United States Department of the Interior

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September 23, 2016

Mr. Jon M. Stansfield, District Ranger
Poplar Bluff Ranger District
Mark Twain National Forest
1420 Maud St.
Poplar Bluff, MO 63901

Dear Mr. Stansfield:

This letter is in response to your May 20, 2016, request for site-specific review, pursuant to section 7 of the Endangered Species Act of 1973, as amended, (ESA) on the Blackwell Ridge Project on the Poplar Bluff Ranger District (District) in Butler and Wayne counties, Missouri.

We have reviewed the information contained in the Biological Assessment (BA) and accompanying maps, which you submitted on May 20, 2016 and additional information provided on July 20 and July 27, 2016. In the original documents submitted on May 20 and July 20, 2016, two alternatives were considered for each project action evaluated and we were unclear which alternative was the preferred alternative. In an electronic mail message provided by Theresa Davidson on July 27, 2016, we learned that alternative 2 is the preferred alternative and our analysis is based on that determination. We have determined that the actions and effects associated with the proposed Blackwell Ridge Project are consistent with those identified and discussed in the U.S. Fish and Wildlife Service's (Service) Programmatic Biological Opinion (BO), issued on September 16, 2005, amended in 2009, and extended on June 30, 2016, that evaluated the effects of all U.S. Forest Service (USFS) actions outlined in the Forest Land and Resource Management Plans (Forest Plan) for the Mark Twain National Forest (MTNF).

The enclosed BO tiers to the Service's programmatic BO for the MTNF Forest Plan and addresses effects of the proposed action on the Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*). We concur with your determination that project activities may affect, but are not likely to adversely affect the gray bat and that activities are likely to adversely affect the Indiana bat. Based on the size and scope of the project, environmental baseline, status of Indiana bat and its potential occurrence within the project area, effects of the action, and any cumulative effects, it is the Service's biological opinion that this action is not likely to jeopardize the continued

existence of the Indiana bat. Provided in this BO is a statement of anticipated incidental take of the Indiana bat as a result of the project.

The northern long-eared bat (*Myotis septentrionalis*)(NLEB) was listed after the last revision of the MTNF Forest Plan; thus, it is not included in the programmatic BO and requires a separate analysis. On January 14, 2016, a final rule pursuant to section 4(d) of the ESA was published for the NLEB. The final rule exempts take of the NLEB from section 9 prohibitions of the ESA for activities meeting certain provisions and complying with specific conservation measures. We have determined that 11,144 acres of project activities meet provisions of the final 4(d) rule and comply with associated conservation measures. Because effects from activities meeting these provisions were already evaluated in a programmatic biological opinion issued by the Service on January 5, 2016, no further evaluation of effects is required. We concur with your determination that the NLEB may be adversely affected but all actions are consistent with those analyzed in the Service's rangewide no jeopardy Programmatic BO of January 5, 2016. Because no prohibited take of the NLEB will occur, an incidental take statement is not needed in the following BO.

In the event that future surveys document the presence of a maternity roost or hibernaculum of NLEB within the project area, we recommend that measures outlined in the Service's January 5, 2016 Programmatic BO be implemented so that any incidental take is still exempted per the Service's January 14, 2016 4(d) rule. Additionally, we ask that you contact this office for any roosts or hibernacula discovered.

We appreciate your efforts to conserve threatened and endangered species. If you have any questions regarding our response or if you need additional information, please contact me at 573-234-2132 x 107.

Sincerely,

/s/ Paul McKenize, Ph.D.
Acting Field Supervisor

Cc: USFS, Mark Twain National Forest, Wildlife, Rolla, MO (Theresa Davidson)

[1]TIERED BIOLOGICAL OPINION FOR INDIANA BAT

On September 16, 2005, the U.S. Fish and Wildlife Service (Service) issued a Programmatic Biological Opinion (Programmatic BO) for the Mark Twain National Forest (MTNF) 2005 Forest Plan (Forest Plan). This Programmatic BO established a two-tiered consultation process for Forest Plan activities, with the issuance of the programmatic opinion being Tier 1 and all subsequent site-specific project analyses constituting Tier 2 consultations. When it is determined that a site-specific project is likely to adversely affect federally listed species, the Service will produce a "tiered" biological opinion.

In issuance of the Programmatic BO (Tier 1 biological opinion), the Service evaluated the effects of all U.S. Forest Service actions outlined in the Forest Plan for the MTNF. The Programmatic BO evaluated the effects of Forest Service management program activities, including timber management and prescribed burning, on the bald eagle (*Haliaeetus leucocephalus*), Gray bat (*Myotis grisescens*), Hine's emerald dragonfly (*Somatochlora hineana*), Indiana bat (*Myotis sodalis*), Mead's milkweed (*Ascelpias meadii*), Pink mucket pearlymussel (*Lampsilis abrupta*), Running buffalo clover (*Trifolium stoloniferum*), Scaleshell mussel (*Leptodea leptodon*), Topeka shiner (*Notropis topeka*), Tumbling Creek cavesnail (*Antrobia culveri*), and Virginia sneezeweed (*Helenium virginicum*). We concurred with your programmatic determinations of "no effect" for Virginia sneezeweed, running buffalo clover, and Topeka shiner. We concurred with your programmatic determinations of "may affect, not likely to adversely affect" for the Hine's emerald dragonfly, Tumbling Creek cavesnail, pink mucket, scaleshell, bald eagle, and gray bat. We also concurred with your programmatic determination of "may affect, likely to adversely affect" for Mead's milkweed and Indiana bat.

