Tensas River National Wildlife Refuge

Bottomland Hardwood Forest Management

(Commercial Tree Harvesting)

Draft Compatibility Determination

Title

Draft Compatibility Determination for Commercial Tree Harvesting, Tensas River National Wildlife Refuge (NWR, refuge)

Refuge Use Category

Agriculture, Aquaculture, and Silviculture

Refuge Use Type

Tree Harvesting (Commercial)

Refuge

Tensas River NWR

Refuge Purposes and Establishing and Acquisition Authority

Tensas River NWR was established under the Migratory Bird Conservation Act (16 U.S.C. § 715d).

In an effort to conserve the largest privately owned tract of bottomland hardwoods remaining in the Mississippi Delta, Congress authorized the Secretary of the Interior to establish the Tensas River NWR by Public Law 96-285 on June 28, 1980. Tensas River NWR was established for various purposes:

> "For the preservation and development of the environmental resources ... to conserve the diversity of fish and wildlife and their habitat ... for the conservation and development of wildlife and natural resources, the development of outdoor recreation opportunities, and interpretative education," and "to give special consideration to management of the timber on the refuge to insure [ensure] continued commercial production and harvest compatible with the purposes for which the refuge is established and the needs of fish and wildlife which depend upon the dynamic and diversified hardwood forest" (94 Stat. 595, dated June 28, 1980);
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> "For the development, advancement, management, conservation, and protection of fish and wildlife resources" [16 U.S.C. 742f(a)(4)] "for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude" [16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)];
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> "For conservation purposes" [7 U.S.C. 2002 (Consolidated Farm and Rural Development

Act)]; and

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

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as Refuge System, is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife,and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

Yes. This Compatibility Determination (CD) reviews and replaces the 2009 CD for Bottomland Hardwood Forest Management.

What is the use?

Commercial timber harvest includes the cutting and removing of trees by various techniques for sale or commercial. It is one of many refuge habitat management activities essential to supporting the NWRS mission, refuge purposes and habitat objectives identified in refuge plans. Tensas River NWR only uses tree harvesting as a "refuge management activity". Revenue from the sale of forest products is a biproduct of the essential forest habitat management, a fiscally responsible tool for conservation for the American people. This habitat management activity requires a compatibility determination because it also meets the definition of "refuge management economic activity". Most forest management actions do not result in revenue generation as they are conducted at a cost to the agency, and they do not require a compatibility determination. Activities will consist of assessing habitat conditions, developing management prescriptions then issuing a Special Use Permit (SUP) to conduct commercial timber harvest operations on the refuge to accomplish forest and wildlife habitat management objectives specified in the Comprehensive Conservation Plan (CCP; U.S. Fish and Wildlife Service [USFWS], 2009a) and Habitat Management Plan (HMP; USFWS, 2014). As stated in the previously approved CD, "Utilizing contract loggers to achieve forest habitat management goals is the only way to achieve improvement given the lack of resources to implement force account harvest activities."

Is the use a priority public use?

No

Where would the use be conducted?

When forests are outside biologically established desired conditions and tree harvesting (commercial) for refuge resources of concern is deemed a necessary option to move habitats toward desired conditions, this use may occur anywhere on the Refuge outside of passively

managed areas. There are 84 management compartments designated on the refuge, of which 77 are designated for active management (Figure 1). The matrix of recently treated areas with early successional habitat adjacent to untreated areas with later successional growth for high priority species increases species diversity by providing alternative habitat needs (Twedt and Somershoe, 2009).

Staggering harvest among years and actively managing multiple forest stands will ensure a matrix of seral stages including early successional habitats for species that rapidly exploit treated stands (e.g., red-headed woodpecker and eastern wood-pewee [Contopus virens]) as well as forest structure for high-priority species such as white-eyed vireo, hooded warbler and Swainson's warbler. In compartments 1-25 and 32-84, adaptive management strategies will be used to actively manage bottomland hardwood forests over 60 years old on approximately 50,000 acres as described by the Lower Mississippi Valley Joint Venture (LMVJV) Forest Resource Conservation Working Group (LMVJV, 2007). These areas and historical treatments are specified in the HMP 2.2 Management Unit Descriptions (Figure 1; USFWS, 2014).

Refuge ownership has increased from 74,622 acres when the CCP was approved in 2009 to 77,868 acres today. The additional acreage acquired has been reforested from 2009-2014 through the Wetland Reserve Program or carbon sequestration funds. These areas contain young hardwood stands and will not need management prescriptions until they are > 20 years old.

When would the use be conducted?

