 3. Methodology Used for Economic Analysis

In the structural economic model that HISTECON used, each calibrated area (or region) has economic and demographic variables, as well as policy variables so that any policy that affects a local economy can be tested. IMPLAN's Social Accounting Matrices (SAMs) capture the actual dollar amounts of all business transactions taking place in a regional economy as reported each year by businesses and governmental agencies. SAM accounts are a better measure of economic flow than traditional input-output accounts because they include "non-market" transactions. (Examples of these transactions would be taxes and unemployment benefits.)

SAMs can be constructed to show the effects of a given change on the economy of interest. These multiplier models study the impacts of a user-specified change in the chosen economy for 440 different industries. Because the multiplier models are built directly from the region-specific SAMs, they will reflect the region's unique structure and trade situation.

Multiplier models are the framework for answering impact-analysis questions. Derived mathematically, these models estimate the magnitude and distribution of economic impacts, and measure three types of effects that are displayed in the final output. These are the direct, indirect, and induced changes within the economy. Direct effects are determined by the event as defined by the user (e.g., the loss of a \$10 million order is a -\$10 million direct effect). The indirect effects are determined by the amount of the direct effect spent within the study region on supplies, services, labor, and taxes. Finally the induced effect measures the money that would have been re-spent in the study area as a result of spending from the indirect effect. Each of these steps recognizes an important leakage from the economic study region spent on purchases outside of the defined area.

The model is calibrated to many sub-national and county areas for policy analysis and forecasting. We have the ability to compare baseline economic activity in many regions at the county level with any direct and indirect changes that may occur if a CHU designation affects certain industries or plans for development (e.g., fishing areas or logging activity). Plus, we can analyze these changes at the proper frame of analysis for Arkansas, which is the county or multi-county level, **not** isolated census tract boundaries.

Many other federal and state agencies use a variety of EI modeling to identify economic changes that may occur in affected communities from the agency's projects. For

example, the US Department of Transportation recommends its core methodology for most construction planning.

Input-output analysis is a key component of most regional economic modeling of the employment, output, and income impacts of transportation infrastructure investments. Input-output analysis quantifies the multiple economic effects resulting from a change in the final demand for a specific product or service. For example, a person being paid to work on a highway project will spend some of those wages to buy goods and services. The money he or she spends shows up as sales and wages to other parties, who spend the money elsewhere, and so on. This chain of effects, known as the “multiplier,” captures the distributive effects...<sup>3</sup>

In this case, it is the possible removal or limitation of economic activity that must be considered, but the EI methodology can be used “in reverse” to measure the losses to the local economy from lost or delayed projects. This is referred to as “counterfactual” analysis, whereby “counterfactual simulations model the effect upon a regional or state economy by removing an organization or business from the economy. Counterfactual questions that could be modeled include: ...‘What would be the effect upon southwest Oklahoma if XYZ Corporation closed and had to lay off 250 employees?’”<sup>4</sup>

One caveat that must be noted is that some of the delays or project interruptions that the CHU restrictions may cause could be simply transferred to other locations in the state. It has been noted that: “While these figures sometimes have significant shock value, rarely is it acknowledged that decreases in commodity production in one region are usually made up by increases in production (and corresponding employment gains) in other regions.”<sup>5</sup>

For example, a poultry farm may not be located in Searcy County if the Rabbitsfoot habitat is finalized, but it may find another location outside the watershed in Van Buren County. From a state or national perspective, little or no economic loss may be suffered from this transfer. Even though local jobs and revenues in the first county would suffer, the second county would benefit from the change.

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<sup>3</sup> Federal Highway Administration (2013).

<sup>4</sup> Southwestern Oklahoma State University (2013).

<sup>5</sup> Loomis and White (1996).

However, two problems are evident from applying this logic to the mussel areas in Arkansas.

1) Absent the proposed restrictions, the initial county has a right to proceed with improving its roads and bridges, economic development, and a host of other activities that create wealth and well-being for its citizens. The benefit of these improvements will not accrue to these communities if the projects are not built, so this is a net loss to the first county regardless of whether or where the projects are eventually located. For example, very little of the investment in a planned poultry farm in Marion County that was moved to a neighboring county would benefit Marion County.

2) Many of the economic activities that are described in this report cannot simply be moved to alternate locations. Prime examples of these are bridges, paving county roads, harvesting timber from previously cultivated tree stands, parks and recreation areas, and “highest-in-structure” drilling sites for natural gas. In each of these cases, the lost opportunity would be unavailable absolutely to any other location in the region because of the unsuitability or non-comparability of the suggested alternatives.

#### **4. Rivers Involved and Affected County Groupings**

These areas have been mapped into affected Arkansas counties and the economic impacts of any changes will be allocated to related groups of these counties. As can be seen in Map 1, the affected counties follow many of the major rivers in the state. A total of 34 counties are listed with the potential CHU designations, mostly for the Rabbitsfoot mussel. (Note that four counties repeat because they have potential designations on two rivers; thus, the total count of affected counties is 30.)

##### **Affected Neosho Mucket Counties**

**COUNTY GROUP 1: Illinois River—Benton and Washington Counties, Arkansas**

##### **Groupings of Affected Rabbitsfoot Counties**

**COUNTY GROUP 2: Ouachita River—Montgomery County, Clark, Hot Spring, and Ouachita Counties, Arkansas**

**COUNTY GROUP 3: Saline River—Ashley, Bradley, Cleveland, Dallas, Drew, Grant, and Saline Counties, Arkansas**

**COUNTY GROUP 4: Little River—Little River and Sevier Counties, Arkansas**

**COUNTY GROUP 5: Middle Fork Little River—Van Buren County, Arkansas**

**COUNTY GROUP 6: White River—Independence, Jackson, White, and Woodruff Counties, Arkansas**

**COUNTY GROUP 7: White River—Arkansas and Monroe Counties, Arkansas**

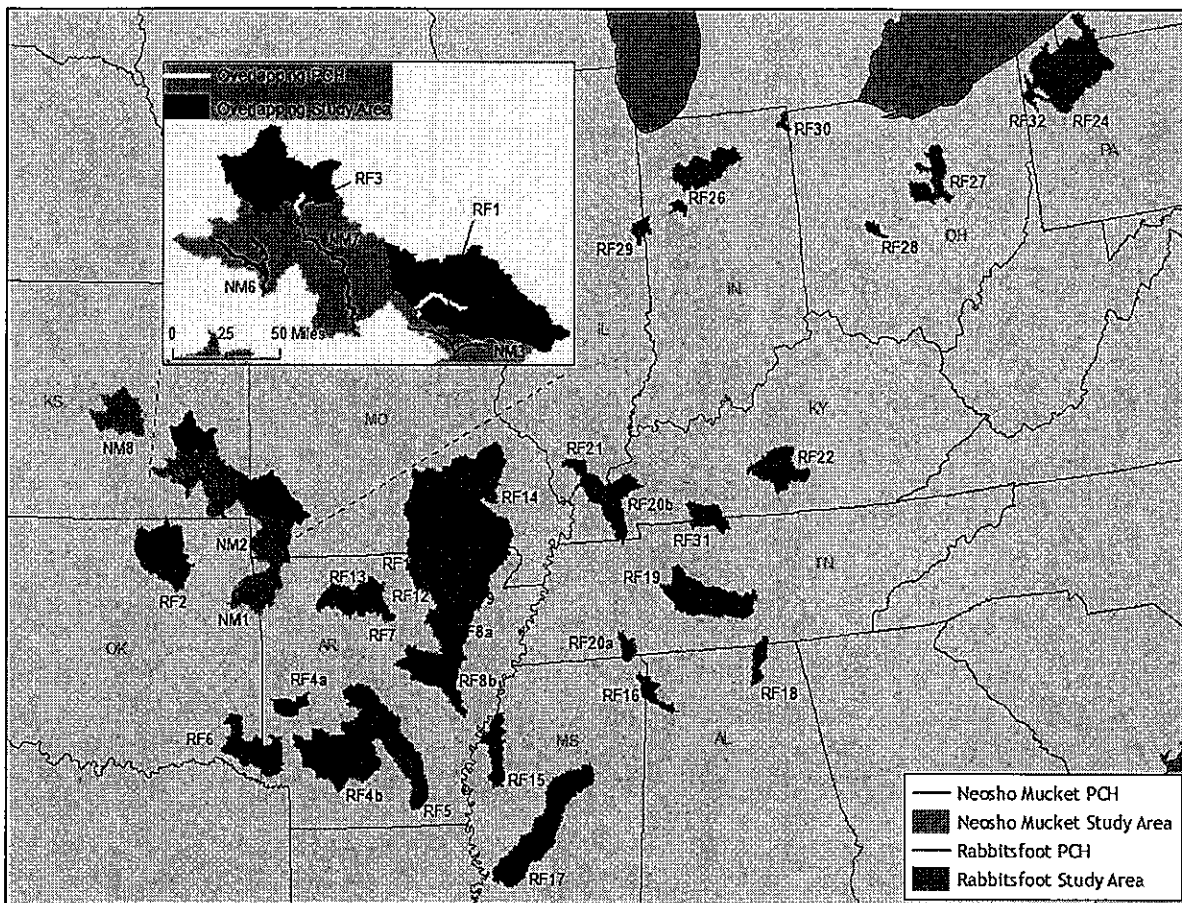
**COUNTY GROUP 8: Black River—Lawrence and Randolph Counties, Arkansas**

**COUNTY GROUP 9: Spring River—Lawrence, Randolph, and Sharp Counties, Fulton County, Arkansas**

**COUNTY GROUP 10: Strawberry River—Izard, Lawrence, and Sharp Counties, Arkansas**

**COUNTY GROUP 11: Buffalo River—Marion, Newton, and Searcy Counties, Arkansas**

For the purpose of analyzing the economic effects of the possible restrictions, we have created an allocation table based on the percentage of each river's affected area that is located in the listed Arkansas counties. Table 1 facilitates an understanding how some of the negative economic effects from the CHU changes may be parceled out to various parts of each river's contiguous counties.



Source:  
1. U.S. Fish and Wildlife Service, Arkansas Field Office  
2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

0 20 40 80 120 160 Miles

IEc  
ENVIRONMENTAL ECONOMICS, BY ROBERT ELLMAN

**Table 1. Percentage Distribution of the River Distances among Affected Counties**

<b>Name of Species and River Unit</b>	<b>County</b>	<b>River Miles</b>	<b>Percent of River Miles</b>
NM1	Benton	25	83.3%
	Washington	5	16.7%
Total		30	100.0%
RF4a	Montgomery	13.6	100.0%
Total		13.6	100.0%
RF4b	Hot Springs	20	20.4%
	Clark	48.1	49.0%
	Ouachita	30	30.6%
Total		98.1	100.0%
RF5	Saline	12	6.7%
	Grant	35	19.5%
	Cleveland	45	25.1%
	Dallas	23.2	12.9%
	Drew	18	10.0%
	Bradley	21	11.7%
	Ashley	25	14.0%
Total		179.2	100.0%
RF6	Sevier	10	50.0%
	Little River	10	50.0%
Total		20	100.0%
RF7	Van Buren	14.5	100.0%
Total		14.5	100.0%
RF8a	Independence	36	30.8%
	Jackson	28	23.9%
	White	26.5	22.6%
	Woodruff	26.5	22.6%
Total		117	100.0%
RF8b	Monroe	17	39.7%
	Arkansas	25.8	60.3%
Total		42.8	100.0%



RF9	Randolph	18	31.4%
	Lawrence	39.3	68.6%
Total		57.3	100.0%
RF10	Lawrence	13	33.3%
	Randolph	13	33.3%
	Sharp	13	33.3%
Total		39	100.0%
RF11	Fulton	10.2	100.0%
Total		10.2	100.0%
RF12	Izard	8	10.4%
	Lawrence	24	31.2%
	Sharp	44.9	58.4%
Total		76.9	100.0%
RF13	Marion	30	42.5%
	Newton	20.6	29.2%
	Searcy	20	28.3%
Total		70.6	100.0%

Source: Calculations by HISTECON Associates, Inc. from data contained in U.S. Fish and Wildlife Service (FWS), "Endangered and Threatened Wildlife and Plants: Endangered Status for Neosho Mucket, Threatened Status for Rabbitsfoot, etc." Aug. 22, 2012.

## 5. Key Impacts Projected Within County Groupings

The present study uses the methodology of an EIA to quantify the types of local costs that are likely to occur if these proposed CHU are restricted. As will be seen, these are reasonable examples of economic activity that may happen in the next 20 years in these regions. This is not a complete EIA, however; such a study normally entails a larger and more time-consuming effort and would not be appropriate for the current “public comment” period.

As such, this study attempts to answer several important questions that were ignored by the IEI report.

- Are there critical economic activities that the CHU might limit?
- What specific developments or projects should be analyzed as examples of these lost opportunities?

In discussions with local officials in the affected areas, many areas of concern were raised if these rivers were subject to restricted activities. Some examples of these concerns are:

- Ag. Issues, such as grazing, poultry and hogs;
- Utility ROW or connections;
- Road work or highway projects;
- Natural gas drilling; and
- Timber industry activities.

From these areas we have selected a set of quantifiable developments that would suffer economic losses if they were delayed or cancelled as a result of new CHU designations. Using this limited set of projects and the IMPLAN model for projecting both direct and indirect effects to the local economies, we find that the total costs to the affected counties would exceed \$19 million. This is approximately **five times** the cost of \$4.4 million that was contained in the IEI report for the entire ten states and all rivers involved, yet the \$19 million figure only represents the present value of a small sample of the total amount of economic activity that needs to be considered before the two mussels are labeled.

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## Overlapping Areas of Critical Habitat Designation

The RF7 proposed designation on the Middle Fork of the Little Red River contains part of the river that is currently protected under the ESA for the Yellow Cheek Darter.

This overlap example presents a question whether a new action to protect the Rabbitsfoot would have any measurable economic effect in an already protected area. Interestingly, the proposed action would likely have some serious impacts for several technical reasons.

First, the living conditions of – and therefore the necessary restrictions to protect – the mussels are more strenuous than those in place for the darter. Water-quality levels must be maintained at higher standards of turbidity, and so runoff, stream-bank erosion, and other forms of sedimentation are more restricted. Thus more construction, plowing, grading, and drilling types of activities will be subject to review and possible prohibition under CHU rules.

Second, one of the primary economic activities in Van Buren County during the last ten years has been exploration and production of natural gas from the Fayetteville Shale region. These activities are known to generate long amounts of polluted water for disposal, plus land disruption for service roads, pad and tank yards, and holding ponds.

While the present drilling has not conflicted with the darter CHU, it is likely that future drilling in the northeast part of the county will occur within the watershed of the proposed Rabbitsfoot CHU. When this happens, the ability of natural-gas exploration to continue in this area will be directly impacted by the later designation in a more demanding way. As the report makes clear, the economic effects of delaying or not drilling a natural-gas well would be large for this rural area, and would constitute a major loss for the county's welfare.