On April 2, 2015, the Service listed the Northern Long-eared Bat (*Myotis sepentrionalis*) as an endangered species. On Jan. 14, 2016, the Service published a final 4(d) rule for the Northern Long-eared Bat (NLEB). This rule outlined various incidental take prohibitions for this species within areas of the country affected by White-nose syndrome (Missouri was included in this identified area). These were: 1) activities that occur within a hibernaculum, 2) tree removal activities within 0.25 mi. (0.4 km) of a known hibernaculum, and 3) any activity that cuts or destroys a known, occupied roost tree or other trees within a 150' radius from the maternity roost tree during the pup season from June 1 through July 31. A Programmatic Biological Opinion on the Service's 4(d) rule was issued on January 5, 2016.On April 27, 2016, the Service published a final rule in the *Federal Register* determining that designation of critical habitat for this species was not prudent.

In June 2009, the Service provided MTNF with an amended Programmatic BO that addressed running buffalo clover and updated the status of the species for the Indiana bat. The MTNF also amended the Forest Plan in 2014 to reflect critical habitat designations for the Hine's emerald dragonfly and Tumbling Creek cavesnail and for the listing of four additional species as endangered: the Ozark Hellbender (*Cryptobranchus alleganiensis bishopi*), snuffbox mussel

[1] Tier 2 consultation currently do not include the northern long-eared bat (*Myotis septentrionalis*)(NLEB) because the species was not addressed in the 2005 and 2009 Programmatic BO or 2016 extension. A BO evaluating effects on the NLEB is provided after the tiered BO.

(*Epioblasma triquetra*), spectaclecase mussel (*Cumberlandia monodonta*), and sheepnose mussel (*Plethobasus cyphyus*). The Service concurred with the MTNF's determinations that the Forest Plan, as amended, is not likely to adversely affect the aforementioned species or adversely modify critical habitat of the Hine's emerald dragonfly or the Tumbling Creek cavesnail. The 2005 Programmatic BO that was amended in 2009 and extended on June 30, 2016.

Your request for Service review of the proposed activities associated with the Blackwell Ridge Project is a Tier 2 consultation because (1) this proposed project falls within the scope of the Programmatic BO issued for the MTNF's Forest Plan; (2) effects of this proposed action are consistent with those anticipated in the Tier 1 Programmatic BO; and (3) you have stated that the MTNF will adhere to the appropriate implementing terms and conditions associated with the reasonable and prudent measures identified in the Tier 1 BO.

We have reviewed the information contained in the Blackwell Ridge Project Biological Assessment/Evaluation (BA), submitted by your office submitted on May 20, 2016, with additional information provided on July 20 and July 27, 2016, describing the potential effects of the proposed project on the above federally listed species. **Based on information presented in the BA, we concur with your determination that project activities are likely to adversely affect the Indiana bat.** Therefore, this tiered BO identifies incidental take of the Indiana bat anticipated from project activities. The tiered BO conforms to the Service's Programmatic BO (page 14) pertaining to individual projects the Service reviews following the issuance of the Programmatic BO.

Consultation History

April 15, 2016: Original BA submitted to the Service
May 20, 2016: Revised BA submitted to the Service with a request for formal consultation
July 20, 2016: Additional information provided by USFS biologist Megan York
July 27, 2016: Email from Theresa Davidson clarifying that alternative 2 listed in the BA was the preferred alternative.

This biological opinion is based on information provided in the original biological assessment dated April 15, 2016, supplemental information provided on May 20, July 20, and July 27, 2016, and telephone conversations with Megan York and Theresa Davidson to clarify aspects of the biological assessment. A complete administrative record of this consultation is on file at this office.

Description of the Proposed Action

The Blackwell Ridge Project area is located on the Poplar Bluff Ranger District of the Mark Twain National Forest, and situated primarily west of U.S. Highway 67 and north of the Black River (Maps of different project areas are provided in Appendix B). No proposed activities will occur south of the Black River, but a small buffer along the south side of the river is included in the project area. This buffer was created to delineate the area proposed for wild and scenic river designation.

The nearest rural community is Williamsville, Missouri. The town of Poplar Bluff is approximately 11 miles southeast of the project area at its closest point. The vast majority of activities would occur in Wayne County, Missouri, but a very small section of the project area is in Butler County. Project locations include: Township 28 North, Range 4 East, sections 35 and 36; Township 27 North, Range 6 East, sections 30, and 31; Township 27 North, Range 5 East, sections 4-8, 10, 15-18, 20-28, and 34-36; Township 27 North, Range 4 East, sections 1 and 2, and 11-15, and 23; Township 26 North, Range 6 East, section 5 and 6; Township 26 North, Range 5 East, sections 1-3, 10-14.

A consolidated list of proposed actions is provided in Table 1. Types of commercial harvest proposed with this project include overstory removal, shelterwood establishment, clearcut with reserves, seedtree cut, shelterwood removal, group selection, commercial thinning, salvage cut with prep and salvage cut without prep, site preparation, timber stand improvement, and pre-commercial thinning. Old growth will also be designated based on requirements of the 2005 Forest Plan. The Blackwell Ridge Project proposes to conduct vegetation management and timber treatments on 8,703 acres, conduct timber stand improvement work on 709 acres of small-diameter understory trees, designate 1,949 acres for management as old growth, maintain 810 acres as openlands, restore 38 acres of wetlands, control invasive plants on 32 ponds, maintain 32 wildlife ponds and leaning trees around the ponds, rehabilitate 1 pond, protect special habitats, reconstruct 15.6 miles of road, maintain 24.0 miles of road, decommission 2.5 miles of National Forest System road, decommission 22.5 miles of illegal user-created road and trails, remove trash dumps, and create 21.2 miles of temporary roads for vegetation management activities that would be decommissioned once activities are complete. All measures above are, and acres of harvest and associated timber activities may be duplicated. Firewood removal may also occur on an as-needed basis.