Every species has unique habitat requirement and habitat is ephemeral. Because forests are dynamic, management is often required to restore and maintain desired habitat conditions for refuge resources of conservation concern as identified in the Tensas River NWR HMP. Due to the dynamic nature of habitats, the specific locations and acreages are identified via habitat assessments used to develop Forest Management Prescriptions. These prescriptions receive comprehensive review and regional approval prior to any commercial tree harvesting activity. Prior to approval, the refuge will complete any necessary Endangered Species Act Section 7 intra-service consultation and cultural resource review per section 106 of the National Historic Preservation Act. Tree harvesting may occur daily throughout the year, but traditionally most harvest operations occur between July 1-November 15. A refuge Special Use Permit (SUP) will identify specific temporal constraints and other appropriate conservation measures essential to meeting refuge objectives. Specific silvicultural techniques will be identified in the forest habitat management prescriptions developed and approved prior to implementation. Equipment varies by objective, site and condition and is typically identified in a bid prospectus and/or in the SUP. The Permittee is normally identified via competitive bid and implements habitat project per forest management prescription and SUP with oversight from refuge staff. Please refer to the 2005 Forest Management Plan (USFWS, 2005) and HMP (USFWS, 2014) for additional specifics on desired habitat conditions and forest habitat assessments beyond details necessary for the Refuge Manager to make an informed decision on this compatibility determination.

How would the use be conducted?

Commercial tree harvest will be the preferred means of achieving habitat improvement. Logging equipment typically consists of skidders, feller bunchers, loaders, bulldozers, road graders,

transport trucks and log trucks for hauling material. Compartments scheduled for entry that are cruised and determined not feasible to support a commercial harvest can be postponed until another entry. Existing roads will be used when feasible during commercial timber harvest operations; however, temporary roads will be used throughout the sale area and restored with vegetation (approved by the refuge) following harvest operations. When harvesting is complete, the refuge forester or designated refuge staff will inspect the site for compliance with all requirements of the contract. If full compliance is achieved, the Permittee's performance deposit will be returned in full, otherwise damages will be deducted from the performance deposit and the remaining amount returned.

The 2005 Forest Management Plan (USFWS, 2005) and HMP (USFWS, 2014) include specific information that is not mentioned in this compatibility determination but should be considered an integral part of this compatibility determination. Forest management prescriptions will be prepared at the refuge and undergo a review and approval process through the Louisiana Ecological Services Field Office and Southeast Regional Office of the U.S. Fish and Wildlife Service (Service).

Why is this use being proposed or reevaluated?

Commercial tree harvesting is being reevaluated as prescribed in Service policy (603 FW 2.11 H, USFWS, 2000). Centuries of anthropogenic impacts have significantly altered forest structure, composition, and function such that active management is essential to restore and maintain desired habitat conditions. Multiple wildlife species, including refuge resources of concern identified in the HMP (USFWS, 2014) such as forest-interior breeding birds, require a mosaic of mature bottomland hardwood forests with tiered canopy layers. Hetzel and Leberg (2006) found that Swainson's (*Limnothlypis swainsonii*), Kentucky (*Geothlypis formosa*) and hooded warblers (*Setophaga citrina*) increased by 200% in bottomland hardwood forest where selective timber harvest had occurred. Priority species such as Swainson's, hooded and Kentucky warblers and white-eyed vireos (*Vireo griseus*) require dense understory growth (Rich et al., 2004), that is often associated with tree fall gaps (Pashley and Barrow, 1993) in forests with large block sizes (>5,200 acres) in a largely forested landscape (>60%) (LMVJV Forest Resource Conservation Working Group, 2007). American woodcock (*Scolopax minor*) prefer early successional habitat interspersed with hardwood forests lacking midstory and containing dense understory thickets (Dickson and Whiting, 2001). Silvicultural decisions will be based upon refuge resources of concern and their habitat requirements as it relates to desired forest conditions outlined in the HMP. Popular resident game species, such as white-tailed deer (*Odocoileus virginianus*) and eastern wild turkeys (*Meleagris gallopavo silvestris*) also respond favorably to selective timber harvests and uneven aged timber management.

Forest management on refuges is conducted solely to enhance wildlife habitat and quite often the use involves commercial forestry contractors that result in an economic use of the refuge.

This use is being proposed by the refuge as a management tool to improve habitat conditions on the refuge for trust species.

Availability of Resources

Forest management is integral to successful habitat conservation programs and may be conducted by Service staff and/or professional contractors. Project oversight is often conducted by the Tensas NWR forester or other refuge personnel. However, private contract foresters may be used for project implementation and oversight. Commercial timber harvests are primarily conducted by private contractors (loggers) identified via a competitive bid process and operating under refuge SUP. Project scope and scale may vary by location, resources of concern, current conditions, and desired future habitat conditions. Assuming the FWS fully uses existing authorities, the net fiscal impact to the refuge should be nil as the Refuge Revenue Sharing Regulation (16 USC 715S) authorizes the Service to offset all costs associated with refuge revenue generation and sharing activities. Additionally, costs may be incorporated into a timber sale prospectus and SUP, and these will be the responsibility of the SUP permitee. Refuge administrative and monitoring costs are accounted for in personnel salaries.

The analysis of cost for administering and managing each use will only include the incremental increase above general operational costs that we can show as being directly caused by the proposed use. Existing refuge resources are adequate to properly administer commercial tree harvesting in a way that will not materially interfere with or detract from fulfillment of the refuge purposes and the System mission. This use was previously approved in the refuge CCP and associated EA (USFWS 2009a, 2009b) and HMP (2014).