## A. Recreation Uses

### Camp Ozark Summer Camp

As an example, from a previous study we know that the impact of closing or limiting a long-standing summer camp in Montgomery County will have several deleterious results for local businesses. For three months each year, Camp Ozark welcomes about 5,600 campers and employs more than 600 people. (For comparison purposes, the year-round population of Mt. Ida was 1,076 according to the 2010 Census.) Directly, the Camp generated about \$5.8 million in spending during the summer months in 2013, according to an updated analysis.

These jobs and the income from them have a powerful effect in the county's economy and tax revenue. Based on the earlier study, the total number of jobs created by the Camp is about 800 after accounting for the impact of the respending of income. Total spending is estimated at about \$8.2 million.

It is possible, of course, that the camp may still be able to operate after a CHU has been designated for the Ouachita River. Some activities may be curtailed on the river, and this could lead to a smaller number of campers and consequently a smaller loss of revenue for the camp operators and the

local economy that depends on them. Still, even if the decline is only 25 percent because of the changed nature of the camp experience and the restricted use of Ouachita River, such a reduction would equate to the loss of about 200 summer-time jobs and \$2.1 million in revenue annually. So small changes in the operations of this camp, like many other businesses in the affected counties of this Rabbitsfoot CHU, could have fairly large economic consequences for the surrounding county.<sup>6,7</sup>

### **ATV Trails Near Rivers**

Earlier research in the Polk County area provides a first look at what limitations on recreation uses of the nearby Little River in Sevier and Little River counties might entail. In that study, a national forest that features a set of all-terrain trails was jeopardized by a management plan that would restrict usage of the trails.<sup>8</sup>

The study found that even a 10-percent reduction in visitation to the Wolf Pen Gap Park caused by new usage restrictions would cost the county \$5.9 million in direct tourism expenditures, causing a reduction of \$7.7 million in annual total output and a \$4.4 million loss in value added.

If we apply the results of that research on one single park location to the many miles of available recreation along the Arkansas rivers that stretch throughout the south and southwestern counties, the economic costs are similar to those above. As shown in Table 2, any similar reduction could jeopardize local economies and cost the area scores of jobs and local revenue for city and county governments.

Table 2. Typical Economic Impact of Reducing Tourism Use of Recreation Rivers by 10 Percent in Affected Counties in Southern and Southwestern Arkansas

	Value Added	Total Output	Employment	State and Local Tax Revenues
Losses	- \$4,400,000	- \$7,700,000	- 124 jobs	- \$729,00

Source: Hamilton (2010).

<sup>6</sup> Hamilton to Day (2002).

<sup>7</sup> Day (2013).

<sup>8</sup> Hamilton (2010)

### **Pond Creek National Wildlife Refuge, Little River**

An alternative approach to understanding the potential losses from expanding the CHU on Arkansas rivers is to consider the effect of a reduction in recreational usage. An example of this approach is a recent study of the Little River that separates Sevier and Little River counties, an area that is well-known for its hunting, fishing, and other attractions.

The Pond Creek National Wildlife Refuge attracts thousands of visitors each year, and studies have shown that these hunters, fishers, and general tourists add a great deal to the local economies in this area.<sup>9</sup> If usage were restricted by shortened weeks or a limit to the visitation, this could have a sizeable impact on the nearby towns like Horatio and Ashdown. Even a modest reduction in visitors of 20 percent would cost the area jobs and the loss of more than \$117,000, as shown in Table 3. Total output would drop by about \$230,000 and local and state tax revenue would decline by almost \$20,000.

While these are not huge losses compared to potential losses from agriculture or oil and gas exploration, this is the effect of one small wildlife refuge in a sparsely populated, rural area of the state. Applying this same effect to larger rivers in more populated areas would result in a magnified loss from these CHU designations.

Table 3. Economic Impact of Reducing Tourism Use of the Little River by 20 Percent in Little River and Sevier Counties

	Value Added	Total Output	Employment	State and Local Tax Revenues
Losses	- \$117,510	- \$230,034	- 3.8 jobs	- \$19,272

Source: Implan model based on data from Sexton et al (2011). Calculations from UALR Institute of Economic Advancement, August 2013.

### **B. Drilling for Oil and Natural Gas**

Arkansas has two main areas for exploration and production of oil and natural gas: the southern tier of counties known traditionally as the “oil patch” and the newer, recently booming tier of counties in the north central part known as the “Fayetteville Shale Play.”

<sup>9</sup> Sexton (2011).

Most of the oil production occurs in the following counties: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Three of these counties are directly affected by the proposed CHU on the Ouachita and Saline rivers -- Ashley, Bradley, and Ouachita.

Counties producing natural gas are: Cleburne, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Pope, Scott, Sebastian, Van Buren, White, and Yell. Two of these counties are located in the Shale area and contain parts of the Middle Fork of the Little Red River: Cleburne and Van Buren.

As an example of the potential cost of disrupting the exploratory drilling for natural gas, the Van Buren County judge indicated that a portion of the Little Red River under CHU consideration is “within five miles” of a potential drilling site. While it is not this report’s intention to unnecessarily alarm or “cry wolf” about pending changes in drilling patterns, it is instructive to illustrate the magnitude of the possible losses to the local economy if mussel protection is allowed to interfere with a powerful economic engine for the area’s current prosperity. Overall, almost \$13 billion has been invested in the Shale Play since 2008.<sup>10</sup>

Table 4. Economic Impact of Loss of One Natural Gas Well in Van Buren County

	Value Added	Total Output	Employment	State and Local Tax Revenues
Losses	- \$1,977,611	- \$3,449,753	- 9.3 jobs	- \$114,561

Source: Implan model based on a typical well cost of \$2.6 million. Calculations from UALR Institute of Economic Advancement, August 2013. Data are from Institute for Economic Advancement (2008).

As noted elsewhere, the Yellow Cheek Darter is currently protected in this area of the river. Yet other gas-producing counties are also included in the proposed CHUs, and Van Buren and other counties may face increased restrictions as part of a Rabbitsfoot CHU. Thus, if we use this site as an example and apply the costs of a single average drilling operation to the available location along the Middle Fork of the Little River, the

<sup>10</sup> Actually, it should be pointed out that drilling activity has slowed in the past two years because of historically low prices for this resource. For example, only 17 drilling rigs were active in January 2013 as compared to 33 rigs in January 2012. Nevertheless, new permits continue to be issued and Cleburne and Van Buren counties are “primary areas of Fayetteville Shale exploration and development” according to Arkansas Oil and Gas Commission representatives. See “Drilling in state shale scales back,” *Arkansas Democrat*, Jan. 20, 2013.

economic costs of delay or inability to drill are easily seen. As shown in Table 4, total impact from the loss of one typical well would be \$3.5 million. The loss of value added to the local economy is somewhat less, at \$2 million, because a sizeable amount of the materials for these wells is brought from other areas and other states. Still, almost \$2 million over a one or two-year period would be a notable loss for any of the Fayetteville Shale counties, as would be the loss of about nine jobs.

### C. Poultry Farms and Agricultural Activity

Raising poultry and livestock is a common farming occupation throughout the north central areas of Arkansas, with chicken and turkey “houses,” hog farms, and grazing cattle a familiar sight along state and county roads. Yet many of these operations are large businesses that may be affected by the restrictions on agricultural runoff and the use of water from nearby streams. We have modeled a typical poultry setup that involves an investment of \$117,000 for construction, materials, animals, and maintenance and operations.<sup>11</sup>

As shown in Table 5, total impact from the loss of one typical poultry farm would be \$145,000 per year. The loss of value added to the local economy is somewhat less, at \$33,000 per year, because a certain amount of the supplies for these farms is bought from other areas and other states. Still, almost \$33,000 annually over the entire 20-year period would be a notable loss for any of these agriculture-based counties.

Table 5. Economic Impact of Loss of One Large Poultry Farm in Searcy County

	Value Added	Total Output	Employment	State and Local Tax Revenues
Losses	- \$145,487	- \$32,753	- 1 job	- \$2,291

Source: Implan model based on a typical farm cost of \$117,000. Calculations from UALR Institute of Economic Advancement, August 2013. Data are from Hamra (2010).

<sup>11</sup> Hamra (2010).

#### D. Bridges and County Roads

As was described above, without the proposed restrictions the affected counties have a right to proceed with repairing and improving their roads and bridges, economic development, and a host of other activities that create wealth and well-being for their citizens. The benefit of these improvements will not accrue to these communities if the projects are not built, or are delayed indefinitely due to lengthy consultations about protected species in nearby rivers.

As an example of the economic costs involved, we have modeled the costs of delaying the planned county-road bridge over the Osage River, a tributary of the Illinois River that divides Benton and Washington counties. As shown in Table 6, the loss in total output from the \$700,000 initial cost would be \$1.4 million. Actual value added to the local county would decrease by \$627,000, and the lost project would cost the area about 10 jobs.

Again, this is the negative effect of losing only one bridge for these counties. Yet over a 20-year period, the 34 counties that may be impacted by these CHU designations will likely repair or improve scores of bridges. Especially in the northern, hillier, areas of Arkansas, the highway and bridge construction schedule for county governments is never finished. (It is worth noting that six counties in northwest Arkansas have just been declared disaster areas because of heavy flooding in August 2013. These include both Benton and Washington counties, whose roads and bridges suffered serious damage.)

In addition, consideration must be given to the possible routes for the proposed corridors for I-69 and I-49, both of which may cross parts of the CHUs under consideration.

Table 6. Economic Impact of Loss of One Bridge Construction Project  
in Benton and Washington Counties

	Value Added	Total Output	Employment	State and Local Tax Revenues
Losses	- \$626,748	- \$1,374,331	- 10.3 jobs	- \$41,660

Source: Implan model based on a typical bridge cost of \$700,000. Calculations from UALR Institute of Economic Advancement, August 2013. Data are from Clinard (2013).



## **F. Water Quality and Water Treatment Facilities in the Affected Counties**

While it is not possible in this study to comprehensively analyze the many ways that an expansive CHU designation could affect municipal water treatment plants, it is known that many of the rivers subject to the designations have water-quality issues at present. As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) Permit Program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

In Table 7, the location of permits for direct and indirect discharges of wastewater into the affected rivers is outlined. A simple ranking system is used to determine where the most serious potential exists for conflict between continued discharges and the advent of new CHU. A “Primary Concern” label indicates that permits currently allow direct and indirect discharges into a host river; e.g., in County Group 2 (which includes RF4a) 11 direct permits and 20 indirect permits are currently in place for this section of the Ouachita River. Also, a “Major” label indicates that permits currently allow only a few direct and mostly indirect discharges into a host river; e.g., in County Group 3 (which includes RF5) one direct permit and 32 indirect permits are currently in place for this section of the Saline River. (See Table 7 for a full explanation of the ranking.)

The technical difficulties that will arise for many cities and counties if discharges are restricted for all of these river segments are described in the companion ecological report to this study. However, it is evident that serious economic and fiscal impacts will accompany any water-system adjustments that would have to be instituted to divert or avoid discharges into the host rivers. Given the nature and complexity of typical water-treatment upgrades, filtration systems, and plant expansions in other parts of Arkansas, the costs to local communities will likely total millions of dollars.

Table 7. Direct and Indirect NPDES Discharges into Affected Rivers, by County Groupings

County Groupings	Water Flow Management Ranking	Affected Rivers	Specific Counties Affected With Direct Discharges*
Group 1	Minor		None
Group 2	Primary Concern	Ouachita	Clark, Hot Spring, and Ouachita
Group 3	Major	Saline	Bradley
Group 4	Moderate		None
Group 5	Minor		None
Group 6	Major	White	Independence and Woodruff
Group 7	Major	White	Arkansas and Monroe
Group 8	Primary Concern	Black	Lawrence and Randolph
Group 9	Major	Spring	Fulton, Sharp, and Randolph
Group 10	Moderate		None
Group 11	Major	Buffalo	Marion

\*Counties are noted as “Primary Concern” or “Major” if they have direct discharge permits for one of the rivers affected by the proposed CHU. Primary Concern counties have both direct and indirect discharge permits. A “Moderate” label indicates that the counties only have indirect discharges of wastewater into tributaries of host rivers. “Minor” labels indicate that no significant discharges are believed to affect these rivers. Source: GBMc & Associates, “Proposed Designation of Critical Habitat for Rabbitsfoot Mussel and Neosho Mucket,” (handout), July 25, 2013.

## 6. Review of Economic Costs from Proposed Critical Habitat Units for Two Mussels

Based on the limited data that were available during this general review of the potential economic impacts from the proposed CHU, it is not possible to completely assess the magnitude of the economic losses that may be involved for Arkansas. What this report has done is establish that, at a minimum, the potential costs to local businesses, farmers, and local governments is much higher than previously determined by the FWS.

As Table 8 summarizes, the dollar amounts of even a sampling of possible losses from the proposed restrictions have dwarfed the \$3.9 or \$4.4 million that FWS have used in their public communications. It is not difficult to imagine that this sample of projects, many of which would occur annually, could readily increase in size over time to even larger losses. Added to these losses would be those from the closing or a larger curtailment of Camp Ozark.

The table separates our sample projects into one-time and recurring losses. Based on that distinction, we see that one-time output losses would total about \$15 million and annually-occurring projects would total \$250,000 per year. (Over a 20-year period, the present value of these annual losses would be more than \$3.7 million. See note below Table 8.) While there is no way to predict how many such projects and threatened businesses and farms may be affected, the story of Table 7 is that it will not require too many such losses before the total economic impact on the state will be considerable.

Table 8. Summary of the Sample Economic Impacts from the Loss of Economic Activity in Seven Arkansas Counties

Type of Losses from Table No.	Value Added	Total Output	Employment	State and Local Tax Revenues
Episodic		- \$2,200,000	-200 jobs	
2. Episodic	- \$4,400,000	- \$7,700,000	- 124 jobs	- \$729,00
3. Annual*	- \$117,510	- \$230,034	- 3.8 jobs	- \$19,272
4. Episodic	- \$1,977,611	- \$3,449,753	- 9.3 jobs	- \$114,561
5. Annual*	- \$145,487	- \$32,753	- 1 job	- \$2,291
6. Episodic	- \$626,748	- \$1,374,331	- 10.3 jobs	- \$41,660
Illustrative Total Only				

\*Note: Those losses marked as "Annual" will occur each year after any CHU restriction is in place. For a 20-year period, the dollar values should be multiplied by a Present Value factor of 14.9 (at 3-percent interest per annum) to calculate the total impact over the period.

Source: Calculations from UALR Institute of Economic Advancement, August 2013.