All project activities are consistent with the Plan and capable of meeting specific needs identified in this document. Project needs were established by comparing the current conditions with desired conditions, and relevant goals, objectives, standards and guidelines (S&G's). All timber harvest activities would take place a minimum of ¼ mile from the Black River, and National Forest lands within the project area are a minimum of four air miles from the St. Francis River.

TABLE 1. PROPOSED ACTIONS FOR THE BLACKWELL RIDGE PROJECT

PROPOSED PROJECT ACTIVITIES	MEASURES
Timber Harvest Activities (in acres)	
Vegetation Management Activities	
Salvage & Sanitation Harvest	2,825 ac.*
Intermediate Treatments	
Commercial Thinning	892 ac.*
Timber Stand Improvement	742 ac.*
Even-Aged Treatments	
Seed Tree Harvest with Reserves	1,160 ac.*

PROPOSED PROJECT ACTIVITIES	MEASURES
Clearcut Harvest with Reserves	278 ac.*
Shelterwood with Reserves	106 ac.*
Overstory Removal Cut	51 ac.*
Shelterwood with Reserves Establishment Harvest	39 ac.*
Uneven-Aged Treatment	
Group Selection Harvest	689 ac.*
Other Forest Management Activities	
Site Preparation Treatments	4,214 ac.*
Old Growth Designation	1,949 ac.
Wildlife Activities	
Wildlife Habitat Treatments	
Maintain Openlands	810 acres.*
Wetlands Restoration	38 acres.
Pond Treatments	
Treat Watershield on Ponds	32 Ponds
Pond Dam Maintenance	32 Ponds
Rehabilitate Pond	1 Pond
Protect Kneibert Spring and Riparian Areas	
Establish Buffer Around Kneibert Spring	100 foot radius
Protect Riparian Areas in T27N, R5E,Sec. 27, 28, 34 by blocking the ends of System roads 3749, 3749A, and 3827	Block 4 roads
Fully Protect Kneibert Spring & Riparian Areas	Area Conditions
Transportation Activities (in miles)	
System Roads	
Road Maintenance on System Roads[2] (58.18 acres)	24.0 mi.*
Road Re-construction on System Roads (37.81 acres)	15.6 mi.*
Decommission System Roads	2.5 mi.
Non-System Roads	
Decommission Non-System Roads and Illegal Trails	22.5 mi.
Create Temporary Roads for Administrative Use (51.39 acres)	21.2 mi.*

Of the proposed activities outlined in Table 1, we have determined that actions with an asterisk (*) are ones which may involve tree removal or disturbance activities, and could thus impact the roosting and foraging habitat of Indiana bats. We have calculated that the total acreage impacted by these activities is approximately 11,144 acres.

[2] Road width for road maintenance, road re-construction, and construction of temporary roads is 20’ to calculate area in sq. ft. and then to acres

Detailed description of proposed actions for the Blackwell Ridge Project

Timber Harvest: Even aged harvests include clearcut, seedtree, and shelterwood cut. These harvest types are distinguished by the residual basal area remaining in the stand when harvest is complete. Clearcuts have far less residual basal area than shelterwood harvests. Clearcutting with reserves is the cutting of essentially all trees except for reserve trees, producing a fully exposed microclimate for the development of a new age class. Regeneration can be from natural seeding, direct seeding, planted seedlings, or advance reproduction. Varying numbers of reserve trees are not harvested to attain goals other than regeneration.

Seed tree with reserves is the cutting of all trees except for a small number of widely dispersed trees retained for seed production, and to produce a new age class in a fully exposed microenvironment. Some of the seed trees or other reserve trees are retained after regeneration has become established to attain goals other than regeneration. Areas receiving seed tree harvest are generally predominantly pine. Approximately 10-15 residual basal area is common with a seed tree cut.

Shelterwood cut is the cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment. The sequence of cutting can include three types of cuttings: (a) an optional *preparatory cut* to enhance conditions for seed production, (b) an *establishment cut* to prepare the seed bed and create a new age class, and (c) a *removal cut* to release established regeneration from competition with the overwood. Some of the shelterwood trees or other reserve trees are retained after regeneration has become established to attain goals other than regeneration. Residual basal areas range between 25 and 30 with a shelterwood cut.

An overstory removal cut is the cutting of trees constituting an upper canopy layer to release understory trees. The primary source of regeneration is advanced reproduction. A minor (less than approximately 10% of full stocking), live component of the upper canopy may be retained for reasons other than regeneration. Stands chosen for an overstory removal cut in the Blackwell Ridge Project area are generally unhealthy, resulting in few large, standing trees.
Within all even aged harvest stands, 7-10% of the area will be retained in reserve trees and/or reserve tree groups, as required by the Forest Plan. Reserve trees and reserve tree groups should include a combination of the following (USDA Forest Service 2005):

- The largest, long-lived species occurring on the site (pine, white oak, post oak, hickory, black gum);
- Standing dead trees; and
- Cavity or den trees.

All Forest Plan S&G's would be followed with this project. Land adjacent to intermittent streams that are considered watershed protection zones will be protected within 25 feet of either side of the stream, where no timber will be marked or removed.

Salvage Harvest: The specific actions proposed for salvage include the removal of black, scarlet, and possibly red oak that are showing signs of dieback. The majority of non-red oak tree

species (such as hickory, white oak, post oak, and shortleaf pine) and any vigorous appearing southern red oak or northern red oak will be retained. In addition, den trees will be protected. However, some white oak may be harvested due to recent dieback. This has resulted from the extreme drought conditions. Residual basal areas in salvage harvests will vary from 10-60, but some stands may be as high as 90. This is dependent upon the amount of non-black and scarlet oak species retained in the stand. Approximately ¼ of the salvage acres will have a residual basal area below 30 (M. Stevens, personal communication, February 17, 2015).