One-time costs:

- There are no one-time costs associated with this use.

Annual/recurring expenses:

- Administration and Management – The refuge currently has one vacant full-time equivalent (FTE) administrative forester position and one FTE forester position. The refuge foresters assist with all aspects of the administration and management of commercial timber operations including inventory, marking, bid solicitation, logging operation oversight and post-harvest inventory. Two refuge foresters spend approximately 1,560 hours cumulatively ($83,000) to meet specified objectives identified in the HMP. Private industry foresters assist with timber marking to meet management objectives, but do not administer timber sales. The administrative forester position is vacant; therefore, habitat objectives specified in the HMP cannot be met without using Service employees from other refuges or private contractors to accomplish habitat objectives.
- Monitoring – An FTE refuge forester spends 80 hours annually ($3,700) monitoring timber harvest operations. Upon completion of prescribed timber harvest operations, each treatment area will be monitored the next year and every 5 years after to see if desired results of the compartment prescription have been met.
- Maintenance – All maintenance activities associated with commercial timber harvest, including road maintenance, will be carried out by the logger. While this will reduce the

payment to the government for the value of the timber, no additional costs will be incurred by the refuge.

Offsetting Revenue:

Fair market value of standing timber is obtained through a competitive bidding process. Successful bidders are issued a SUP following full payment of timber sale bid amount. Receipts generated from the sale of forest products removed from the refuge are deposited into the Refuge Revenue Sharing Account. The funds collected annually from all refuges are distributed to the counties on a prorated basis (acreage of refuge land within each county and appraised value of this land) as an "in-lieu-taxes" payment as directed by the Refuge Revenue Sharing Act. Other revenue above amounts owed to counties is used to support forest management activities across the SE Region wildlife refuges.

Anticipated Impacts of the Use

Potential impacts of a proposed use on the refuge's purposes and the Refuge System missionCenturies of anthropogenic impacts have altered every major forested ecosystem in the southeast such that desired habitat conditions cannot be restored or maintained in the absence of active forest habitat management. The Service uses commercial tree harvest contracts that emulate natural processes and provide ecologically appropriate wildlife habitats.

Multiple NEPA analyses and decision documents address the direct, indirect, short-term, long-term, and cumulative impacts associated with bottomland hardwood forest management on Tensas River NWR, as listed.

- 2009 Tensas River NWR CCP/EA/FONSI and Endangered Species Act (ESA) Section 7 Biological Evaluation (BE) (USFWS 2009, 2009a)
- 2014 Tensas River NWR HMP/CatEx/EAS (USFWS 2014)
- Annual ESA Section 7s

This use was previously analyzed in the Draft CCP and Environmental Assessment (EA, USFWS, 2009a) and approved in the refuge CCP (USFWS, 2009) and HMP (USFWS, 2014). Furthermore, the Intra-Service Section 7 for the CCP and the Intra-Service Section 7 for each prescription support the CCP's Finding of No Significant Impact (USFWS, 2009).

Because of the dynamic nature of ecosystems, the impacts of all habitat management, including all forest management, are variable and depend upon a huge range of factors including the complex interaction of biotics and abiotic factors unique to the site at the specific time of treatment and the silvics of the species on site. Consequently, it is impossible to identify exact short-term, long-term, or cumulative impact of any habitat practice. Many aspects and impacts of commercial tree harvests are very similar to other habitat practices not requiring compatibility determination. However, commercial tree harvest is different from many other silvicultural practices in that varying amounts of wood fiber are removed from the site, and this does yield different impacts. The impacts are summarized below.

Short-term impacts

1. Short term impacts are to be expected during commercial forest habitat management. Whether they are considered positive or negative depends upon objectives and/or perspective. Tensas River NWR forest management program promotes ecological forestry concepts that focus treatment operations on what is being retained within the forest as opposed to traditional production harvest that is focused on what is being removed. As forest restoration progresses, various amounts of legacy retention of forest products occurs to promote desired habitat conditions for a broad range of priority wildlife. Careful forest prescription planning and implementation of appropriate conservation measures mitigates many short-term impacts. Many short-term impacts during and following timber harvest are positive for refuge resources. Sunlight is immediately introduced to the forest floor, stimulating herbaceous plant growth and tree regeneration. The avian community shifts towards species such as indigo buntings (*Passerina cyanea*) and yellow-breasted chats (*Icteria virens*) that prefer early successional habitat types, ultimately increasing biodiversity by creating different forest habitat types. American woodcock, a refuge resource of concern, prefer habitat with hardwood regeneration areas interspersed with stands of sawtimber-size trees (Dickson and Whiting, 2001). Table 1 details various bird habitat selection priorities. Forest management strategies that create more diverse forests, increase the availability of understory vegetation, and maintain consistent availability of early successional forest communities benefit the bear population as well as breeding birds. Soft mast preferred by bears increases as a result of the proposed forest management activities, and bears use brush and logging slash piles to den during winter months; these sites, however, are more vulnerable to disturbance (Weaver and Pelton, 1994). Silvicultural prescriptions that include large canopy gaps benefit foraging bats by providing uninhibited foraging areas. Thinning of dense regrowth within these gaps to reduce small diameter stem growth (i.e., clutter) will increase bat access for foraging in forests below the canopy (Ketzler et al., 2018). Other potential impacts include: A direct effect is that harvested trees are either killed, or for some species they are simply top killed and almost immediately resprout from stump and/or root systems.
2. The density or volume of wood in America's forests have increased by nearly 50% in less than 70 years (Oswalt et al 2019) and volumes continue to grow 2.5 times faster than removals. Increasingly dense forests have resulted in degraded habitat for many wildlife resources of concern and a forest management objective is often to reduce the amount of biomass to improve habitat. Post harvest forests are more open, creating conditions that favor increased groundcover and promotes an increase in diversity and retention of legacy promotes a more complex forest structure (Fedrowitz et al 2014).
3. Soil disturbance will occur during commercial forestry operations. Scarification frequently stimulates germination of various grasses and forbs. Potential negative impacts including erosion, sedimentation and compaction are minimized by abiding by state Best Management Practice (BMP) guidelines (www.stateforesters.org/bmps/). The extensive use and positive impacts of forestry BMPs is well documented (Schilling et al 2021). Forest management prescriptions, timber bid prospectus and special use permits identify constraints on equipment, timing and techniques to minimize negative impacts.