In other words, this study has selected only a handful of economic activities that may be hampered by the widespread designations of CHU for these two mussels. Many other locations and projects – such as oil and gas drilling in other counties, farming in many counties, county roads and bridges in many areas, and recreation along some of the most used rivers in the state – will arise and also be affected in the next 20 years. However, just based on the sample of projects outlined in this report, the standard economic models demonstrate that a present value of **almost \$19 million in total output may be lost just in those counties.** Camp Ozark's losses of \$6 million more may be added to that figure if the camp is forced to close entirely. Clearly, over the next 20 years the volume of affected projects in the 34 counties will be much greater than this small sample, and the amount of potentially impacted economic output will be much greater as well.

To further illustrate how potentially damaging these CHU restrictions may become in two critical areas, Table 9 lists the annual contribution that the timber industry and agriculture made in a recent year to the county economies of Arkansas. By any measure, timber production is sizeable and vitally important to the lives of many residents throughout the state – these 30 counties account for more than one-half (52.9 percent) of the state's output of timber, despite representing only 40 percent of the 75 Arkansas counties. And agriculture supports almost \$2.9 billion in cash receipts to these farm communities.

Several affected counties – Ashley, Bradley, Clark, and Dallas – each account for more than five percent of the entire state timber output individually. Cleveland County alone reports that timber revenue is about \$34.5 million in its area, after accounting for multiplier effects. That represents a total impact of 318 jobs in the county.<sup>12</sup>

Beyond this, each county carries the responsibility for maintaining local roads, which could also be impacted negatively. As one county judge noted:

...we have approximately eight hundred (800) miles of county roads and timber company roads. Road repair would be so complicated and much more costly. The process to replace bridges and culverts would take much longer and the cost would skyrocket. ...The County's cost relating to the designation is hard to determine but no doubt would be **in the millions** (emphasis added).<sup>13</sup>

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<sup>12</sup> Spears (2013).

<sup>13</sup> Ibid.

**Table 9. Annual Timber Output and Farming Revenue in the Affected Counties**

	Timber			Farming Cash
	<u>Number (Thousand Cubic Feet)</u>			<u>Receipts (mil.)</u>
County	Softwood	Hardwood	Total	5-Year avg.
	2009	2009	2009	(inc. 2009)
Arkansas	292	1,376	1,668	204.8
Ashley	21,593	8,810	30,403	94.7
Benton	-	840	840	436.3
Bradley	28,334	3,558	31,892	36.9
Clark	13,266	10,843	24,109	26.3
Cleveland	16,777	3,236	20,013	125.8
Dallas	19,849	3,892	23,741	3.3
Drew	19,472	2,127	21,599	69.1
Fulton	-	2,310	2,310	37.3
Grant	13,518	2,212	15,730	18.8
Hot Spring	9,388	1,860	11,248	24.0
Independence	1,106	2,677	3,783	129.2
Izard	1,561	486	2,047	47.8
Jackson	-	172	172	140.2
Lawrence	22	835	857	134.6
Little River	3,788	3,812	7,600	67.5
Marion	158	549	707	37.6
Monroe	14	721	735	116.2
Montgomery	2,429	1,806	4,235	54.5
Newton	771	868	1,639	23.9
Ouachita	8,775	5,077	13,852	16.7
Randolph	-	1,158	1,158	79.1
Saline	8,211	1,322	9,533	8.6
Searcy	1,067	1,207	2,274	20.5
Sevier	7,455	2,093	9,548	152.6
Sharp	288	769	1,057	62.1
Van Buren	3,997	3,504	7,501	25.6
Washington	-	1,387	1,387	414.6
White	4,568	2,189	6,757	133.6
Woodruff	45	649	694	110.2

Sub-total, 30 counties	186,744		72,345		259,089	\$2,852.4
State Total, 75 counties	361,741		127,692		489,433	\$7,750.4
Percentage Produced in Affected Counties						
	51.6%		56.7%		52.9%	36.7%
Source: Arkansas Farm Bureau (2011) and U.S. Forest Service, Forest Inventory and Analysis National Program, available on-line at <a href="http://srsfia2.fs.fed.us/php/tpo_2009/tpo_rpa_int1.php">http://srsfia2.fs.fed.us/php/tpo_2009/tpo_rpa_int1.php</a> . Calculations by HISTECON Associates, Inc., August 2013.						

## 7. Conclusions

In many ways, the approach taken in the FWS economic assessment is akin to painting with a small brush when a larger brush was needed. The small brush covered the details of Section 7 consultations and minimal real-world consequences of widespread CHU designations, but completely missed the bigger picture of the true economic impacts that such designations could present to dozens of communities and counties along the affected rivers. By choosing this incremental approach, the annual cost of \$290,000 or even \$390,000 that is suggested by the FWS consultant woefully understates the potential impact of these new regulations.

The EA prepared by Industrial Economics, Inc. evaluated the consultation costs at \$4.4 million over a 20-year period. These numbers cover the entire area of the proposed CHU in parts of ten states, not just in Arkansas. When compared to the actual cost of lost business and economic activity that may occur from these CHU designations, however, this figure is clearly underestimated. As an example, this report shows that the closing of one summer camp on the Ouachita River alone would cost the local economy of Montgomery County more than \$8 million annually.

Two major flaws in the IEI study explain why its cost estimates are so low. First, the report uses an “incremental analysis” that focuses primarily on the limited costs that governmental agencies will bear if these designations cause additional consultation work for the FWS, the US Army Corps of Engineers, and other agencies. The actual cost to local economies for delayed or prohibited economic development is not a major factor in these estimates.

Second, the IEI study limits the physical scope of its enquiry to riparian watersheds and only the Census tracts that they include. In other words, regardless of the threat to economic activity that a particular CHU designation may cause elsewhere – where workers may commute from anywhere in the region and local market centers (e.g., county seats) are the locales for shopping, banking, recreation, etc. – their “incremental analysis” almost completely ignores the economic consequences of these actions. However, the reality is that modern economies are interconnected in many ways, both within and across county boundaries, and any attempt to limit the estimated effects to small-area Census tracts is doomed to failure and gross underrepresentation.

For this reason, for decades the standard practice for economic impact analysis has been to use county boundaries or a defined local market area as the basis for any

comprehensive evaluation of the costs and benefits of new laws or regulations. The justification is unclear for using such narrow boundaries and excluding important business centers (e.g., county seats) from the FWS assessment of economic impacts in the areas surrounding proposed critical habitat designations.

We also find a third, albeit technical, error of the IEI report. The authors claim that OMB has promulgated two interest rates for use in the present value calculations – three and seven percent. However, throughout the report the authors use the higher percentage and produce lower cost estimates of \$4.4 million total and \$290,000 annually for the CHU designations. Only in Appendix B does the report complete the exercise and use the lower – and in today’s low rate environment the more reasonable – interest figure of three percent. Accordingly, the PV rises by 34 percent to \$5.9 million and the annual cost rises to \$390,000.

In contrast, in the structural economic model that HISTECON used, each calibrated area (or region) has economic and demographic variables, as well as policy variables so that any policy that affects a local economy can be tested. IMPLAN’s Social Accounting Matrices (SAMs) capture the actual dollar amounts of all business transactions taking place in a regional economy as reported each year by businesses and governmental agencies.

This study attempts to answer several important questions that were ignored by the IEI report: 1) are there critical economic activities that the CHU might limit; and 2) what specific developments or projects should be analyzed as examples of these lost opportunities?

In discussions with local officials in the affected areas, many areas of concern were raised if these rivers were subject to restricted activities. Some examples of these concerns are:

- Ag. Issues, such as grazing, poultry and hogs;
- Utility ROW or connections;
- Road work or highway projects, including proposed I-69 and I-49;
- Natural gas drilling; and
- Timber industry activities.

From these areas we selected a set of quantifiable developments that would suffer economic losses if they were delayed or cancelled as a result of new CHU designations. Using this limited set of projects and the IMPLAN model for projecting both direct and



indirect effects to the local economies, we find that the total costs to the affected counties would exceed \$19 million. This is approximately **five times** the cost of \$4.4 million that was contained in the IEI report for the entire ten states and all rivers involved, yet the \$19 million figure only represents a small fraction of the present value of the total amount of economic activity that needs to be considered before the two mussels are labeled.

## General Bibliography

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- Arkansas Farm Bureau. 2011. Arkansas Agricultural Profile. Little Rock.
- Black, Montgomery County Judge Alvin. (2013, July 25). Interview by James Metzger. Economic costs of restricting Ouachita River usage by summer campers.
- Carlander, H. B. 1954. Mussel fishing and the pearl button industry. Pages 40–51 in A history of fish and fishing in the Upper Mississippi River. Upper Mississippi River Conservation Committee, Rock Island, Illinois.
- Ciborowski, Jan. (n.d.) INDICATOR: INVASION OF ZEBRA MUSSELS (*DREISSENA POLYMORPHA*) AND QUAGGA MUSSELS (*DREISSENA BUGENSIS*). [Issued separately by Department of Biological Sciences, University of Windsor.
- Clinard, Benton County Judge Bob. (2013, Aug.2). Interview by James Metzger. Economic costs of Illinois and Osage River bridges.
- Day, Peter A. 2013. "Camp Ozark Economic Impact Study." 2003-2013 Modification Notes (mimeo, February 11, 2013).
- Day, Peter A. 2002. Letter from Gregory Hamilton, UALR Institute of Economic Advancement. Summarizes the major findings from analysis of Camp Ozark's economic impact.
- Diamond, J.M., D.W. Bressler, and V.B. Serveiss. 2002. Assessing relationships between human land uses and the decline of native mussels, fish, and macroinvertebrates in the Clinch and Powell River Watershed, USA. Environmental Toxicology and Chemistry 21(6): 1147-1155.\*
- Federal Highway Administration, US Department of Transportation. (2013). "Transportation Performance Management." Available on-line at: <http://www.fhwa.dot.gov/infrastructure/asstmgmt/primer08.cfm>.
- Hamilton, G. 2010. *Potential economic impacts on Mena, Arkansas and the surrounding region regarding the 2010 Forest Service travel management decision for Ouachita National Forest*. Informally published manuscript, UALR Institute for Economic Advancement College of Business, University of Arkansas at Little Rock, Little Rock, AR.
- Hamra, C.F. 2010. "An Assessment of the Potential Profitability of Poultry Farms." Agricultural and Natural Resources Systems Management, University of Tennessee at Martin.
- Harris, J.L. and Milam, C.D. (2002, March). *Mussels of the White River from Newport to the*

- Arkansas River*. White River Field Identification Notebook, Version 2.0. U.S. Army Corps of Engineers.
- Hinchey, Searcy County Judge Johnny. (2013, July 23). Interviewed by Stephen Gross. Meeting about critical habitat designation.
- Hooper, Van Buren County Judge Roger. (2013, July 23). Interviewed by Stephen Gross. Meeting about critical habitat designation.
- Institute for Economic Advancement. 2008. "Energy Resource Development Strategy: The Economic Impact of the Fayetteville Shale Play on Conway County, Arkansas." West Central Arkansas Planning and Development District, Inc.
- Industrial Economics, Inc. (2013, Feb. 6). Economic Analysis of Critical Habitat Designation for the Neosho Mucket and Rabbitsfoot. *Industrial Economics Incorporated*.
- Loomis, J.D. and White, D.S. (1996). "Economic benefits of rare and endangered species: summary and meta-analysis." *Ecological Economics* 18 (1996) 197-206.
- Meek, S. E., and H.W. Clark. 1912. The mussels of the Big Buffalo Fork of White River, Arkansas. Report and Special Papers of the U.S. Fish Commission. [Issued separately as U.S. Bureau of Fisheries Document 759], 1911: 1-20.
- Phillips, S. (n.d.). Potential Economic Impacts of Zebra Mussels on the Hydropower. *Pacific States Marine Fisheries Commission*. Retrieved July 29, 2013, from [www.aquaticnuisance.org/wordpress/.../Phillips-Darland-and-Sytsma.pdf](http://www.aquaticnuisance.org/wordpress/.../Phillips-Darland-and-Sytsma.pdf).
- Ream, T. J. (2013, July 2). Letter from N.L. Wagoner. Violation of the endangered species act related to off-highway vehicle use in the Wolf Pen Gap Trail complex.
- Sexton, Natalie R. et al. 2011. "National Wildlife Refuge Visitor Survey 2010/2011: Individual Refuge Results for Pond Creek National Wildlife Refuge." U.S. Fish and Wildlife Service, Division of Visitor Services and Communications Headquarters Office. Arlington, Virginia.
- Southwestern Oklahoma State University. 2013. "Economic Impact Analysis." Center for Economic & Business Development. Available on-line at: <http://www.swosu.edu/cebd/remi.htm>.
- Smith, K.L., W.F. Pell, J.H. Rettig, R.H. Davis, and H.W. Robison. 1984. Arkansas's Natural Heritage. August House Publishers, Little Rock, AR.\*
- U.S. Fish and Wildlife Service (FWS). 1997. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Cumberland Elktote, Oyster Mussel, Cumberlandian Combshell, Purple Bean, and Rough Rabbitsfoot, Final Rule. 62 FR 1647. January 10, 1997.

- U.S. Fish and Wildlife Service (FWS). 2012. "Endangered and Threatened Wildlife and Plants: Endangered Status for Neosho Mucket, Threatened Status for Rabbitsfoot, etc." Aug. 22, 2012.
- U.S. Fish and Wildlife Service (FWS). 2004. Designation of critical habitat for five endangered mussels in the Tennessee and Cumberland River basins, final rule. 69 FR 53135. August 31, 2004.
- Wagoner, N. L. (2013, June 17). Letter from T.J. Ream. Violations of the endangered species act related to off-highway vehicle use in the wolf pen gap trail complex.
- Warren, M.L. Jr., and W.R. Haag. 2005. Spatio-temporal patterns of the decline of freshwater mussels in the Little South Fork Cumberland River, USA. *Biodiversity and Conservation* 14:1383-1400.\*

## Northern Spotted Owl

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- Andre, Claire, and Manuel Velasquez.(n.d.) "Ethics and the Environment: The Spotted Owl Controversy." *Santa Clara University -Welcome*. N.p. Retrieved July 28, 2013, from <http://www.scu.edu/ethics/publications/iie/v4n1>.
- California Spotted Owl (*Strix occidentalis occidentalis*). (n.d.). *Sierra Forest Legacy- Protecting Sierra Nevada Forests and Communities*. Retrieved July 30, 2013, from [www.sierraforestlegacy.org/FC\\_SierraNevadaWildlifeRisk/CaliforniaSpottedOwl.php](http://www.sierraforestlegacy.org/FC_SierraNevadaWildlifeRisk/CaliforniaSpottedOwl.php).
- Industrial Economics, Inc. (2012, May 29). Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl. *Industrial Economics Incorporated*. Retrieved July 29, 2013, from [www.calforests.org/wp-content/uploads/2012/11/120530\\_Draft-Economic-analysis\\_critical\\_habitat.pdf](http://www.calforests.org/wp-content/uploads/2012/11/120530_Draft-Economic-analysis_critical_habitat.pdf).
- Kusel, Jonathan, Dr.(n.d.) *Response to the Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl*. Working paper. N.p. Retrieved July 29, 2013, from [http://www.sierrainstitute.us/documents/Research\\_Reports/OWLS\\_Final\\_Report\\_10-10-12.pdf](http://www.sierrainstitute.us/documents/Research_Reports/OWLS_Final_Report_10-10-12.pdf).
- Northern Spotted Owl Recovery. (n.d.). *Skamania County*. Retrieved July 29, 2013, from [www.skamaniacounty.org/Spotted%20Owl/NSO\\_Critical\\_Habitat.pptx](http://www.skamaniacounty.org/Spotted%20Owl/NSO_Critical_Habitat.pptx).