Group selection: A method of regenerating uneven-aged stands in which trees are removed, and new age classes are established, in small groups. The objective of this method is to establish regeneration at each harvest cycle, thereby producing an uneven-aged stand. Because the removal of groups will permit more light to reach the forest floor than with single tree selection, group selection can be used to encourage a higher proportion of shade-intolerant species. The width of smaller groups is commonly twice the height of the mature trees, and the width of larger openings is up to two acres.

Commercial thinning is an intermediate treatment that reduces basal area by cutting and removing trees by means of a commercial timber sale. The treatments may be made to improve growth, enhance forest health, obtain advanced regeneration, or move the stand toward its natural community type. Residual basal areas would be between 60 and 70.

Forest Modification Activities (Site Preparation/Timber Stand Improvement): After harvest is complete, forest improvement activities will take place to manage the future species composition and health of the stands. This activity would occur using chainsaws between November 1 and April 1 on the same acres where trees are proposed for removal. The objective of these activities is to "release" some of the smaller (9 inches in diameter or less) trees not removed from areas proposed for harvest treatment or to encourage regeneration from the stump of small residual trees that may have been damaged during logging activities. This release work will be accomplished by selectively removing those trees with poor form that are competing with other well-formed, healthy trees for nutrients. This will allow expansion of the crown and root systems of desirable, larger residual trees. Undesirable broken, crooked, and/or diseased trees less than nine inches in diameter would be felled with hand tools and left on the ground. Approximately 2825 acres or less of site preparation and 709 acres of timber stand improvement is proposed. There would be no use of heavy equipment during these operations. Generally, tree species such as flowering dogwood and Eastern redbud are retained in these areas for aesthetic purposes. Debris will be kept out of stream channels.

No other types of trees would be cut and/or removed as part of these activities unless necessary for skid trail development, log landings, temporary roads, road maintenance or because they are considered hazardous to employees or contractors operating in the salvage treatment areas. Skid trails and log landings would be necessary within these areas to remove the merchantable timber. Some previously decommissioned non-system roads may be re-opened and used as temporary roads to reduce building any new temporary roads. Old logging roads would be used if possible prior to building new roads.

Planting Shortleaf Pine: Shortleaf pine may be planted on an 11 foot by 11 foot spacing within salvage harvests depending on residual basal area. This would be determined on a stand-by-stand basis. This would entail approximately 360 trees per acre. These areas would have no or very little pine in the stand. Planting will provide greater species diversity in the stand. Pine will be planted using a dibble bar. There will be no mechanized equipment used to complete this work.

Old Growth Designation: Approximately 1949 acres will be designated as old growth. These forested areas may or may not have mature trees presently, but these conditions will develop with time.

Transportation Management: Approximately 21.2 miles of temporary roads will be created for vegetation management activities that would be decommissioned once activities are complete. Proposed road work includes re-construction of approximately 15.6 miles and road maintenance of 24 miles. Examples of activities involving re-construction include minor realignment of the road footprint, installation of additional drainage structures, and adding of gravel. Maintenance includes cutting of brush along the edge of the road, cleaning out ditches, grading the road to ensure proper drainage, and adding gravel. Approximately 2.5 miles of a National Forest System road and 22.5 miles of illegal user-created road and trails will be decommissioned. This would be accomplished using earth berms, boulders, or other non-permanent structures. These roads are not expected to be needed for administrative use in the future. Temporary road construction will occur to allow removal of timber from specified areas. Approximately 21.2 miles of temporary roads will be created. These roads are constructed primarily on ridgetops to avoid crossing intermittent streams to access timber units. Any decommissioned non-system roads re-opened for use would again be decommissioned once harvest and restoration-related activities are completed. Layout of any new temporary roads would be approved by the Forest Service before construction by timber purchasers to ensure environmental impacts are mitigated. All temporary access roads – new or previously decommissioned - would be decommissioned once resource management activities have been completed. This includes construction of water bars, seeding/fertilization to minimize soil movement and allow vegetation to re-establish, and possibly place slash within temporary roads to slow any soil movement that may occur immediately after closing.

Pond Maintenance and Control of Watershield: Thirty-two pond dams, as well as the perimeter of the ponds, will be maintained using chainsaws. These pond dams are overgrown with trees that are an average of nine inches in diameter, which will eventually compromise the integrity of the dam. No heavy equipment will be used for this work. These same ponds will be sprayed with an aquatic-labeled glyphosate at a rate of 1.6 ounces (1 ounce = 2 tablespoons) and ½ - 2 ounces of surfactant per gallon of water in order to kill watershield that is floating on and impeding the surface of the water. Surfactant is a wetting agent, activator and penetrant all in one. It increases the wetting, spreading, sticking and dispersing of aquatic herbicides and algaecides. It helps break down the waxy cuticle on the leaf surface and allows chemical applications to penetrate the leaf area, resulting in a more effective uptake of the herbicide or algaecide. For best results, this will take place in October, two weeks before the first frost, as recommended by the Missouri Department of Conservation (1999).

Rehabilitate One Pond: Heavy equipment would be used to rehabilitate this small and shallow pond. Vegetation, consisting mostly of cattails, would be removed from the pond interior and compaction to the pond bottom would occur. It would also be widened to approximately 60 feet by 60 feet and dug deeper (approximately four feet deep) in order to provide more surface area and water-holding capability. The area above the pond would be cleared so free-flying animals can more easily access it. This work would be completed during November-January when the chance of impacting amphibians and other wildlife is less likely.

Wetland Restoration: Approximately 38 acres of wetlands would be restored using heavy equipment to create small depressions in pockets of silt-clay-loam soils. Work would be conducted in existing open field areas. Following ground disturbance, exposed soils would be immediately seeded with a desirable seed mix to reduce erosion.