4. Wildlife utilizing forest habitats may be temporarily displaced during commercial forestry operations and some individuals could be harmed as trees are removed.
5. Commercial forestry operations cause a temporary increase in noise disturbance, and in emissions from equipment and vehicles. This will not have a significant, long-term impact on the local habitat or priority wildlife populations.
6. Commercial forestry operations impact on the distribution of woody debris on the habitat. Some merchantable material is moved off site while some biomass (tops, small trees, etc.) will be redistributed on the site in the form of dead and down woody material. The removal of trees will have an impact on hazardous fuels from a fire planning perspective. Proper harvest management oversight will ensure that there is no excessive buildup of woody debris. Logging debris becomes an important component of dead wood habitat, and the retention of dead wood contributes to an important habitat component for many wildlife species.
7. Commercial forestry operations may temporarily impact public use of forested areas. Due to the danger associated with timber harvesting, public access may be restricted around harvest operations to ensure safety. Post-harvest ingress/egress may be impacted in specific locations due to residual woody material on site or resulting changes in forest structure. Finally, hauling of wood has potential to degrade refuge infrastructure but costs associated with restoring sites including road repairs can be offset from revenue generated via sale of forest products.
8. Aesthetics are often significantly impacted, especially in the short-term and particularly associated with haul roads, landings (log decks), skid trails and tree felling (Jones 1993). Foresters integrate many avoidance and minimization measures to minimize impacts including closing temporary roads after harvest operations, removing all merchantable material from felled trees, cutting stumps as low as possible, and scattering slash across the stand rather than in large piles.

Potential negative short-term impacts exist with this use but are minimized through stipulations specified in the SUP including seasons, location of loader sets, and operations during dry ground conditions. This use could potentially remove cavity trees, but adherence to harvest stipulations and Desired Forest Conditions guidelines will ensure that a suitable number of cavity trees remain on the landscape. Post-harvest timber cruises were conducted on Tensas River NWR in 2016-2017, and results showed that the cavities left post harvest exceeded DFC guidelines (Renick, unpublished data).

Long-term impacts

Timber harvest activities are a long-term habitat management action with long-term impacts, many of them beneficial. Recognizing that all forest management on Tensas River NWR is solely to enhance habitats for wildlife resources of concern, the most significant long-term impact is enhanced desired forest conditions and habitats for priority wildlife. Impacts vary significantly depending upon subsequent management or disturbance and often include a decrease in stand density, an increase in forest structure, an increase in forest composition and an increase in groundcover. The ecological approach to forestry often used by the NWRS emulates the normal range of variation within healthy, fully functional forest ecosystems. Management generally moves simplified or degraded forest habitats towards more complex ecosystems typical of older

growth forests (Bauhus et al 2009).

- Desired forest conditions are identified in refuge planning documents (HMPs and Forest Management Prescriptions) and supported by scientific literature (e.g. Restoration, Management and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat (LMVJV 2007) and also is based upon professional expertise. For the long-term, forests are moved closer to desired habitat conditions.
- Habitat management including commercial tree removal changes environmental conditions such that some species benefit more than other species. Twedt and Wilson (2016) identified bird responses to wildlife friendly forestry and concluded that habitat conditions markedly changed in treated stands over time, often reverting to pre-treatment state within 20 years.
- Because tree removal is an intentionally significant disturbance and is conducted using equipment that moves to many different sites, it may create conditions to favor introduction of invasive or noxious species. This risk is mitigated by including SUP conditions on cleaning equipment prior to contractors arriving on-site. Additionally, silviculture is often used in the management of invasive or noxious species to restore habitats (Muzika, RM 2017).
- Forest function has become highly degraded across the southeastern united states and forests are very dynamic. Forest management is not a one-time activity but rather is a long-term process and reaching conservation success, towards Refuge purpose and objectives, depends upon ongoing management.