# Sage Grouse

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Conservation Plan for Greater-Sage Grouse in Utah. (2013, February 14). *Wildlife Utah*. Retrieved July 30, 2013, from [wildlife.utah.gov/uplandgame/sage-grouse/pdf/greater\\_sage\\_grouse\\_plan.pdf](http://wildlife.utah.gov/uplandgame/sage-grouse/pdf/greater_sage_grouse_plan.pdf).

Copeland, H., & Naugle, D., Dr. (2013, June 28). New Study Predicts Sage Grouse To Benefit Significantly from Wyoming Core Policy and Targeted Conservation Easements | Sage Grouse Initiative. *Sage Grouse Initiative | A non-regulatory success story*. Retrieved July 30, 2013, from <http://www.sagegrouseinitiative.com/content/new-study-predicts-sage-grouse-benefit-significantly-wyoming-core-policy-and-targeted>.

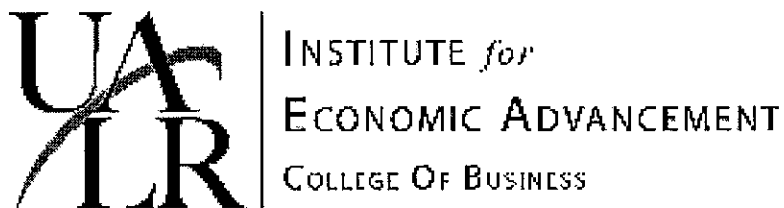
Sage-grouse. (2012, June 13). *BLM - The Bureau of Land Management*. Retrieved July 30, 2013, from [http://www.blm.gov/co/st/en/BLM\\_Programs/wildlife/sage-grouse.html](http://www.blm.gov/co/st/en/BLM_Programs/wildlife/sage-grouse.html).



# **Potential Economic Impacts on Mena, Arkansas and the Surrounding Region Regarding the 2010 Forest Service Travel Management Decision for Ouachita National Forest**

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**March 24, 2010  
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September 23, 2010**



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## Overview of Study

In January 2010, Ouachita National Forest managers announced the implementation of their travel management plan starting spring of 2010. The ruling eliminates most cross-country travel on established trails or through the forest, and it closes the Wolf Pen Gap trail system except for weekends and holidays from May 15th to September 15th. This study reports the findings from the brief examination of the potential economic impacts of the new trail usage regulations.

After identifying the tourist industry that has developed around off highway vehicle (OHV) and all terrain vehicle (ATV) recreation in Polk County, the study reviews the nation estimates of tourist and travel expenditures associated with OHV and ATV use. The Arkansas Department of Parks and Tourism estimates of the impacts of travel on Polk County are also reviewed. The findings from these reviews indicated:

- Nonlocal OHV day visitors spend \$50 to \$75 per day on average.
- Nonlocal overnight OHV users spend \$120 to \$210 per night on average. For an extended weekend (three night and four day) OHV user's spending was estimated to range from \$360 to \$630 per family.
- Tourist spending losses from the 32 weeks proposed closure of Wolf Pen Gap for OHV and ATV riders were estimate to be \$15,530 per non local overnight riders and \$1,918 per day rider.
- Arkansas Parks and Tourism estimated 2008 travel expenditures in Polk County at \$21 million; this spending supports approximately \$3.9 million in travel generated payrolls, and adds nearly \$1.7 million to state and local taxes.

To simulate the economic consequences of the new regulations, the study developed several scenarios to reflect the possible loss of tourist activity on Polk County's economy and analyzed the economic impacts of those losses. A 10% hypothetical reduction of \$5.8 million tourist related expenditures (= \$3.7 million retail reduction + \$2.1 million leisure and hospitality reduction) was found to:

- Reduce the output of Polk County by \$7.7 million. In other words, for every dollar reduction in tourist related expenditures, Polk County's output falls by an additional 32 cents or by a total of \$1.32. The expenditure multiplier for Polk County OHV and ATV tourist related activities is estimated at 1.327.

- Reduce value added (includes payments to the factors of production and indirect business taxes) in Polk County by approximately \$4.39 million, or equivalently for every dollar reduction in tourist related expenditures in Polk County reduces value added payments by 74 cents.
- Reduce Polk County's payrolls by \$2.4 million and employee's wage and salary by \$1.67 million. That is, a dollar reduction in tourist related expenditures can be expected to reduce Polk County's payrolls by 41 cents and employee's incomes by 28 cents.
- For every million dollar reduction in tourist expenditures in Polk County 21 full-time jobs are lost of 21 full-time jobs and the current unemployment rate increases by 0.2%.

The worse possible consequence of the closing of the Wolf Pen Gap would be a complete collapse of tourist activities by OHV and ATV riders. This possibility was analyzed by assuming a 100% reduction in tourist expenditures and then analyzing the economic impacts of this reduction. For this worse case scenario, the analysis found:

- Polk County direct tourist spending would decline by \$58.6 million.
- In turn this would cause total output to decline by \$77.1 million and value added to decline by \$33.1 million in Polk County.
- Polk County payrolls would decline by \$20.6 million.
- Unemployment rates would increase by approximately 13% from their current levels due to an estimated loss of 1,109 full-time equivalent jobs.
- State and Local tax revenues would decline by \$6.4 million.

## **Part I**

### **Economic Analysis**

#### **The Problem**

Wolf Pen Gap is an all terrain vehicle (ATV) trail complex consisting of 35 miles of loop trails featuring scenic high mountain vistas and forests of large pines and hardwoods. The Gap opened in the 1990s especially for ATV riders. Wolf Pen Gap is open year-round except during hunting season lasting from mid-November until early December. The Wolf Pen Gap complex is near Mena, Arkansas in Polk County. It is surrounded by the Ouachita National Forest which also provides opportunities for cross-country travel, either on user created trails or just riding through the forest on an off highway vehicle (OHV) and ATVs.

Estimates of OHV and ATV ridership range from as low as 10,000 riders per year to as high as 22,000. The most quoted estimate is 17,000 riders per year. These riders come from all over the region. Although there are no official sources for ridership data, residents of Mena reported that riders from Louisiana, Texas, Missouri, and Oklahoma use the trail system.

In January 2010, Ouachita National Forest managers announced a decision regarding their travel management project that started in 2005. The project required National Forest managers to designate a travel system for OHV that would limit harmful environmental impacts of unregulated OHV usage. The January ruling eliminates most cross-country travel on established trails or through the forest starting in the spring of 2010. Travel will be limited to game retrieval corridors that are within ½ mile of designated trails. Regarding Wolf Pen Gap trail system, 31 miles of loop trails will be open routes on weekends and holidays from May 15<sup>th</sup> to September 15<sup>th</sup>.<sup>1</sup> The trail complex will be closed for the remainder of the year. Details of the regulation impacts on the transportation system are provided in an accompanying appendix.

This national forest travel management decision to restrict OHV and ATV recreation has evoked concerns about the economic consequences on Mena, AR. The Mena Chamber of Commerce contacted the Institute for Economic Advancement (IEA) at the University of Arkansas at Little Rock requesting and commissioning a study of the possible economic impacts of limiting ATV recreational activity in Polk County. This study reports the findings from the brief investigation of the potential economic impacts of the new trail usage regulations.

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<sup>1</sup> Ouachita National Forest Makes Travel Management Decision, News Release, Ouachita, Ozark, and St Francis National Forest, Hot Springs, AR, January 4, 2010.

## Economic Value of OHV Recreation

Very little is known about the recreational value of OHVs and ATVs so it is difficult to weigh recreational and economic values of this activity against the environmental and social costs of OHV activity. Silberman and Andereck (2006) site several studies that estimated the economic value of OHV including:<sup>2</sup>

- Bergstrom and Cordell (1991), who used a travel cost model, reported a consumer surplus of \$15.06 per person per activity day in 1987.<sup>3</sup>
- Bergstrom et al. (1996) reported a consumer surplus in 1992 of \$3.97 and \$30.58 per activity day for two different U.S.D.A. Forest Service Regions using a travel cost model.<sup>4</sup>
- Walsh and Olienyk (1981) reported a consumer surplus of \$6.45 per activity day in 1980 for a Forest Service Region using a contingent valuation method.<sup>5</sup>

In their study, Silberman and Andereck (2006) surveyed Arizona OHV users by type of vehicle. They found that specialized OHV vehicles like ATV and Motorcycle/Dune Buggy/ Dirt Bike have higher consumer surplus values per trip, \$96 and \$82, respectively, than respondents who use vehicles that have multiple purposes like a 4-Wheel Truck (\$54) and a SUV (\$67).<sup>6</sup>

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<sup>2</sup> Jonathan Silberman, and Kathleen L Andereck. The Economic Value of Off-Highway Vehicle Recreation. Journal of Leisure Research. Arlington: Second Quarter 2006, Vol. 38, Iss. 2, 208-223.

<sup>3</sup> Bergstrom, J. C. and Cordell, H. K. (1991). An analysis of the demand for and value of outdoor recreation in the United States. Journal of Leisure Research, 23, 67-86.

<sup>4</sup> Bergstrom, J. C., Bowker, J. M., Cordell, H. K., Bhat, G., English, D. B. K., Teasley, R. J., et al. (1996). Ecoregional estimates of the net economic values of outdoor recreational activities in the United States: Individual mode results. Final Report, Resources Program and Assessment Staff, USDA Forest Service, Washington, D. C., and Outdoor Recreation and Wilderness Assessment Group SE-4901, USDA Forest Service, and Department of Agricultural and Applied Economics, University of Georgia, Athens, GA:

<sup>5</sup> Walsh, R. G., Oleinyk, J. P. (1981). Recreation demand effects of mountain pine beetle damage to the quality of forest recreation resources in the Colorado Front Range. Fort Collins, CO: Department of Economics, Colorado State University.

<sup>6</sup> Consumer surplus is a measure of the willingness of people to pay for a good or services over and above what is required in the market place. In terms of recreation, consumer surplus is the value of a recreation activity over and above what must be paid to participate in the activity. It is a net benefit measure of the recreational activity.

## Methodology

Due to the lack of OHV and ATV recreational data concerning the riders at Wolf Pen Gap, it is not currently possible to value the rider's willingness to pay or compute the net benefits of their recreational activities in terms of consumer surplus. Because of this lack of data it is not possible to evaluate the spending of the riders to determine their impacts on Mena and Polk County. Consequently, this study investigates the tourist industry that has developed around OHV recreation in Polk County. This industry is composed of selected retailers who service OHV tourists and a leisure and hospitality sector. After identifying these industries, this study develops several scenarios reflecting the possible loss of tourist activity on Polk County's economy, and analyzes the economic impact of these losses using an Implan Model of Polk County.<sup>7</sup> The study proceeds by first examining the Polk County economy and the size of its tourist industry. It then summarizes the findings from the several scenarios that reflect the likely economic impacts of the Ouachita National Forest managers decision to restrict the use of the trail system.

## Polk County and Mena, Arkansas Demographic and Economic Characteristics

The Census population estimates for Mena and Polk County have shown very little change over the 2000-2008 period.<sup>8</sup> In fact for all effective purposes, there has been no significant change in total population estimates in either Mena or Polk County since Census 2000. Comparing the average annual population growth rates, Arkansas population has grown annually at an average of 8/10 of a percent while Polk County and Mena's annual average population growth have both been slightly negative.

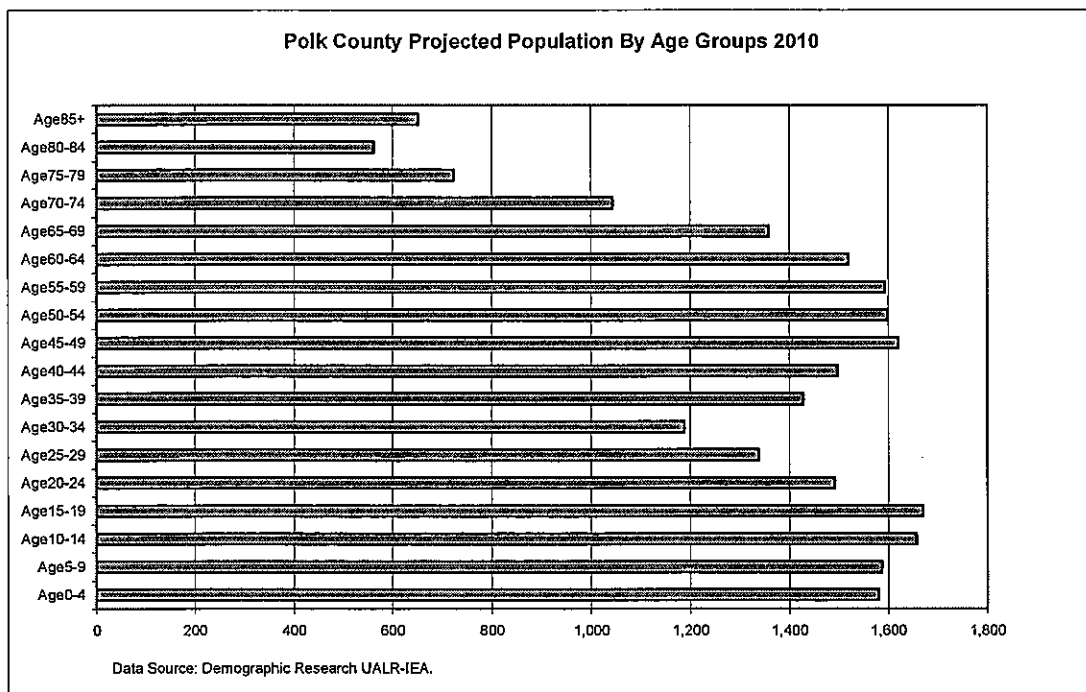
Geographic Area	Population Estimates								
	1-Jul 2008	1-Jul 2007	1-Jul 2006	1-Jul 2005	1-Jul 2004	1-Jul 2003	1-Jul 2002	1-Jul 2001	1-Jul 2000
Arkansas	2,855,390	2,830,557	2,804,199	2,768,918	2,740,191	2,717,909	2,701,889	2,689,601	2,678,217
Polk County	20,257	20,166	20,195	20,007	19,906	20,082	20,175	20,163	20,262
Mena	5,630	5,600	5,610	5,583	5,556	5,600	5,620	5,623	5,664
Percent Shares									
Polk County % of AR	0.71%	0.71%	0.72%	0.72%	0.73%	0.74%	0.75%	0.75%	0.76%
Mena % of Polk, CO	27.79%	27.77%	27.78%	27.91%	27.91%	27.89%	27.86%	27.90%	27.95%
Growth Rates									Annual Average
Arkansas	0.9%	0.9%	1.3%	1.0%	0.8%	0.6%	0.5%	0.4%	0.804%
Polk County	0.5%	-0.1%	0.9%	0.5%	-0.9%	-0.5%	0.1%	-0.5%	-0.001%
Mena	0.5%	-0.2%	0.5%	0.5%	-0.8%	-0.4%	-0.1%	-0.7%	-0.074%

Data Source: Demographic Research, UALR-IEA

<sup>7</sup> Minnesota Implan Group Inc. Stillwater, MN.