Any ditches or drains that show evidence of having been created or altered for historical draining of the land would be modified to restore natural hydrology. Any underground tiles or drainage structures inadvertently discovered at the site would be removed. The end result would be shallow, naturally-appearing wetlands that hold water seasonally or year round. In addition, native aquatic vegetation may be planted within and on the edges of the wetlands, and native warm season grasses may be established within the open field adjacent to the wetlands. This work may be conducted any time of the year.

Management of Openlands: Prescribed fire would be reintroduced to two areas, consisting of 208 and 602 acres respectively. Both areas are considered a mix of openlands and forest. A mixture of hand line, blown line, wet line, roads, powerlines, and/or natural features may be used to contain the fire. Open areas around the perimeter of the prescribed fire area may be mowed to create a green firebreak. In order to accomplish resource objectives, these two areas may be burned any time of year. No bulldozer line would be constructed. If objectives are not met through the use of fire, mechanical means may be used. This would consist of using a farm tractor to mow the areas anytime during the year.

Prescribed burning first involves line preparation in which hazard trees (those trees that have an imminent chance of failure and could fall where public use is concentrated) are removed using chainsaws between November 1 and April 1. These trees will only be removed if they pose an immediate threat to personnel working on the fire or to visitors of the area. Otherwise, personnel will rake around these trees or wet them prior to burning. Fireline (defined here as a combination of handline, wet line, or leaf-blown line) will be constructed for the prescribed burn, and this usually occurs a few days prior to implementing the burn. Firelines are used to create a fuel-free area between the burn unit and the area not proposed for burning. Dozers will not be used to create fireline but could be used to push trees over. Small trees (approximately 6 inches in diameter or less) would be removed where they cannot be avoided, and all efforts will be made to minimize impacts on the resource. Fireline construction will take place between November 1 and April 1 to avoid pushing over den or cavity trees that may be occupied by wildlife species. Handline, wet line, or a leaf blower will be the method used within 100 feet of any riparian management zone (RMZ), within 50 feet of any watershed protection zone (WPZ), and on slopes greater than 35%, as required by the 2005 Forest Plan.

Prescribed burning could take place any time of year, but it is likely with this project that it will occur in early spring due to the abundance of cool season grasses in the area. These grasses do not carry fire as well when greenup has occurred. Very specific parameters related to humidity, wind speed and direction, time since last precipitation, and others will be strictly followed. Drip torches filled with a mixture of diesel and gasoline will be used to hand ignite the areas. Desired flame lengths in these areas are less than 18 inches. Minimum mop up operations are necessary with prescribed fires in the Ozarks because most fuel is consumed by the fire. However, any snags which have been ignited may be cooled down using plain water. Sometimes, but very infrequently, a foamy substance (called Sylvex) similar to dish soap will be used to extinguish the flames and heat in heavy fuels. If a snag has too much fire in it to control while standing, it may be felled using either a chainsaw or a dozer to push it down inside the fire perimeter.

Protection of One Spring: Consistent with the 2005 Forest Plan (p. 2-13), actions would be taken to prohibit vehicular damage to Kneibert Spring, and a 100 foot buffer would be established around the spring. The means of protection would be commensurate with the success of closure. Boulders, felled trees, berms, and/or a gate would be placed at the end of National Forest System road 5820 to deter illegal traffic from travelling into the spring and buffer area. Increased law enforcement to those areas will also occur. In addition, other measures may be taken as necessary to fully protect this special habitat per the 2005 Forest Plan (p. 2-13). The same measures would take place at the end of National Forest System roads 3827, 3749, and 3749A.

Firewood Gathering: Tops and cull material felled during timber harvesting operations or as part of other resource management activities would be available as firewood after harvesting and other resource management activities are complete. Fallen, dead trees could be taken any time of the year. No standing dead trees will be cut from April 1-November 1. Access to and from these areas would be on existing system roads, temporary roads, and skid trails used for timber harvest and/or other resource management activities. No cross-country vehicular travel would be authorized. Once resource management activities are complete and firewood collection areas closed, roads and trails used for firewood access would be closed using rock, berm, and/or gates and re-seeded with native species appropriate to the site. Sterile non-native, annual species (wheat, rye, etc.) may be also used in the short term.

STATUS OF THE INDIANA BAT

This section presents the biological or ecological information relevant to formulating this BO. Appropriate information on the species' life history, its habitat and distribution, and other data on factors necessary to its survival are included to provide background for analysis in later sections. This analysis documents the effects of past human and natural activities or events that have led to the current range-wide status of the species. Portions of this information are also presented in listing documents, the recovery plan (USFWS 1983), and the draft recovery plan, first revision (USFWS 2007), and are referenced accordingly. Species description, life history, population dynamics, status and distribution for the Indiana bat range-wide and for Missouri are also fully described on pages 23-32 of the 2005 Programmatic BO and the 2009 amendment to the Programmatic BO and can be further incorporated by reference

3.1 Species Description

The Indiana bat was originally listed as an endangered species by the Service in 1967. Thirteen winter hibernacula (11 caves and two mines) in six states were designated as critical habitat for the Indiana bat in 1976 (USFWS 1976). Six of these hibernacula are in Missouri.
The Indiana bat is an insectivorous, temperate, medium-sized bat that migrates annually from winter hibernacula to summer habitat in forested areas. The bat has a head and body length that ranges from 41 to 49 mm, with a forearm length of 35 to 41 mm. The fur is described as dull pinkish-brown on the back but somewhat lighter on the chest and belly, and the ears and wing membranes do not contrast with the fur (Barbour and Davis 1969). Although the bat resembles the little brown bat and the northern long-eared bat, it is distinguished by its distinctly keeled calcar and a long, pointed, symmetrical tragus.