As with any habitat enhancement, wildlife responses are variable and ephemeral. Passerine response to habitat modifications has been documented in numerous publications. Three species of concern (Swainson's warbler, hooded and Kentucky warblers) responded favorably to selectively thinned timber harvests 12-18 years post-harvest versus untreated stands >30 years, while other species, such as Acadian flycatchers (*Empidonax virescens*), red-eyed vireos (*Vireo olivaceus*), prothonotary warblers (*Protonotaria citrea*) and summer tanagers (*Piranga rubra*), that breed on the refuge declined temporarily in treated stands (Twedt & Somershoe, 2009; Heltzel & Leberg, 2006) then populations increased later. Staggering harvest among years and actively managing multiple forest stands will ensure a matrix of early successional habitats for species that rapidly exploit treated stands (e.g., red-headed woodpecker and eastern wood-pewee [Contopus virens]) as well as later successional growth for high-priority species such as white-eyed vireo, hooded warbler, and Swainson's warbler.

White Nose Syndrome has been the foremost stressor on northern long-eared and tricolored bats, and the current impact of habitat enhancement is considered "Low" because the severity of population-level declines is slight. (Service 2021, p. 43). Many studies of cavity roosting bats have concluded that retention and maintenance of potential roost trees, particularly snags, is important for bats (Campbell et al., 1996; Jung et al., 1999; Gooding & Langford, 2004, Silvis et al., 2016). The northern long-eared bat (NLEB) is federally listed, and the refuge is within the edge of the NLEB range.; although no NLEB's and maternal colonies have been detected on the refuge. The tricolored bat (TCB) is proposed for listing as proposed endangered. Documentation of this

species has occurred during mobile acoustical bat surveys and anthropogenic structure surveillance on the refuge. Mitigation measures such as implementing buffers around known roost sites (150 feet radius) and snag retention (especially snags larger than 8 inches in diameter) will be utilized to minimize potential impacts. Consultation (formal or informal) with Ecological Services will occur prior to any timber harvest activities taking place on the refuge. Ketzler et al., 2018 concluded that management towards Tensas River NWR desired forest conditions is likely to maintain or increase bat activity as compared to unmanaged forests.

Monarch butterflies have been listed as candidate species and utilize herbaceous ground cover, particularly milkweeds, for foraging. This species does not winter on the refuge, but may be present during the spring breeding period. Timber harvest could improve habitat for this species by creating earlier successional habitat including blooming nectar plants. The Fat Pocketbook freshwater mussel is listed as endangered and after a 5-year review in 2019, the U.S. Fish and Wildlife Service proposed to delist this species. This species has not been detected in the Tensas River during two rigorous mussel surveys. The Alligator snapping turtle has recently been proposed threatened and has been documented on the refuge. Inclusion of Louisiana forestry best management practices mitigates risks to aquatic ecosystems.Long-term impacts to habitat are expected to be beneficial. Large canebrakes were common in the early 1800s on what is now Tensas River NWR (Baldwin & Barrow, 2012), and palmetto (*Sabal minor*) was not as predominant due to annual flooding. Switch cane or river cane (*Arundinaria gigantea*) is considered a rare and declining habitat type, and remaining examples are small and fragmented. This type is listed as a "critically endangered ecosystem," meaning that it has declined more than 98% from its original extent (Noss et al., 1995). Canebrake restoration is possible when cane is already present. At least partial sunlight is critical for development of cane thickets. Cane is somewhat shade tolerant and on a favorable site, it can grow into high-density patches in the forest gaps commonly left by uneven aged silviculture (LMVJV Forest Resource Conservation Working Group, 2007). Foresters implement 1-to-3-acre targeted patch cuts where existing cane is present during timber harvest operations.

Benson (2005) reported a relatively high reuse of tree dens on Tensas River NWR with almost all denning attempts occurring in mature baldcypress trees. Crook and Chamberlain (2010) studied den selection at Tensas River NWR and found most (65%) den sites were in trees, primarily baldcypress trees. Due to the high denning use in this particular tree species, mature baldcypress trees are excluded from timber harvest. The production of soft mast and creation of logging slash piles can positively impact Louisiana black bear habitat. Strategically placed patch cuts can improve declining switch cane habitat, thus benefitting forest interior breeding birds and bears. While evaluating actively versus passively managed timber stands, Ketzler et al. (2018) found little evidence that silvicultural activities proposed by the LMVJV for managing bottomland hardwood forests negatively impacted bat communities. Detection of acoustic recordings of bats was similar in stands silviculturally treated to enhance habitat for wildlife and reference stands, though the proportion of acoustic recordings was higher in treated stands for most bat species.

Cumulative Impacts

Cumulative impacts may result from sequential actions on a given area, ecosystem or

species. Significant cumulative impacts can result from individually minor but collectively important actions taking place over time. Spatial and temporal considerations may influence cumulative or indirect impacts. As example, deforestation around a refuge may influence wildlife response to forest management treatments within the refuge. Recolonization of improved habitats may be influenced by an off-site barrier such as an urban development.