<sup>8</sup> Polk County population estimates for 2009 are 20,259. Demographic Research, UALR, Institute for Economic Advancement, (<http://www.iea.ualr.edu/research/demographic/population/default.html>).

A review of the population pyramid (age group population distribution) projected for Polk County shows a problem common to many rural areas. That is, Polk County's youth (20-34 age groups) tend to leave the county when they become young adults as they seek opportunities elsewhere. Some return in latter years to raise families. Meanwhile the baby boomer (45-65 age groups) cohort continues to move through the age groups.

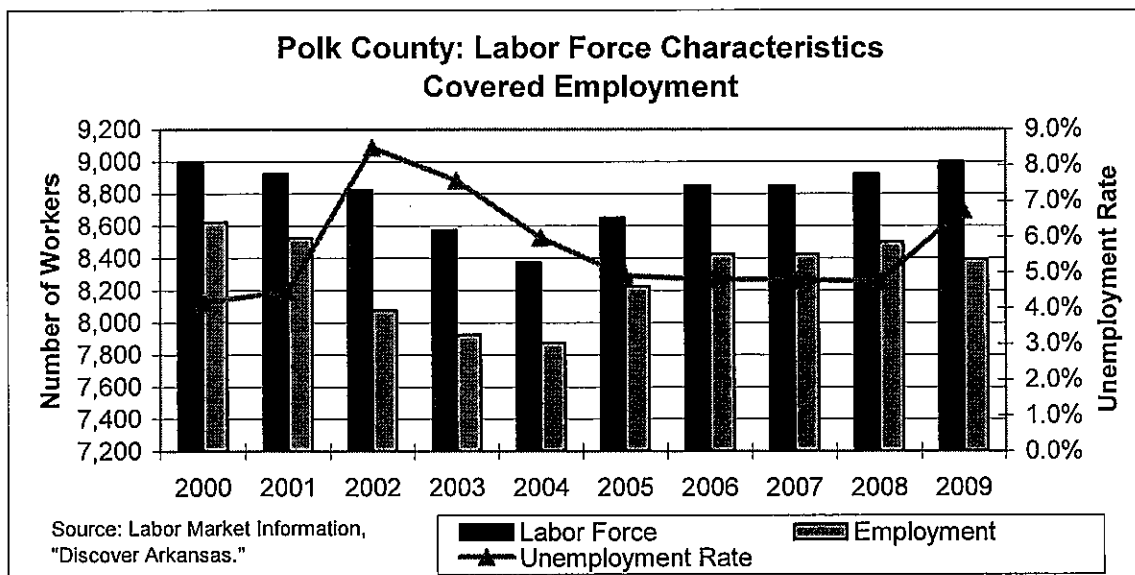


### **Labor Force, Employment, and Unemployment**

The relative stability of the Polk County population is also reflected in its covered civilian labor force which is made up of individuals paying unemployment insurance and who are eligible for unemployment insurance.<sup>9</sup> In 2000, the size of this labor force was 9,000 which is identical to the preliminary estimate for 2009. Even though the labor force appears stable, Polk County covered labor market has gone through a minor contraction and recovery cycle during

<sup>9</sup> Department of Workforce Services "Discover Arkansas." (<http://www.discoverarkansas.net/>). Currently, self-employed and unpaid family workers are excluded from coverage in the covered civilian labor force. Within this group of excluded workers, there may be owners of small business that provide services to ATV and OHV riders; such as, those services provided by locally owned and operated lodging establishments (cabins, bed and breakfast places for example).

the last nine years. Unemployment rates reached a peak in the 2002 national recession. After that the size of the labor force and number of employed declined until reaching the bottom of a trough in 2004. A period of recovery occurred during the 2005-2008, but it now appears the national slow down is beginning to impact Polk County's unemployment rate and employment level.



### Nonfarm Employment in Polk County

Nonfarm employment is an estimate of jobs by place of work. It excludes self-employed, unpaid family workers, farm workers, and private household workers. Although, nonfarm employment data are not as timely as covered employment data they are consistent with the cycle pattern in the covered employment data for Polk County.

Polk, County: Nonfarm Employment - Number of Jobs 2001-2007							
	2001	2002	2003	2004	2005	2006	2007
Total	10,884	9,608	9,587	9,731	9,994	10,017	10,162
Percent Change		-11.7%	-0.2%	1.5%	2.7%	0.2%	1.4%
Source: Bureau of Economic Analysis.							

The nonfarm data series provides industrial detail in terms of employment and earnings by industry. An analysis of Polk County's nonfarm employment data found that the major

employment sectors were manufacturing, trade/transportation/utilities, government, health care and social services, respectively. Leisure and hospitality which is a part of Polk County's tourist sector was a source of stable employment ranging from 484 to 543 over the 2001 to 2007 period.

<b>Polk County: Nonfarm Employment by Major Sector- Number of Jobs 2001-2007</b>							
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Manufacturing</b>	2,268	1,622	1,498	1,482	1,457	1,420	1,407
<b>Trade/Transportation/Utilities*</b>	1,939	1,970	1,933	1,963	2,069	2,007	1,927
<b>Health Care &amp; Social Services</b>	911	906	963	1,061	1,104	1,091	1,117
<b>Leisure and Hospitality</b>	484	476	488	432	451	543	541
<b>Government**</b>	1,327	1,311	1,342	1,363	1,398	1,419	1,422
<b>All Others***</b>	3,955	3,323	3,363	3,430	3,515	3,537	3,748
<b>Total</b>	<b>10,884</b>	<b>9,608</b>	<b>9,587</b>	<b>9,731</b>	<b>9,994</b>	<b>10,017</b>	<b>10,162</b>
* includes wholesale, retail, transportation and warehousing, and utilities.							
** includes federal, military, state and local government.							
*** includes construction, information, financial services, real estate, professional services, business services, educational services, and other services.							
Source: Bureau of Economic Analysis, Department of Commerce.							

An industry's employment share of total nonfarm employment indicates the significances of an industry's contribution to overall employment. Polk County nonfarm employment shares indicate that there has been employment shifts between industrial sectors over the 2001-2007 period. Overall, total nonfarm employment declined over the period because of the loss of manufacturing employment. Manufacturing employment shares have declined from 25% of nonfarm employment to 14% in 2007. Except for "all others," the other major industrial sectors have not shown large variations. Over this period, the variations in these sector shares have been less than 3%. The "all other" industry sector, which includes industries that essentially provide some type of service, employment shares have increased by approximately 23% from 2001 to 37% of all nonfarm employment in Polk County by 2007. Meanwhile, leisure and hospitality employment shares remained relatively stable varying from 4.4% to 5.4% over the 2001-2007 period.



Polk County: Employment Shares by Major Sectors 2001-2007							
	2001	2002	2003	2004	2005	2006	2007
Manufacturing	25.35%	16.88%	15.63%	15.23%	14.58%	14.18%	13.85%
Trade/Transportation/Utilities*	21.68%	20.50%	20.16%	20.17%	20.70%	20.04%	18.96%
Health Care & Social Services	10.18%	9.43%	10.04%	10.90%	11.05%	10.89%	10.99%
Leisure & Hospitality	5.41%	4.95%	5.09%	4.44%	4.51%	5.42%	5.32%
Government**	14.84%	13.64%	14.00%	14.01%	13.99%	14.17%	13.99%
All Other***	22.54%	34.59%	35.08%	35.25%	35.17%	35.31%	36.88%
* includes wholesale, retail, transportation and warehousing, and utilities.							
** includes federal, military, state and local government.							
*** includes construction, information, financial services, real estate, professional services, business services, educational services, and other services.							

Tourism activities chiefly incorporate parts of the leisure and hospitality and trade/transportation/utilities sectors. As such, tourist related employment in Polk County has been a source of economic stability to the county and its communities. Tourism and its related employment have provided a solid employment base that has aided in mitigating some of the adverse effects of declining manufacturing employment in Polk County.

### Nonfarm Earnings in Polk County

The components of earnings by place of work include wage and salary disbursements, contributions to pensions and insurance funds, and nonfarm proprietors' income. After a decline in 2002, Polk County earnings have grown annually at rates in excess of the national inflation rates except in 2007. Polk County's nonfarm earnings are less than 1% of Arkansas' nonfarm earnings.

Polk County: Total Nonfarm Earnings All Sectors 2001-2007							
	2001	2002	2003	2004	2005	2006	2007
Total (Thousands)	\$199,510	\$190,936	\$195,278	\$203,833	\$218,165	\$225,177	\$229,135
Percent Change		-4.3%	2.3%	4.4%	7.0%	3.2%	1.8%
Data Source: Bureau of Economic Analysis, Department of Commerce							

Nonfarm earnings reflect Polk County's major employment sectors. In 2007, 60% of nonfarm earnings came from manufacturing, trade/transportation/utilities, and government activities. The leisure and hospitality sectors contributed approximately \$6 million to nonfarm earnings which amounted to 2.6% of Polk County's nonfarm earnings.

Polk County: Nonfarm Earnings by Major Sector 2001-2007							
	2001	2002	2003	2004	2005	2006	2007
Manufacturing	\$61,518,000	\$49,255,000	\$50,384,000	\$50,641,000	\$51,149,000	\$53,245,000	\$52,157,000
Trade/Transportation/Utilities*	\$43,510,000	\$44,433,000	\$42,116,000	\$43,274,000	\$47,601,000	\$46,056,000	\$46,817,000
Health Care & Social Services	\$21,034,000	\$21,692,000	\$23,421,000	\$26,403,000	\$28,972,000	\$30,405,000	\$31,943,000
Leisure & Hospitality	\$4,340,000	\$4,643,000	\$4,819,000	\$4,222,000	\$4,459,000	\$5,547,000	\$5,988,000
Government**	\$38,045,000	\$38,831,000	\$42,092,000	\$45,137,000	\$50,540,000	\$52,140,000	\$53,684,000
All Others***	\$31,063,000	\$32,082,000	\$32,446,000	\$34,156,000	\$35,444,000	\$37,784,000	\$38,546,000
Total	\$199,510,000	\$190,936,000	\$195,278,000	\$203,833,000	\$218,165,000	\$225,177,000	\$229,135,000
* includes wholesale, retail, transportation and warehousing, and utilities.							
** includes federal civilian, military, state and local government.							
*** includes construction, information, financial services, real estate, professional services, business services, educational services, and other services.							

Polk County: Nonfarm Earnings Share by Major Sector 2001-2007							
	2001	2002	2003	2004	2005	2006	2007
Manufacturing	30.8%	25.8%	25.8%	24.8%	23.4%	23.6%	22.8%
Trade/Transportation/Utilities*	21.8%	23.3%	21.6%	21.2%	21.8%	20.5%	20.4%
Health Care & Social Services	10.5%	11.4%	12.0%	13.0%	13.3%	13.5%	13.9%
Leisure & Hospitality	2.2%	2.4%	2.5%	2.1%	2.0%	2.5%	2.6%
Government**	19.1%	20.3%	21.6%	22.1%	23.2%	23.2%	23.4%
All Others***	15.6%	16.8%	16.6%	16.8%	16.2%	16.8%	16.8%
* includes wholesale, retail, transportation and warehousing, and utilities.							
** includes federal civilian, military, state and local government.							
*** includes construction, information, financial services, real estate, professional services, business services, educational services, and other services.							

## Earnings by Workers

Nonfarm earnings per nonfarm worker is an indicator of an average worker's earnings. Since both nonfarm earnings and employment include nonfarm proprietors, the average worker may be a self-employed person, a worker for a business, or a government worker. In 2007, government workers ranked highest in Polk County in terms of earnings per worker, overtaking workers in manufacturing who had previously ranked first. Health care and social assistance and trade/transportation/utilities ranked third and fourth, respectively. The leisure and hospitality sector ranked fifth ahead of all the others.

Polk County: Non-Farm Earnings Per Worker by Major Sector - Number of Jobs 2001-2007							
	2001	2002	2003	2004	2005	2006	2007
Manufacturing	\$27,124	\$30,367	\$33,634	\$34,171	\$35,106	\$37,496	\$37,070
Trade/Transportation/Utilities*	\$22,439	\$22,555	\$21,788	\$22,045	\$23,007	\$22,948	\$24,295
Health Care & Social Services	\$23,089	\$23,943	\$24,321	\$24,885	\$26,243	\$27,869	\$28,597
Leisure & Hospitality	\$8,967	\$9,754	\$9,875	\$9,773	\$9,887	\$10,215	\$11,068
Government**	\$28,670	\$29,619	\$31,365	\$33,116	\$36,152	\$36,744	\$37,752
All Others***	\$7,854	\$9,655	\$9,648	\$9,958	\$10,084	\$10,682	\$10,284
Total	\$18,331	\$19,873	\$20,369	\$20,947	\$21,830	\$22,479	\$22,548
* includes wholesale, retail, transportation and warehousing, and utilities.							
** includes federal, military, state and local government.							
*** includes construction, information, financial services, real estate, professional services, business services, educational services, and other services.							
Data Source Bureau of Economic Analysis, Department of Commerce							

As is the case for many tourist related activities, earnings of tourist workers are low in Polk County relative to workers earnings in other sectors. One contributing factor may be the existences of unreported earnings, but regardless on average leisure and hospitality workers in Polk County are low income earnings.

### **Tourism and Travel Expenditures in Polk County**

Generally, economic impact studies of tourism focus on the expenditures of tourists from outside the study area. Surveys are often administered to visitors, business establishments, and at the various tourist attractions to try to quantify visitors' expenditures by activity. Stynes and White (2006) have estimated some national nonlocal visitors spending for OHV use.<sup>10</sup> These are shown in the accompanying table.