3.2 Life History

The key stages in the annual cycle of Indiana bats are: hibernation, spring staging, pregnancy, lactation, volancy/weaning, migration and swarming. While there is variation based on weather and latitude, generally bats begin winter torpor in mid-September through late-October and begin emerging in April. Females depart shortly after emerging and are pregnant when they reach their summer area. Birth of young occurs between mid-June and early July and then nursing continues until weaning, which is shortly after young become volant (able to fly) in mid- to late-July. Migration back to the hibernaculum may begin in August, peak in September, and continue into October.

Winter Hibernation

After the summer maternity period, Indiana bats migrate back to traditional winter hibernacula. Some male bats may begin to arrive at hibernacula as early as July. Females typically arrive later and by September the number of males and females are present in comparable numbers. Autumn "swarming" occurs prior to hibernation. During swarming, bats fly in and out of cave entrances from dusk to dawn and use trees and snags as day roosts (Cope and Humphrey 1977). Swarming continues for several weeks and mating occurs during the latter part of the period. Fat supplies are replenished as the bats forage prior to hibernation. By late September many females have entered hibernation, but males may continue swarming well into October in what is believed to be an attempt to breed with late arriving females.

All cohorts of Indiana bats are hibernating by November and remain in hibernacula through April (Hall 1962, LaVal and LaVal 1980), depending upon local weather conditions. Indiana bats hibernate in caves and mines with cold, stable microclimates. They form large, dense clusters, ranging from 300 bats per square foot to 484 bats per square foot (Clawson et al. 1980, Clawson, pers. observ. October 1996 in USFWS 2000). Clusters form in the same area in a cave each year, with more than one cluster possible in a particular cave (NatureServe 2007). Indiana bats, especially females, are philopatric to hibernacula (i.e., they return annually to the same hibernaculum). Bands returns from a mine in Missouri during winter surveys have documented

one female Indiana bat present in a cluster in the same location for three years (Marquardt, pers. comm.).

Summer Roosting and Foraging

After hibernation ends in late March or early April, most Indiana bats migrate to summer roosts. Females emerge from hibernation ahead of males. Reproductively active females store sperm from autumn copulations through winter, and ovulation takes place after the bats emerge from hibernation. The period after hibernation and just before spring migration is typically referred to as "staging," a time when bats forage and a limited amount of mating occurs (USFWS 2007). In spring when fat reserves and food supplies are low and females are pregnant, migration is probably hazardous (Tuttle and Stevenson 1977). Consequently, mortality may be higher in the early spring, immediately following emergence. Once en route to their summer destination, females move quickly across the landscape. Radio-telemetry studies in New York documented females flying between 10 and 30 miles in one night after release from their hibernaculum, arriving at their maternity sites within one night. Indiana bats can migrate hundreds of miles from their hibernacula. Observed migration distances range from just 34.1 mi to 356.5 mi (USFWS 2007).

Females seek suitable habitat for maternity colonies, which is a requisite behavior for reproductive success. They exhibit strong site fidelity to summer roosting and foraging areas, generally returning to the same summer range annually to bear their young (Garner and Gardner 1992). For example, surveys conducted in summer 2014 in a maternity colony homerange first documented in 1985, indicated continued presence of a maternity colony in the area. Females arrive in their summer habitats as early as April 15 in Illinois (Garner and Gardner 1992), and usually start grouping into larger maternity colonies by mid-May. Garner and Gardner (1992) reported that Indiana bats first arrived at their maternity roost in early May in Indiana, with many individuals arriving in mid-May. During this early spring period, a number of roosts may be used temporarily until a roost with larger numbers of bats is established.

In general, Indiana bats roost in large, often dead or partially dead trees with exfoliating bark and/or cavities and crevices (Callahan et al. 1997; Farmer et al. 2002; Kurta et al. 2002). Trees in excess of 16 inch diameter at breast height (dbh) with exfoliating bark are considered optimal for maternity colony roost sites, but trees in excess of 9 inches dbh appear to provide suitable maternity roosting habitat (Romme et al. 1995). Rittenhouse et al. (2007) considered roost trees as suitable at approximately 7 inches dbh, but the suitability index (SI, SI = 0.00 to 1.00) of roost trees increased with greater dbh with trees reaching a SI of 0.50 at approximately 12 inches dbh and a SI of 1.00 at approximately 20 inches dbh or greater.

Indiana bat maternity roosts can be described as primary or alternate based upon the proportion of bats in a colony consistently occupying the roost site. Maternity colonies typically use 10 to 20 trees each year, but only one to three of these are primary roosts used by the majority of bats for some or all of the summer (Gardner and Gardner 1992; Miller et al. 2002). Alternate roosts are used by individuals, or a small number of bats, and may be used intermittently throughout the summer or used only once or for a few days. Females frequently switch roosts to find optimal

roosting conditions, switching roosts every few days on average, although the reproductive condition of the female, roost type, and time of year affect switching. When switching between day roosts, Indiana bats may travel as little as 23 feet or as far as 3.6 miles (Kurta et al. 1996; Kurta et al 2001; Kurta et al. 2002). In general, moves are relatively short and typically less than 0.6 mile (USFWS 2007).

Maternity colonies typically contain 100 or fewer adult females (Harvey 2002), but as many as 384 have been observed from a single maternity roost tree in Indiana (Whitaker and Brack 2002). The average sized maternity colony in Indiana was 80 females (Whitaker and Brack 2002). Birth of young occurs in late June and early July (Easterla and Watkins 1969, Humphrey et al. 1977). The young are able to fly between mid-July and early August (Mumford and Cope 1958, Cope et al. 1974, Humphrey et al. 1977, Clark et al. 1987, Gardner et al. 1991, Kurta et al. 1996). An exit count conducted on July 17, 2014 on U.S. Army Corps of Engineers property (Wappapello Lake) in Missouri yielded a count of 195 individuals exiting a 26-inch dbh cottonwood snag (York-Harris, pers. comm). Volant pups likely were included in the count, but at least 96 adults were present in the primary tree.