- The diversity of seral stages across a landscape can be a consideration influencing cumulative impacts. Enhancements towards desired conditions at a landscape scale often have better wildlife response than stand level enhancements when the broader landscape remains in relatively poor condition for wildlife resources of concern.
- Prescription planning considers cumulative disturbance including tree removal from other actions on and off-refuge, and combined effects of other management actions (e.g. prescribed fire, mechanical or herbicide treatments, plantings) or natural events (wildfire, pest and disease) impact wildlife responses.
- Silviculture is the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis. The ongoing interaction of the range of practices is ultimately what restores and maintains desired habitat conditions. For example, a single tree removal operation only provides a temporary impact. However, when sustained at appropriate frequency and intensity, forest management restores and maintains desired habitat conditions.
- The effects of additive tree mortality are taken into consideration as a cumulative impact when evaluating tree stocking and structure. Following a timber harvest operation there could be subsequent mortality, both direct or indirect, from modified wind dynamics, subsequent wildfires or prescribed burns, and from pests or diseases. Conversely, these same risks occur in the absence of tree harvests and may even be elevated as fuels are greater and higher stand density increase risks of pest outbreaks.

Public Review and Comment

The draft CD will be available for public review and comment for 15 calendar days, from April 17, 2024 to May 1, 2024. The public will be made aware of this comment opportunity through the refuge website (https://www.fws.gov/refuge/tensas_river/) and Tensas River Refuge Association Facebook page (https://www.facebook.com/trrapage/). State agencies and Native American Tribes have been asked to review and comment on the draft CD. A hard copy of this document will be posted at the Refuge Headquarters or Visitor Center (2312 Quebec Rd., Tallulah, LA 71282). Please let us know if you need the documents in an alternative format. Concerns expressed during the public comment period will be addressed in the final CD.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

Prior to implementation of a commercial tree harvest, a step-down forest management prescription will be developed that minimally identifies refuge resource of concern, describes current condition, describes desired future condition and identifies process and treatment(s) to move forest toward desired condition. Additionally, Section 106 (cultural resources) and Section 7 (ESA intra-service consultation) is completed before the prescription is approved for implementation. Finally, the refuge SUP identifies necessary stipulations to meet refuge objectives. Ensuring project implementation specifically supports refuge plans (e.g. CCP, HMP, Forest Management Prescription) and includes appropriate conservation measures and BMPs to support refuge habitat objectives ensures compatibility.

Justification

Tensas River NWR is a bottomland hardwood forest mostly composed of second growth and even-aged hardwood stands. Silvicultural manipulation of these types of stands has been shown to benefit the refuge's Resources of Concern in numerous research publications (Lynch, 1981; Heltzel & Leberg, 2006; Norris et al., 2009; Twedt & Somershoe, 2009; Benson & Chamberlain, 2006). Commercial timber harvest operations on the refuge accomplish forest and wildlife habitat management objectives specified in the CCP (USFWS, 2009a) and HMP (USFWS, 2014).

This use is mandated in the establishing purposes of the refuge:

> "For the preservation and development of the environmental resources ... to conserve the diversity of fish and wildlife and their habitat ... for the conservation and development of wildlife and natural resources, the development of outdoor recreation opportunities, and interpretative education," and "to give special consideration to management of the timber on the refuge to insure [ensure] continued commercial production and harvest compatible with the purposes for which the refuge is established and the needs of fish and wildlife which depend upon the dynamic and diversified hardwood forest" (94 Stat. 595, dated June 28, 1980);

This use benefits multiple wildlife species, including refuge resources of concern, that require a mosaic of mature bottomland hardwood forests with tiered canopy layers of newer growth. Game species, including white-tailed deer and turkeys, respond positively to active forest management as well. Silvicultural treatments provided by commercial timber harvest modify habitat to benefit refuge resources and help achieve the desired forest conditions outlined in the HMP. These treatments can increase the mid-story component and understory vegetation providing a more complex habitat type. Due to the large-scale decline of bottomland hardwood forest habitat, silvicultural manipulations on a localized level rapidly produce forest conditions that optimize habitat for refuge resources of concern.

Based on available science and best professional judgement, the Service has determined that

Tree Harvesting (commercial), as outlined in this compatibility determination, supports the NWRS mission and Tensas River NWR purposes and habitat objectives. The Code of Federal Regulations states, "We may only authorize public or private economic use of the natural resources of any national wildlife refuge … where we determine that the use contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission" (50 CFR 29.1). It is anticipated habitat for priority resources of concern will increase from commercial tree harvest and other non-commercial forest habitat management and wildlife populations will positively respond to habitat enhancements.

The existing use of commercial tree harvest on Tensas River NWR is a compatible use based on sound professional judgment. At the current and proposed levels, bottomland hardwood forest management does not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the refuge. In contrast, this use benefits the refuge's natural resources. Based on available science and best professional judgement, the Service has determined that bottomland hardwood forest management on Tensas River NWR as outlined in the refuges CCP and associated EA, HMP, Forest Management Plan and this updated CD, and in accordance with the stipulations provided here, will not materially interfere with or detract from the fulfillment of the Refuge System mission or the purposes of Tensas River NWR.