<sup>10</sup> Stynes, Daniel J. and Eric M. White. 2006. Spending Profiles for National Forest Recreation Visitors by Activity.

OHV Use	Nonlocal Day Trip Visitors			Nonlocal Overnight Trip Visitors		
Spending Category	Low	Average	High	Low	Average	High
Lodging includes						
camping	\$0.00	\$0.00	\$0.00	\$9.00	\$22.83	\$29.66
Restaurant/Bar	\$9.07	\$10.99	\$13.92	\$20.44	\$28.99	\$37.66
Groceries	\$8.12	\$9.84	\$12.47	\$30.90	\$36.75	\$47.74
Gas and Oil	\$21.60	\$26.17	\$33.16	\$31.95	\$43.49	\$56.51
Activities	\$2.97	\$3.60	\$4.56	\$1.66	\$4.83	\$6.28
Admissions/Fees	\$2.93	\$3.55	\$4.49	\$5.40	\$6.41	\$8.32
Souvenirs/Other	\$4.78	\$5.79	\$7.33	\$20.70	\$18.48	\$24.01
<b>Total Spending</b>	<b>\$49.47</b>	<b>\$59.94</b>	<b>\$75.93</b>	<b>\$120.05</b>	<b>\$161.78</b>	<b>\$210.18</b>
Source: Environmental Assessment for Travel Management Project, USFS.						

As shown by this data, nonlocal overnight visitors spend \$120 to \$210 per night at national prices. Over a three night four day weekend, spending could amount to \$360 to \$630 of spending per visiting group (family unit). The average amount would be \$486 per family per weekend trip. Nonlocal day visitors spend \$50 to \$76 per trip.

Unfortunately, the number of nonlocal OHV and ATV riders visiting Polk County is not known with certainty. Therefore, a direct estimate of the total loss of tourist spending due to the new regulations cannot be computed at this time.

An indirect estimate of the loss of nonlocal OHV and ATV rider's expenditures can be estimated for a typical nonlocal visitor for Wolf Pen Gap assuming that the national price reflects similar prices in Polk County. Under the new regulation, Wolf Pen Gap will be closed for approximately 32 additional weeks per year. That is, it is currently open approximately 48 weeks per year and under the new regulation it will be open 16 weeks. That is, there will be 32 weekends during which nonlocal visitors will not be making expenditures for their recreational activity. The loss of nonlocal overnight visitors spending would be \$15,530 (= 32 weeks x 3 nights x 161.78 per night) for the 32 closed weekends. The loss from a single nonlocal day visitor for the 32 weeks is \$1,918 (= \$59.94 x 32 weeks). It should be noted that the county may not necessarily lose all this visitors expenditures if the ATV riders opt to continue to recreate in Polk County instead of going elsewhere when Wolf Pen Gap is closed.

Arkansas Department of Parks and Tourism has estimated traveler expenditures by county for 2008 and published the findings on their website.<sup>11</sup> For both Polk County and Arkansas, their estimates of the impact of tourist expenditures are shown in the following table.

<b>Impact of Travel on Arkansas Counties-2008 Preliminary</b>			
<b>Year 2008</b>	<b>Polk</b>	<b>Arkansas</b>	<b>Percent of Arkansas</b>
Total Travel Expenditures (Dollars)	\$ 21,180,874	\$ 5,572,955,798	0.38%
Travel-Generated Payroll (Dollars)	\$ 3,875,265	\$ 1,052,053,185	0.37%
Travel-Generated Employment (Jobs)	246	59,677	0.41%
Travel- Generated State Tax (Dollars)	\$ 1,282,788	\$ 290,997,510	0.44%
Travel-Generated Local Tax (Dollars)	\$ 451,815	\$ 105,827,244	0.43%
Visitors (Person-Trips)	92,458	23,815,382	0.39%
<b>Impact of Travel on Arkansas Counties-2006 Preliminary</b>			
<b>Year 2006</b>	<b>Polk</b>	<b>Arkansas</b>	<b>Percent of Arkansas</b>
Total Travel Expenditures (Dollars)	\$ 18,799,173	\$ 5,108,407,442	0.37%
Travel-Generated Payroll (Dollars)	\$ 3,437,824	\$ 964,356,531	0.36%
Travel-Generated Employment (Jobs)	238	59,088	0.40%
Travel- Generated State Tax (Dollars)	\$ 1,132,361	\$ 266,740,649	0.42%
Travel-Generated Local Tax (Dollars)	\$ 400,000	\$ 97,005,736	0.41%
Visitors (Person-Trips)	87,458	23,350,238	0.37%
<b>Percent Change 2006-2008</b>	<b>Polk</b>	<b>Arkansas</b>	<b>Polk: Impact per Visitor 2008</b>
Total Travel Expenditures (Dollars)	12.7%	9.1%	\$370,487,376
Travel-Generated Payroll (Dollars)	12.7%	9.1%	\$67,784,585
Travel-Generated Employment (Jobs)	3.4%	1.0%	4,302.9
Travel- Generated State Tax (Dollars)	13.3%	9.1%	\$22,438,015
Travel-Generated Local Tax (Dollars)	13.0%	9.1%	\$7,902,967
Visitors (Person-Trips)	5.7%	2.0%	
Arkansas Department of Parks and Tourism, The Economic Impact of Travel in Arkansas.			

Although, the impact of travel expenditures is small in Polk County relative to the state, the growth of Polk County's travel expenditures exceeds the states for the 2006 to 2008 period. This table also shows the impact of travel expenditures per visitors (per trips) for 2008. If these travel expenditures reflect OHV expenditures for Arkansas, then a single OHV visitor trip to Polk County contributes \$229 to the local economy, generating \$42 in payroll, and \$5 in local

<sup>11</sup>Arkansas Department of Parks and Tourism, The Economic Impact of Travel in Arkansas 2008, page 77. (<http://www.arkansas.com/governors-conference/pdfs/APT-10369-INT.pdf>)

tax revenues. For every visitor who does not visit Polk County because of the new regulation, the county will lose their travel expenditure, and this loss will result in a loss of payroll and local tax revenue. If the decline of visitor travel expenditures is large enough to significantly reduce local economic activity, employment could decline and unemployment rise as the economy adjusts to a lower level of travel expenditures by nonlocal visitors.

### **Polk County OHV and ATV Tourist Sector**

For as active as OHV and ATV are in Polk County, there are little published and official data on their economic contribution to the region. Riding a forest trail in an OHV or on an ATV in and of itself does not have an economic impact per say, but getting to the trailhead and supporting the trail riding activity does have economic impacts. As a recreational activity, riding in OHVs and on ATVs combines several different activities across different industries, and thus impacts the economy through different sectors. This part of the study approaches the economic impact of OHV and ATV by assuming that it is similar to evaluating impacts of tourism on a region or on communities like Mena, Arkansas.

Tourist expenditures of nonlocal visitors are viewed similar to receiving payments from the export of goods produced locally. As such, they form an economic base in the local economy that supports activities indirectly in other businesses and induces additional income in the community. Survey data are not available for this study. Instead, the expenditures of tourists had to be estimated with a nonsurvey method.

To gather information on the type of tourist activities of OHV and ATV visitors, local merchants were contacted and interviewed regarding activities of OHV and ATV visitors. A phone survey was also designed and administered to various lodging establishments in the Mena area to discover how OHV and ATV visitors utilize their establishments. The findings of the survey are included in this study. From this information a picture of the tourist activities was gleaned. A typical out-of-town tourist arrives on Thursday and stays until Sunday. They stay in the various lodging establishments, visit local retail establishment to purchase groceries, eat dinner at local restaurants, and purchase fuel. They ride Wolf Pen Gap trail system and surrounding national forest trails on Friday and Saturday and return home on Sunday.

The first step in this economic impact study is to identify the industrial sectors that are impacted by the expenditures of OHV and ATV tourist. A focus of the leisure and hospitality

sector is tourism. In terms of North American Industrial Classification System (NAICS) codes leisure and hospitality is a super sector made up of the arts, entertainment, and recreation sector, plus accommodation and food and drinking places. According to NAICS, activities in these two sectors include:

The Arts, Entertainment, and Recreation sector includes a wide range of establishments that operate facilities or provide services to meet varied cultural, entertainment, and recreational interests of their patrons. This sector comprises (1) establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and (3) establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.

The Accommodation and Food Services sector comprises establishments providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption. The sector includes both accommodation and food services establishments because the two activities are often combined at the same establishment. (Bureau of Labor Statistic, Department of Labor)

In the previous section the analysis of Polk County's economy showed that its leisure and hospitality sector comprised about 5% of the county's employment and 2.6% of the economy's earnings. Implan data for the county provide some additional insights into the economy of Polk County. The accompanying tables list the various industries that make up Polk County's leisure and hospitality super sector. There are approximately 500 full-time jobs in this industry producing \$21.3 million in output, and adding approximately \$8.7 million to gross state product (value added), contributing \$5.2 million to payrolls (employee compensation), and pay approximately \$952 thousand in sales, excise taxes, and property taxes.

Polk County Leisure and Hospitality Sector 2008						
Description	Employment	Output	Value Added	Employee Compensation	Proprietor Income	Indirect Business Taxes
Performing arts companies	19.5	\$311,682	\$126,971	\$58,999	\$51,243	\$11,967
Independent artists, writers, and performers	2.6	\$245,818	\$190,938	\$23,069	\$131,306	\$1,067
Fitness and recreational sports centers	15.1	\$354,231	\$80,271	\$56,311	\$17,561	\$4,538
Bowling centers	6.8	\$242,991	\$57,896	\$28,463	\$13,213	\$5,726
Amusement parks, arcades, and gambling	10.4	\$886,654	\$221,327	\$147,080	\$20,519	\$16,967
Other amusement and recreation industries	4.1	\$350,545	\$60,566	\$21,507	\$12,513	\$6,432
Hotels and motels, including casino hotels	25.5	\$1,532,372	\$895,291	\$417,555	\$75,407	\$133,027
Other accommodations	4.8	\$393,164	\$194,492	\$85,941	\$11,374	\$15,558
Food services and drinking places	405.8	\$17,059,672	\$6,842,477	\$4,393,897	\$169,866	\$756,682
(Total)						
Leisure and Hospitality	494.6	\$21,377,129	\$8,670,229	\$5,232,822	\$503,002	\$951,964

Source Implan Data 2008, Minnesota Implan Group Inc.

OHV and ATV tourists also visit retail establishments to get the various supplies necessary for a successful trail riding experience. Retailers engaged in tourism trade included in this study were limited to food and beverage stores, gasoline stations, sporting goods stores, and general merchandise stores. As shown in the accompanying table, the largest group of retailers are those engaged in general merchandising, followed by gasoline stations, food and beverage stores, and sporting goods stores. Combined, these retailers support 615 full-time jobs, and generate approximately \$37 million in sales (output), they add \$20 million to the gross state product (value added), they have payrolls totaling \$14 million, and pay \$4.1 million in property taxes, excise and sales taxes.

Polk County: Tourist Retail Trade Sector 2008						
Description	Employment	Output	Value Added	Employee Compensation	Proprietor Income	Indirect Business Taxes
Retail Stores - General merchandise	395	\$21,713,000	\$4,309,000	\$1,717,000	\$1,216,000	\$1,376,000
Retail Stores - Gasoline stations	111	\$9,570,000	\$4,309,000	\$1,717,000	\$1,216,000	\$1,376,000
Retail Stores - Food and beverage	80	\$5,009,000	\$4,309,000	\$1,717,000	\$1,216,000	\$1,376,000
Retail Stores - Sporting goods	29	\$985,000	\$12,697,000	\$9,028,000	\$430,000	\$3,239,000
Total: Tourist Retail Sector	615	\$37,277,000	\$25,624,000	\$14,179,000	\$4,078,000	\$7,367,000

Data Source Implan Data 2008, Minnesota Implan Group Inc.



### **Economic Impact Scenario: Limiting OHV Recreation in Polk County**

As noted several times, a major problem in assessing the potential economic impact of limiting OHV and ATV recreation in Polk County is the lack of reliable data on the current or future use of the trails especially by nonlocal tourist. Without reliable data on nonlocal riders, visiting ATV and OHV enthusiast spending behavior, or the number of visitor days by these enthusiasts, it is very difficult to quantify the economic impacts of the new off road regulations.

From discussions with individuals in Polk County, OHV and ATV clubs, state, and forest representatives, a general consensus has emerged. The new OHV regulations will likely reduce ATV recreational activities in Polk County somewhat. The new regulations will restrict activities to summer weekends at Wolf Pen Gap and also close the trails when there are excessive rains. Weather uncertainties may reduce nonlocal visitor trips further because visitors may be more reluctant to make a trip when rain may close the trail. Forest Service representatives stated that ridership will be reduced at Wolf Pen Gap, but there will still be trails to ride in Polk County. They pointed out that Arkansas will still have a substantial OHV trail system on public lands compared to other states in the region so riders will like still come to Arkansas.

One way to assess the economic impact of restrictions on OHV and ATV recreation in Polk County is to analyze the consequences of a reduction in related tourist expenditures. The Implan Model which is an economic assessment software system is well suited for this type of analysis. In the previous section, the study used the Implan data to define the OHV and ATV tourist sector for Polk County. The accompanying table combines this tourist data and shows the Implan data for the county as a whole.

Polk County Tourist Related Economy 2008						
(Millions of 2008 Dollars)	Output	Value Added	Labor Income	Employee Compensation	Indirect Business Taxes	Employment
Polk Co	\$1,021	\$417	\$263	\$218	\$29	8,815
Tourism Related Retail	\$37	\$24	\$15	\$12	\$5	615
Leisure&Hospitality	\$21	\$9	\$6	\$5	\$1	494
Tourism Related	\$59	\$33	\$21	\$17	\$6	1,109
Percent of Polk County						
Tourism Related Retail	3.7%	5.9%	5.7%	5.5%	18.9%	7.0%
Leisure&Hospitality	2.1%	2.1%	2.2%	2.4%	3.3%	5.6%
Tourism Related	5.7%	7.9%	7.9%	7.9%	22.2%	12.6%
Source: Implan Data 2008, Minnesota Implan Group, Inc.						

The table shows both the absolute values for output, income, employment and local tax revenues for Polk County and its OHV tourism sector. The percent shares of these indicators are also shown. The tourism related activities make up 5.7% of the county's output, 7.9% of value added and related measures, 22.2% of the local sales, excise, and property taxes (indirect business taxes) , and 12.6% of the employment in 2008.

#### Economic Impact of a 10% Reduction in OHV Tourist Activities in Polk County

The economic impact scenario assumed a 10% reduction in OHV and ATV tourism as a result of the new travel management policy of the forest service. The analysis assumed a 10% reduction in OHV and ATV tourist related by nonlocal tourist and expenditures in Polk County. The economic impact findings associated with this reduction in tourism related expenditures are shown in the next table.