The home range of a maternity colony is the area within a 2.5-mile radius (i.e., 12,560 acres) around documented roosts or within a 5-mile radius (i.e., 50,265 acres) around capture location of a reproductive female or juvenile Indiana bat or a positive identification of Indiana bat from properly deployed acoustic devices and acceptable analysis of data. Based on data provided in the Indiana bat draft revised recovery plan (USFWS 2007), a maternity colony needs at least 10% suitable habitat (i.e., forested habitat that provides adequate roost sites and foraging areas) to exist at a given point on the landscape. Garner and Gardner (1992) found that females in Illinois utilized larger foraging ranges than males, whereas Menzel et al. (2005) found no difference in homerange sizes of males and females in west-central Illinois.

Male Indiana bats may be found throughout the entire range of the species. Some males spend the summer near hibernacula, as has been observed in Missouri (LaVal and LaVal 1980) and West Virginia (Stihler, pers. observ. October 1996, in USFWS 2000). Males appear to roost singly or in small groups, except during brief summer visits to hibernacula. Males have been observed roosting in trees as small as 3 inches dbh, but the average roost diameter for male Indiana bats is 13 inches (USFWS 2007).

Indiana bats forage over a variety of habitat types but prefer to forage in and around the tree canopy of both upland and bottomland forest, along roads, or along the corridors of small streams. Menzel et al. (2005) found that females foraged significantly closer to forests, roads, and riparian habitats than agricultural land and grasslands. Womack et al. (2012) documented selection by reproductive females of forests with higher canopy cover but more open mid-stories caused by management via prescribed fire. Females in Illinois were found to forage most frequently in areas with canopy cover of greater than 80% (Garner and Gardner 1992). Bats forage between dusk and dawn at a height of approximately 6-90 feet above ground level and feed exclusively on flying insects, primarily moths, beetles, and aquatic insects (Humphrey et al. 1977).