This compatibility determination can be categorically excluded from further National Environmental Policy Act (NEPA) analysis under 40 CFR 1508.4 (definition of categorical exclusion) and 516 DM 8.5 B (7,9):

> 8.5 B(7) Minor changes in the amounts or types of public use on Service or State-managed lands, in accordance with existing regulations, management plans, and procedures.
>
> 8.5 B(9) Minor changes in existing master plans, comprehensive conservation plans, or operations, when no or minor effects are anticipated. Examples could include minor changes in the type and location of compatible public use activities and land management practices.

Further, this action does not trigger an extraordinary circumstance as outlined under 43CFR§46.215. This use is consistent with the 2009 CCP and associated EA for Tensas River NWR. The environmental conditions and use have not changed substantially since the previous NEPA analysis and decision in 2009 (USFWS, 2009). This CD updates and replaces the previous CD for use in 2009.

Literature Cited/References

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Figure 1. Tensas River National Wildlife Refuge Compartment Map

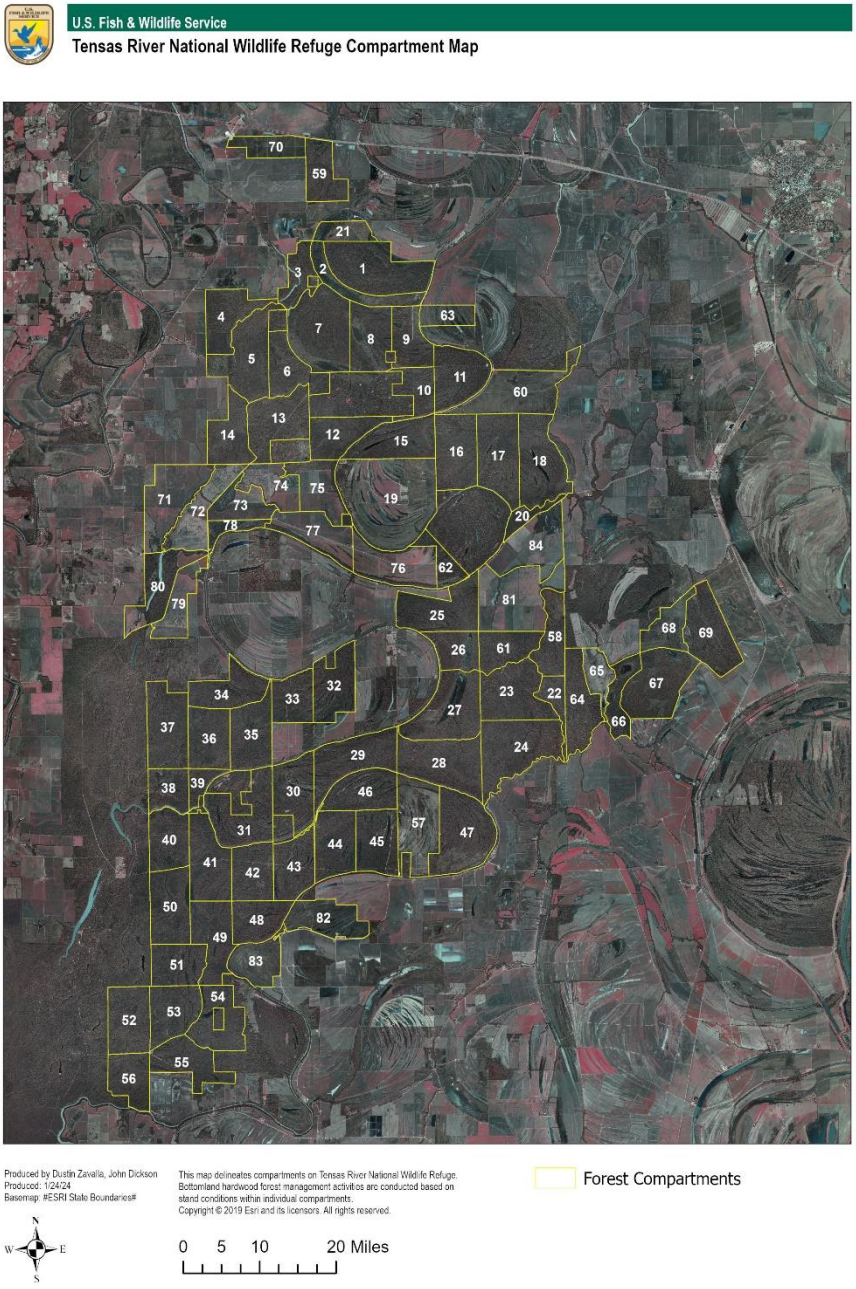

Table 1. Habitat characteristics required by or correlated with occurrence of

forest interior breeding birds known or presumed to breed on Tensas River National Wildlife Refuge NWR. (USFWS, 2014)