Hypothetical Economic Impacts of a 10% Reduction in OHV Tourist Expenditures								
Assumptions		Impact on Polk County						
10% reduction in Tourism Related Expenditures.	Change in Expenditures	Output	Value Added	Labor Income	Employee Compensation	Indirect Business Taxes	Employment	Change in Unemployment Rate
Tourism Related Retail	-\$3,727,700	-\$4,854,538	\$3,139,813	-\$1,647,115	-\$985,946	-\$594,426	-66	0.7%
Leisure&Hospitality	-\$2,137,700	-\$2,876,496	\$1,248,229	-\$780,110	-\$683,376	-\$134,193	-58	0.6%
Tourism Related	-\$5,865,400	-\$7,731,034	\$4,388,042	-\$2,427,225	-\$1,669,322	-\$728,619	-124	1.37%
Source: Implan Software and Data, Minnesota Implan Group Inc. and IEA calculations.								

Economic impacts can be measured by various parameters. One measure is the value of the *economic output* created directly and indirectly by out-of-town tourist spending. This is the broadest measure of economic impact. It represents the value of all business activities related to visitor spending. The analysis found that a 10% hypothetical reduction of \$5.8 million tourist

related expenditures (= \$3.7 million retail reduction + \$2.1 million leisure and hospitality reduction) reduces the overall output of Polk County \$7.7 million. In other words, for every dollar reduction in tourist related expenditures, Polk County's output falls by an additional 32 cents or by a total of \$1.32 ( $=\$7.7/\$5.8$ ). Hence, the expenditure multiplier for Polk County OHV and ATV tourist related activities is estimated at 1.327.

Another commonly presented measure of economic impact is the change in *value added*. Value added represents the payments to the factors of production (labor, capital, land, etc.). It is another broad measure, but value added adjusts output for the cost of those things purchased in order to produce other goods and services. In other words, output as a measure of economic impact includes some "double counting" of the economic effects while value added makes an adjustment for this double counting. A hypothetical reduction in tourist related expenditures of 10% in Polk County is expected to reduce value added in Polk County by approximately \$4.39 million. This is equivalent to saying that a dollar reduction in tourist related expenditures in Polk County reduces its contribution to payments to the factors of production (value added) by 74 cents ( $=\$4.39/\$5.8$ ).

A third commonly provided economic impact measure is *labor income* (or the value of the added wages and salaries paid to workers (employee compensation, and proprietors' income). Labor income is a measure of an overall payroll created in the production of economic output. In this case, a 10% reduction in tourist related expenditures reduces Polk County's payrolls by \$2.4 million and employee's wage and salary by \$1.67 million. Thus, a dollar reduction in tourist related expenditures can be expected to reduce Polk County's payrolls by 41 cents ( $=\$2.4/\$5.8$ ) and employee's incomes by 28 cents ( $=\$1.67/\$5.8$ ).

*Employment* changes are a fourth commonly used measure of the economic impact. Employment refers to full-time equivalent (FTE) jobs and represents which in this study means annual number of full-time jobs. As shown in this analysis a 10% reduction in tourist expenditures would cause a loss of 124 FTE jobs and an increase in the unemployment rate by 1.37%. Based on these findings, a million dollar reduction in tourist expenditures in Polk

County would result in a loss of 21 full-time jobs and add 0.2% to the current unemployment rate.<sup>12</sup>

Indirect business taxes paid by business in Polk County are another measure of economic impact that commonly used to access fiscal impacts. Indirect businesses are composed of property taxes, sales taxes, and excises taxes paid by businesses. This analysis found that dollar reduction in tourist expenditures would reduce indirect business tax collected in Polk County by 12 cents = (\$.72/\$5.8). The total reduction in indirect business taxes associated with the reduced tourist expenditures would be \$728. 6 thousand.

### **Extended Economic Impact Findings of Reduced OHV Tourism in Polk County**

This section of the paper concludes the analysis by extending the previous findings to a 100% reduction in OHV and ATV tourist related expenditures in Polk County. Since the actual effects of the new forest regulation on Polk County will not be known for several years, these findings are presented as a ex ante means of assessing future possibilities outcomes based on the current economic conditions.

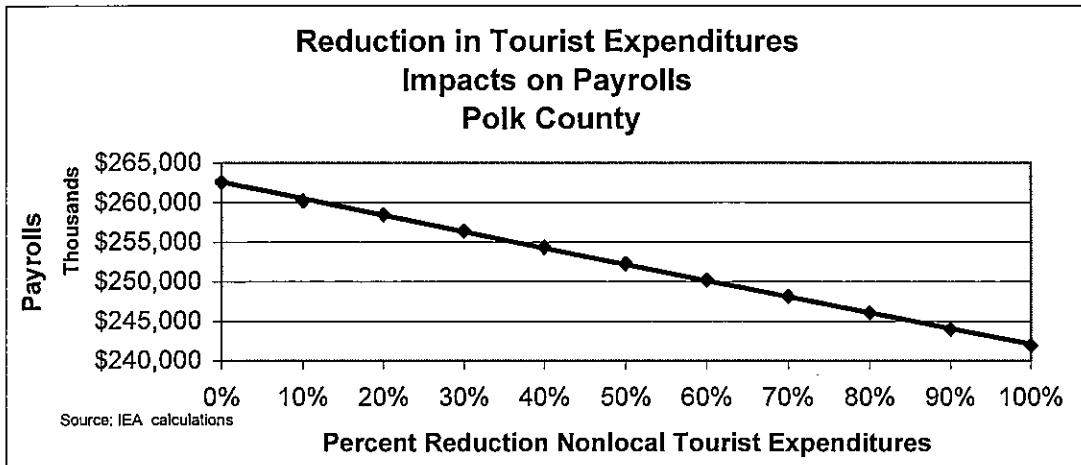
If there were a 100% reduction OHV and ATV tourist spending in Polk County's economy, direct tourist spending would be reduced by approximately \$58.6 million annually. In turn, this would cause a \$77.3 million reduction in Polk County's total output and a \$33.1 million dollar loss in value added. The likely impact of a collapse of OHV and ATV tourist expenditures for Polk County's payrolls, unemployment rates, and indirect business taxes are shown in the accompanying charts.

### **Impacts on Payrolls**

From their 2008 level of \$262.6 million, the accompany chart shows the decline in payrolls in Polk County associated with reduction in tourist expenditures. A 100% reduction in these expenditures is estimated to reduce payrolls by approximately \$20.6 million to \$242 million annually.

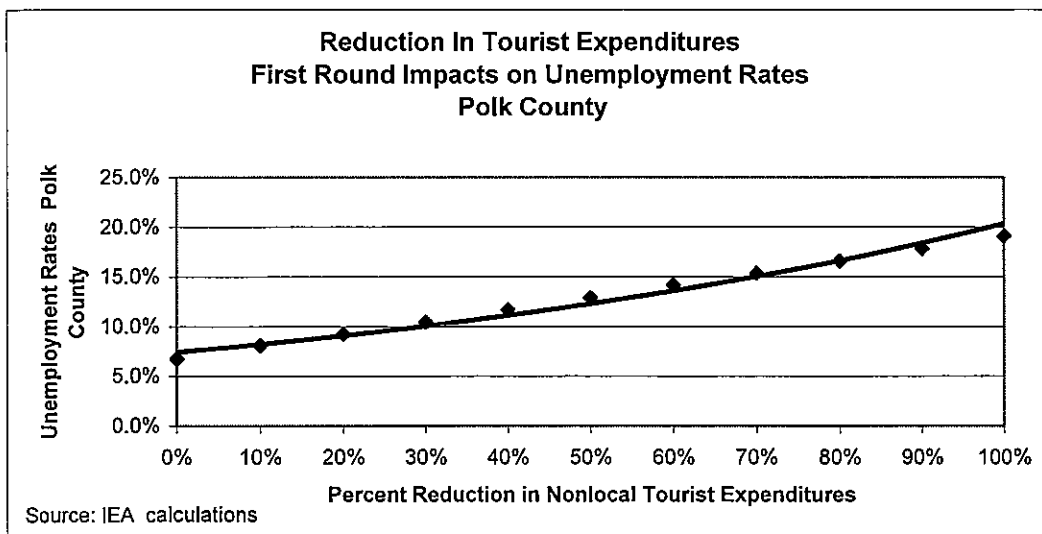
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<sup>12</sup> At the time of this writing Polk County's labor force was 9,000, employment level was 8,394 and number of unemployed was 606. (<http://www.discoverarkansas.net/>).



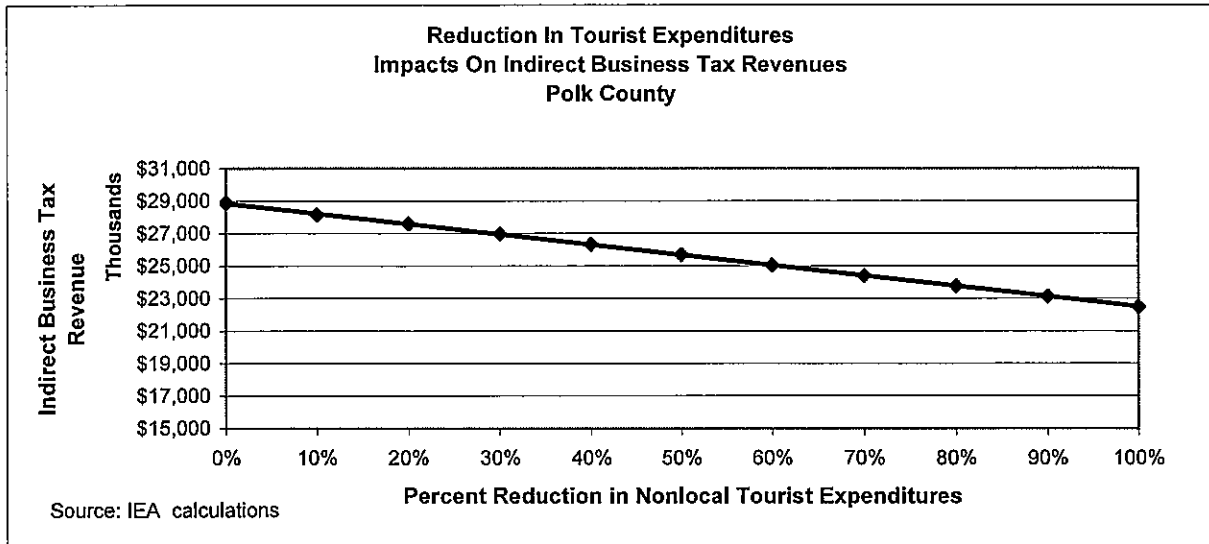
### Impact on Unemployment Rates

This chart shows various unemployment rates in Polk County for different percent reductions in tourist expenditures (nonlocal tourist ) associated with the estimated loss of 1,109 FTE jobs due to the collapse in tourist spending. The calculations are based on the current labor market conditions (2009). As such, they are really first round approximation of the impact of reduction in tourist expenditures. They do not take into account the feedback effects of unemployment on the labor market. People could find jobs outside Polk County or migrate, for example.



### Impact on Indirect Business Taxes

This chart shows the impacts of reduced tourist expenditures on indirect business taxes. A 100% reduction in tourist related expenditures reduces indirect business taxes to approximately \$22.5 million per year or by \$6.4 million from the current level of \$28.9 million.



## Part II

### Mena Arkansas: Summary of 2010 Survey Results

#### Introduction

This part of the report summarizes information collected via phone surveys with businesses in Mena in February of 2010. Questionnaire construction was a cooperative effort between the Institute for Economic Advancement (IEA) and Mena Chamber of Commerce. Mr. Greg Goss of the Chamber of Commerce has asked the IEA to undertake the survey to determine the economic impact of the new All-Terrain Vehicles (ATV) regulations on businesses in the Mena area. The questionnaire was designed to obtain businesses' overall perceptions of the newly released Travel Management Decision in Ouachita National Forest, which states the following:

*Under the newly released Travel Management Plan, National Forest is eliminating most cross-country travel and considerably restricting access for off-highway vehicles (OHVs), including All-Terrain Vehicles (ATVs). The plan is currently scheduled to be implemented by early spring 2010. Off-highway trails will be designated as open routes on weekends and holidays between May 15<sup>th</sup> and September 15<sup>th</sup>.<sup>13</sup>*

The questionnaires included questions referring to the importance of ATV riders to the businesses, business adjustments (if any) under new regulations, estimated occupancy during ATV seasons, and visitors' comments. Results are based upon a sample of 53 businesses (hotels/motels, bed and breakfast, and cabins) in Mena.

#### Survey Report

The survey report shows the type of responses from the phone survey conducted over the month of February 2010. In February 2010, 53 phone calls were attempted and 31 were completed (58%).

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<sup>13</sup>[www.pryor.senate.gov](http://www.pryor.senate.gov)

Type of Response	
Business Closed	6
No Answer	5
Answering Machine	6
<del>Refusal- Hang-up after the end of intro</del>	<del>5</del>
Complete	31
Completion Rate	58%
Total Attempted	53
Total Sample Size	53

In addition to the calls shown in the sample report, several callbacks were also made to verify the validity of the responses.

## General Findings

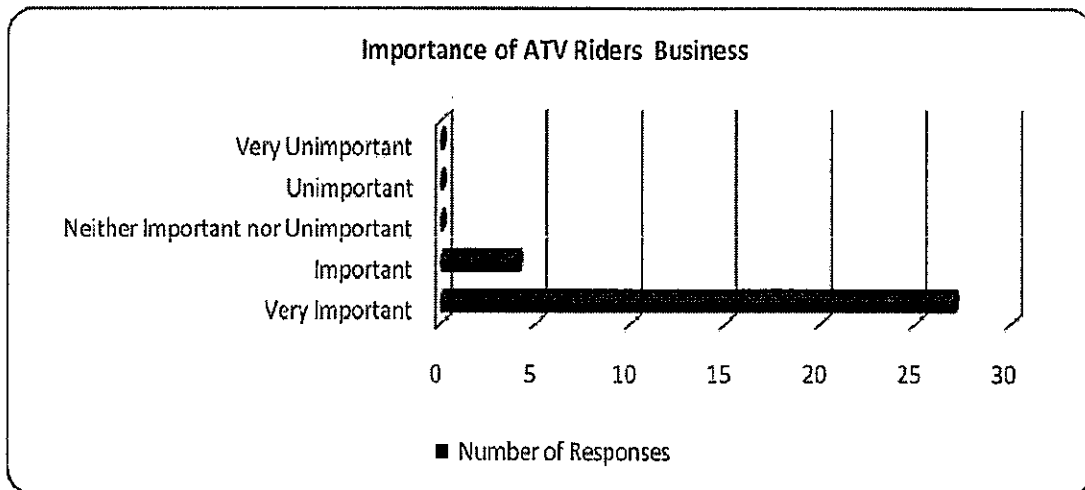
### Are you aware of the new ATV regulations?