Common Name	Habitat Element, Characteristic, or Management Practice
Red-shouldered hawk	Prefers mature hardwood forest with open understory (Dykstra et al., 2008)
Broad-winged hawk	Prefers younger hardwood forest with openings and nearby water, and denser understory than red-shouldered hawk (Goodrich et al., 1996)
Swallow-tailed kite	Although considered a forest edge species (Zimmerman, 2004), swallow-tailed kites require large areas for breeding—100,000 acres (40,000 ha) for 80 breeding pairs (Cely & Sorrow, 1990)
Yellow-billed cuckoo	Avoids heavy forest; prefers open woodland, low dense shrubs, and water nearby (Hughes, 1999); density reduced in stands subjected to group selection and shelterwood cuts (Norris et al., 2009)
Pileated woodpecker	Snags (Pashley & Barrow, 1993);
Acadian flycatcher	"Selective timber harvest" negative effect compared with closed-canopy "reference" stand (>30 years since harvest) (Heltzel & Leberg, 2006); More common in [upland] mature, untreated hardwood forest compared with forest after understory and/or overstory thinning (Rodewald & Smith, 1998); reduced detections in thinned BLH on TRNWR compared to untreated stands (Twedt & Somershoe, 2009).
Great crested flycatcher	Avoids continuous, closed-canopy forest; prefers open woodlands and edges, and wet forests over dry (Lanyon, 1997)
Yellow-throated vireo	Old/large trees (Pashley & Barrow, 1993);
Red-eyed vireo	Patch clearcut, 1 acre [slight negative effect] (Germaine et al., 1997); "Selective timber harvest" negative effect compared with closed-canopy "reference" stand (>30 years since harvest) (Heltzel & Leberg, 2006); reduced detections in thinned BLH on TRNWR compared to untreated stands (Twedt & Somershoe, 2009).
Blue-gray gnatcatcher	Prefers broad-leaved forest (over needle-leaved conifers) for breeding (Ellison, 1992)
Wood thrush	Patch clearcut, 1 acre [possible positive effect] (Germaine et al., 1997);
Northern parula	Spanish moss, (*Tillandsia usneoides*), (Pashley & Barrow, 1993)
Yellow-throated warbler	Spanish moss, baldcypress (*Taxodium distichum*) , Old/large trees (Pashley & Barrow, 1993)

Common Name	Habitat Element, Characteristic, or Management Practice
American redstart	Lianas, including *Parthenocissus quinquefolia* and *Toxicodendron radicans*, Individual tree selection cutting (Pashley & Barrow, 1993);
Cerulean warbler	Prefers mature bottomland hardwoods for breeding (Hamel, 2000); Area sensitive breeder, may require tracts of 8,000 ha (20,000 acres) for sustainable breeding (i.e. source) populations in the MAV (Mueller et al., 1999); Breeding habitat requirements: closed canopy with scattered, very tall super-emergent trees, well-defined canopy, midstory, shrub, and herbaceous understory present (Lynch, 1981).
Prothonotary warbler	"Scour channels" (sloughs) , snags (Pashley & Barrow, 1993); "Selective timber harvest" negative effect compared with closed-canopy "reference" stand (>30 years since harvest) (Heltzel & Leberg, 2006);
Swainson's warbler	Switch cane "brakes", palmetto (*Sabal minor*) thickets, Individual tree selection cutting (Pashley & Barrow, 1993); Switch cane "brakes", individual tree selection or "small" patch clearcuts, dense understory, heavy leaf litter (Bednarz et al., 2005); Understory density of 30,000-50,000 stems/ha, switch cane not an essential element of habitat, early successional forest or disturbance gaps, moist soil but no flooding during breeding season (Graves, 2002); "Older Selective harvests" (12-18 years) beneficial effect compared with "reference" stand (>30 years since harvest) (Heltzel & Leberg, 2006); Relatively dense understory, no flooding during growing season, canopy gaps (Somershoe et al., 2003). Switch cane "brakes", palmetto (Sabal minor), shaded and fairly dense understory, abundant leaf litter, little herbaceous ground cover (Brown, R.E., and J.G. Dickson, 1994)
Kentucky warbler	Switch cane "brakes", lianas, Individual tree selection cutting (Pashley & Barrow, 1993); "Older Selective harvests" (12-18 years) beneficial effect compared with "reference" stand (>30 years since harvest) (Heltzel & Leberg, 2006); increased detections in thinned BLH on TRNWR compared to untreated stands (Twedt & Somershoe, 2009); 50% higher density after group selection than in untreated BLH (Norris et al., 2009).
Hooded warbler	Switch cane "brakes," lianas, Individual tree selection cutting (Pashley & Barrow, 1993); "Older Selective harvests" (12-18 years) beneficial effect compared with "reference" stand (>30 years since harvest) (Heltzel & Leberg, 2006);
Summer tanager	Prefers gaps and edges of deciduous forest (Robinson, 1996); reduced detections in thinned BLH on TRNWR compared to untreated stands (Twedt & Somershoe, 2009).

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date