When asked about the awareness of the new ATV regulations ninety-seven percent (29 of 30) of the respondents indicated they were aware of the new regulations and three percent (1 of 30) said they were not aware of the new ATV regulations.

### How important are ATV riders to your business?

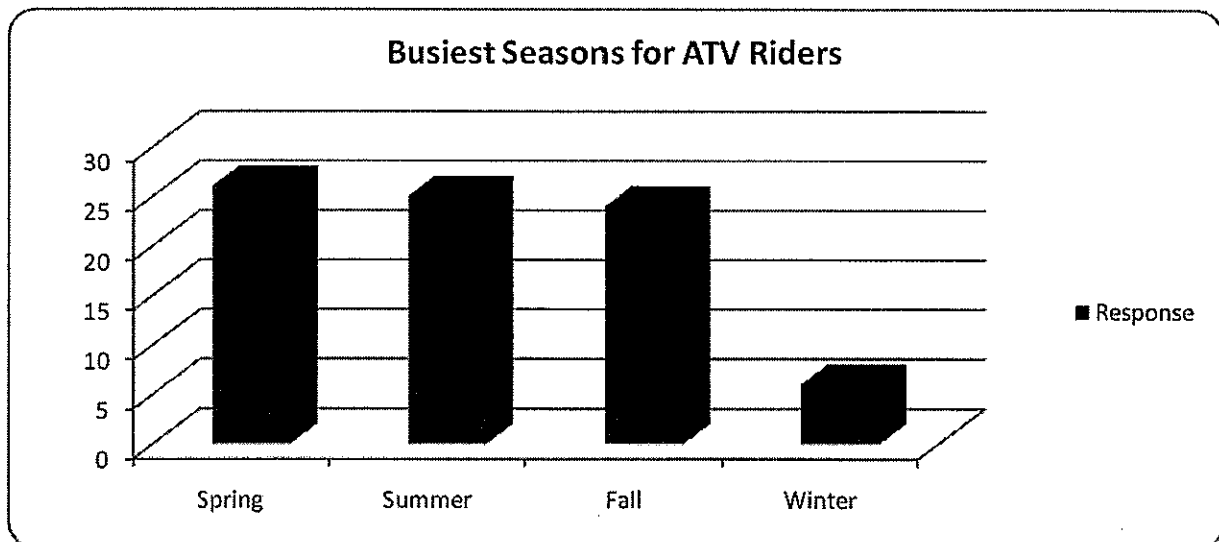
When asked about the importance of ATV riders to the businesses, eighty-seven percent (27 of 31) of the respondents indicated that ATV riders are "Very Important" to their business and the remaining thirteen percent (4 of 31) indicated that ATV riders are "Important" to their business.





### What are the busiest seasons for ATV riders?

When asked about the busiest seasons for ATV riders, eighty-seven percent (26 of 30) of the respondents indicated spring season, eighty-three (25 of 30) indicated summer season, eighty percent (24 of 30) indicated fall season, and twenty percent (6 of 30) indicated winter season.



### What percent of your business comes from ATV riders?

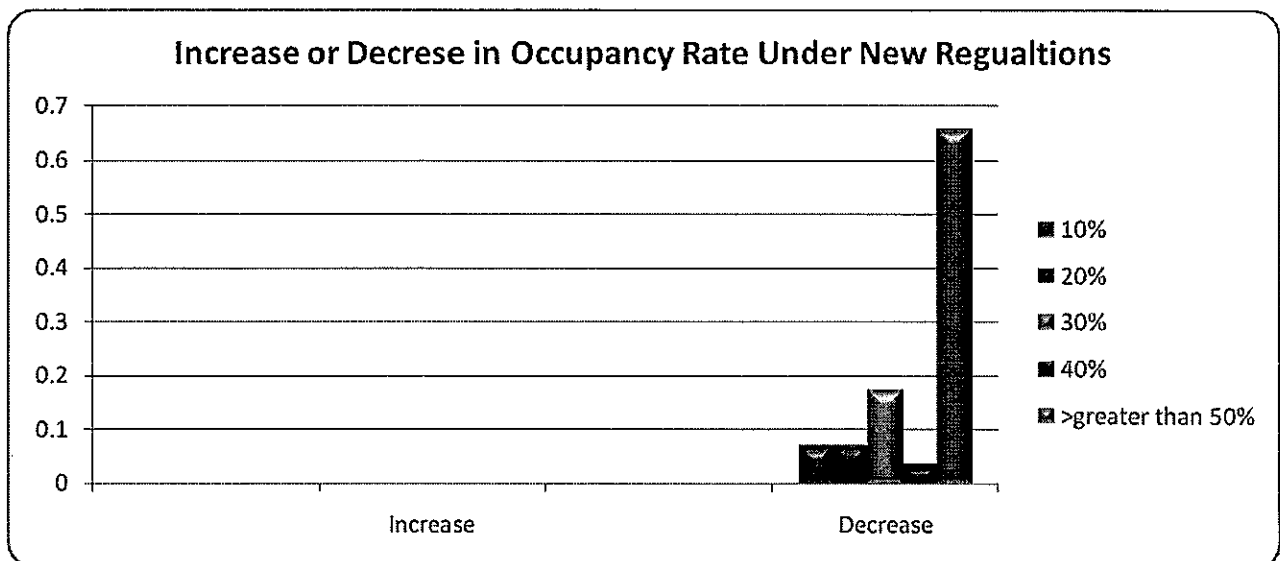
When asked what percent of their business was associated with ATV riders during the week and on weekend, the majority of accommodation business responded that more than 50% of their business was due to ATV riders.

#### What percent of your business comes from ATV riders during weekdays (weekends)?

Percent of Business	10%	20%	30%	40%	Greater than 50%	Total Number of Responses
1 Weekdays	13.79%	10.34%	3.45%	6.90%	65.52%	29
2 Weekends	3.33%	10.00%	6.67%	10.00%	70.00%	30

### Under the new regulations, what do you estimate to be the increase or decrease in your occupancy rate?

When asked about the increase or decrease in the occupancy rate under the new regulations, a total of twenty-nine responses were collected. Sixty-six percent (66% of total 29) of responses from accommodation businesses indicated that they expected a fifty or more percent decrease in their occupancy rate under the new regulations.



**Do you think you will remain in business after the implementation of the new ATV regulations?**

When asked about remaining in business after the implementation of the new ATV regulations, a total of twenty-eight responses were collected. Of the respondents, fifty percent (50% of total 28) indicated “Yes” and fifty percent (50% of total 28) indicated “No” to this question.

**Are you planning to change your employee hours under the new rules? If yes, by what percent?**

Of the respondents from accommodation businesses, fifty-nine percent (59% of total 29) indicated “Yes” and forty-one percent (41% of total 29) indicated “No” when asked about changing employee hours under the new rules. A total of twenty-nine respondents answered to this question.

**Are you planning to adjust to the new regulations? If yes, how?**

When asked about adjusting the business to the new ATV regulations, a total of sixteen responses were collected. One respondent indicated they would increase their employee hours while 11 businesses (73.3%) indicated they would decrease their employee hours by more than 50%.

Are you planning to adjust your employee hours under the new regulations? If yes, how?						
Change Employees Hours	10%	20%	30%	40%	Greater than 50%	Total Number of Responses
Increase	0%	0%	0%	0%	100%	1
Decrease	13%	0%	13%	0%	74%	15

**Are you planning to adjust your business to the new regulations? If yes, how?**

The comments that were made by the survey respondents when asked “*Are you planning to adjust your business to the new regulations*” are listed below.

	Comments
1	No
2	Probably Not. Most business comes from ATV
3	Yes-will be selling other 2 cabins. Not sure what else to do
4	Yes- will have to shut
5	Under new regulations will not be able to survive-sell out
6	No.
7	Advertise more in the areas. Aim at different groups other than ATV riders
8	Yes, Close
9	No. Will be affected greatly if hotels/motels are not receiving lot of businesses
10	Yes- add different rental boat
11	No way to adjust just close
12	Probably have to close
13	Target a new clientele -would take years
14	No idea- no tourist no way to stay open
15	Undecided-if goes as planned no other adjustments to be made
16	Just wait and see. Lose too much money, will quit. Promote horse riding.
17	2 days minimum booking. Weekend booking may go up on rate.
18	Decreased hours of operation. Polk county extremely depends on tourism i.e. camping, lodging, and ATV sports. They are more than 50% of the interest. No other industry to attract people. Affects EVERY business.
19	Advertising to bring different clients-Probably have to close doors.
20	Not at this time
21	Yes-lease land for people to ride
22	Yes-sell out and relocate
23	No
24	Don't know-adjust cabin rentals. Possibly sale

25	No
26	No adjustment in employees-No revenue, no jobs 12-25 rooms per week minimal to ATV
27	No- not as of now
28	No
29	Under new regulations will not be able to survive-sell out
30	Sell the property- wouldn't be able to keep it. Can't afford.

### **Part III**

#### **Background Information**

The growing popularity of ATV riding for recreation in Mena has brought together members from different surrounding states, including Arkansas, Texas, Louisiana, and Oklahoma. State government is taking steps to manage this popular recreational activity and many ATV user groups are looking for ways to enhance their ATV riding experience. This part of the paper outlines a mix of problems, benefits, and opportunities of All-Terrain Vehicles (ATV), and a variety of ideas to consider when deciding what level of ATV activity fits the community while sustaining National Forest System land. Off-highway vehicles are commonly defined as 1) 4-wheel drive jeeps, automobiles, or sport utility vehicles; 2) motorcycles designed for off-highway use; 3) all-terrain vehicles, better known as ATVs and other specially designed off road motor vehicles used in a wide variety of ways.<sup>14</sup> This report, however, focuses only on the recreational uses of ATVs.

#### **Issues**

The National Forest Department has increased high levels of concern on where and how off-highway recreation vehicles (OHV) occur and are offered. Due to the unmanaged recreation, there are possible threats posed to environmental damage, or the perception of environmental damage. ATVs travel across land most of the year, which can lead to soil being churned up, washed away, or otherwise damaged.<sup>15</sup> Since ATV travel is heavy, the damage is likely to occur any time of the year. Some undesirable impacts included severely eroded soils, unplanned roads, disrupted wetland ecosystems, as well as general habitat destructions and degraded water quality throughout forested lands.<sup>16</sup> This section of the paper reviews recommended actions that have been proposed to minimize environmental damage associated with ATVs.

#### **Growing Trends**

A recent study (Outdoor Industry Foundation, 2006) estimated that 72% of Americans aged 16 and older, participated in an outdoor activity in 2005, with hiking, running, and bicycling on trails being three of the most frequently reported activities. The population of OHVs in the United States grew nearly as fast, increasing 174 percent between 1993 and 2003. Similar to annual sales, the number of ATVs existing in the United States represents about 70 percent of

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<sup>14</sup><http://www.srs.fs.usda.gov/>

<sup>15</sup> [www.tughill.org](http://www.tughill.org)

<sup>16</sup><http://www.asce.org/>

the total number of OHVs, not counting 4-wheel drive vehicles.<sup>17</sup> With the increasing demand for ATVs, public land managers are increasingly concerned about mitigating potential adverse environmental impacts, unmanaged ATV use, and the ability to accommodate the rise in ATV recreation.

A survey done by National Survey on Recreation and Environment (NSRE), estimated that over 19 percent, or 13.3 million of the South's 70 million people over 16, were OHV participants. People under the age of 30 (30 percent) were about three times more likely to participate than people over the age of 50 (less than 10 percent). Almost one in four males participated compared to 14 percent of females.<sup>18</sup>

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<sup>17</sup>[www.fs.fed.us](http://www.fs.fed.us)

<sup>18</sup>[http://www.fs.fed.us/r2/blackhills/recreation/Travel%20Management/OHV\\_final\\_report.pdf#xml=http://www.fs.fed.us/cgi-bin/tehis/searchallsites/search.allsites/xml.txt?query=off+highway+recreation&db=allsites&id=4a498a340](http://www.fs.fed.us/r2/blackhills/recreation/Travel%20Management/OHV_final_report.pdf#xml=http://www.fs.fed.us/cgi-bin/tehis/searchallsites/search.allsites/xml.txt?query=off+highway+recreation&db=allsites&id=4a498a340).

## Part IV Overview of New Regulation

The following are excerpts for the Environment Assessment for Travel Management Project.<sup>19</sup>

**Alternative E** (Additional Resource Protection) No cross-country travel except for limited big game retrieval provisions. Game retrieval would be permitted during the months of October, November, and December (during state-specified black bear and white-tailed deer seasons). Parking would be allowed up to 30 feet from the centerline of the road. Approximately 5.5 miles of nonsystem spur roads added to the Forest transportation system to provide motorized access to dispersed campsites. Maximum protection provided for impaired watersheds and T&E species (via more highway-legal only designations). This alternative limits OHV use on routes within the Wolf Pen Gap area to holidays and weekends (Saturday and Sunday) from May 15 through September 15. Approximately 2.6 miles of nonsystem road and 4.8 miles of nonsystem trail added. Some trail changed from motorcycle only, to ATV and motorcycle use designation.

Alternative E: Additional Resource Protection		
Designated Road Use	Change	Result
Highway (Hwy) and OHV year round	-789	1525
Hwy only-year round	593	599
Hwy year round -Seasonal OHV	109	110
OHV year round-Seasonal Hwy	14	14
Seasonal- Hwy only	52	52
Seasonal-OHV and Hwy	-43	257
Hwy year round-OHV WPG Seasonal	20	20
<b>Designated Trail Use</b>		
ATV and motorcycle	10	97
Motorcycle only	no change	0
WPG Seasonal ATV and motorcycle	19	19
US Forest Service, Ouachita National Forest, "Environmental Assessment for Travel Management Project," p. 18.		

<sup>19</sup> Wagoner, Norman. Environmental Assessment for Travel Management Project, US Forest Service, Ouachita National Forest, p 18-19.



**Alternative E (Additional Resource Protection) – Effects**

Motorized road use (highway legal, OHV, or both) would be reduced by 441 miles.

Roads available for OHV use would be reduced by 1,486 miles. Acres available for cross-country travel would be reduced by 52%. Remaining acreage would be available for limited cross country travel for game retrieval. Dispersed campers who have been driving into the woods to camp would be limited to routes designated for motorized use that access dispersed campsites. Campers would also be allowed to park up to 30 feet from the centerline of the road when it is safe to do so and without causing damage to national forest resources and facilities, and walk into the woods and camp. Mixed use of OHV riders and horse riders would remain unchanged. Miles of single track trail for motorcycle use would be reduced by 71%.