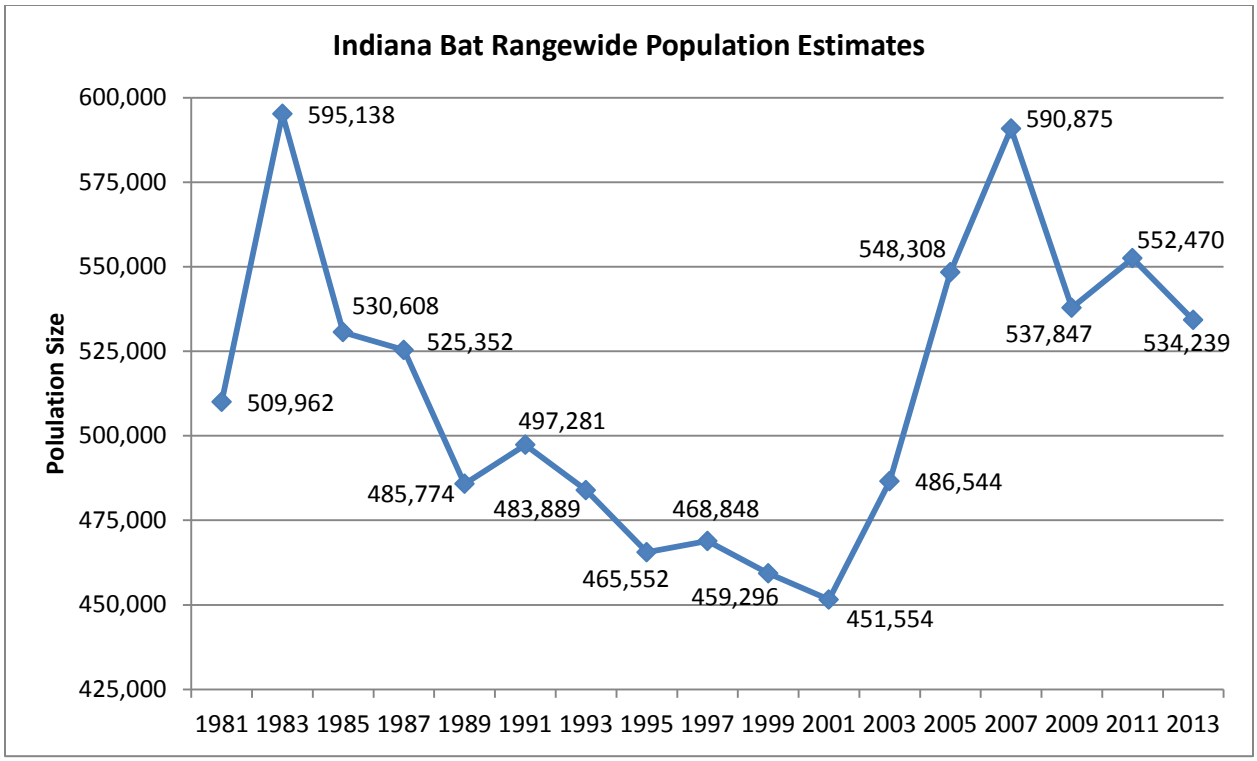
3.3 Population Dynamics

The population of the Indiana bat has decreased significantly from an estimated 808,000 in the 1950s (USFWS 2007). Based on censuses taken at all hibernacula, the current total known Indiana bat population in 2013 is estimated to number about 536,362 bats (Figure 1). Population trend data showed a steady increase from 2001 to 2007, a drop in 2009, an increase in 2011, and finally a drop in 2013 to a population estimate that approximates the 2011 estimate. Missouri, Indiana, and Kentucky have historically had the highest estimated numbers of hibernating bats; all had estimates of greater than 10,000 bats in 1965. Over the period 1965 to 2005, estimated numbers of hibernating bats in Missouri and Kentucky clearly declined (USFWS 2007). Among the group of states in which aggregate hibernaculum surveys have never reached 100,000 bats, hibernaculum surveys in Arkansas, Tennessee, and Virginia consistently declined from 1965 to 2000. Hibernacula surveys in Illinois, New York, Ohio, and West Virginia were greater in 2000 than in 1965, but trends are not entirely consistent through the period. Thus, the southern tier of states in the species' range shows declines in counts at hibernacula, whereas some states in the upper Midwest show increasing counts (USFWS 2007).

3.4 Status and Distribution

The current species range includes much of the eastern half of the United States, from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida. The species has disappeared from, or greatly declined, in most of its former range in the northeastern United States. The current revised recovery plan (USFWS 2007) delineates recovery units based on population discreteness, differences in population trends, and broad level differences in land-use and macro-habitats. There are currently four recovery units for the Indiana bat: Ozark-Central, Midwest, Appalachian Mountains, and Northeast.

Figure 1. Indiana bat rangewide population estimates from1981-2013 [www.fws.gov/midwest/Endangered/mammals/inba/pdf/2011inbaPopEstimate04Jan12.pdf; (USFWS 2013)].



Historically, the Indiana bat had a winter range restricted to areas of cavernous limestone in the karst regions of the east-central United States. Hibernacula are divided into priority groups that have been redefined in the Service's Draft Recovery Plan (USFWS 2007): Priority 1 (P1) hibernacula typically have a current and/or historically observed winter population of greater than or equal to 10,000 Indiana bats; P2 have a current or observed historic population of 1,000 or greater, but fewer than 10,000; P3 have current or observed historic populations of 50 to 1,000 bats; and P4 have current or observed historic populations of fewer than 50 bats. Based on 2009 winter surveys, there were a total of 24 P1 hibernacula in seven states: Illinois (one); Indiana (seven); Kentucky (five); Missouri (six); New York (three); Tennessee (one); and West Virginia (one). One additional P1 hibernaculum was discovered in Missouri in 2012. A total of 55 P2, 151 P3, and 229 P4 hibernacula are also known from the aforementioned states, as well as 15 additional states.

The historical summer range of the Indiana bat is thought to be similar to its modern range. However, the bat has been locally extirpated due to loss of summer habitat. The majority of known maternity sites have been located in forested tracts and riparian areas in agriculturally dominated landscapes such as Missouri, Iowa, Indiana, Illinois, southern Michigan, western Ohio, and western Kentucky. They have been documented to use roost trees in highly fragmented areas as well as more contiguous forested patches. Recent surveys for a proposed utility corridor documented a primary maternity roost tree in a narrow forested corridor in northwest Missouri (Shauna Marquardt, pers. comm).

The reasons for listing the Indiana bat were summarized in the original Recovery Plan (USFWS 1983) including: declines in populations at major hibernacula despite efforts to implement cave

protection measures, the threat of mine collapse and the potential loss of largest known hibernating population at Pilot Knob Mine, Missouri, and other hibernacula throughout the species range were not adequately protected. Although several known human-related factors have caused declines in the past, they may not solely be responsible for recent declines. Documented causes of Indiana bat population decline include: 1) human disturbance of hibernating bats; 2) improper cave gates and structures rending them unavailable or unsuitable as hibernacula; and 3) natural hazards like cave flooding and freezing. Suspected causes of Indiana bat declines include: 1) changes in the microclimate of caves and mines; 2) dramatic changes in land use and forest composition; and 3) chemical contamination from pesticides and agricultural chemicals. Current threats from changes in land use and forest composition include forest clearing on private and public land within the summer range, woodlot management and wetland drainage by landowners, and other private and municipal land management activities that affect the structure and abundance of forest resources.

Climate change is also an emerging threat to the Indiana bat, primarily because temperature is an essential feature of both hibernacula and maternity roosts. Potential impacts of climate change on temperatures within Indiana bat hibernacula were reviewed by V. Meretsky (pers. comm., 2006 in USFWS 2007). Climate change may be implicated in the disparity of population trends in southern versus northern hibernating populations of Indiana bats (Clawson 2002), but Meretsky noted that confounding factors are clearly involved. Potential impacts of climate change on hibernacula can be compounded by mismatched phenology in food chains (e.g., changes in insect availability relative to peak energy demands of bats) (V. Meretsky, pers. comm., 2006 in USFWS 2007). Changes in maternity roost temperatures may also result from climate change, and such changes may have negative or positive effects on development of Indiana bats, depending on the location of the maternity colony. The effect of climate change on Indiana bat populations is a topic deserving additional consideration.

The greatest current threat to Indiana bats is white nose syndrome (WNS). WNS was first documented in New York in February of 2006 and has since been confirmed in 20 states and 4 Canadian Provinces (www.whitenosesyndrome.org/resources/map). It is currently unknown if WNS is the primary cause or a secondary indicator of another pathogen, but it has been correlated with erratic behavior such as early or mid-hibernation arousal that leads to emaciation and mortality in several species of bats, including the Indiana bat (http://whitenosesyndrome.org/; www.fws.gov).

Overall mortality rates, primarily of little brown bats, have ranged from 90 to 100 percent in hibernacula in the northeastern United States. It is currently estimated that 5.7 to 6.7 million bats have died from WNS in infected regions (www.whitenosesyndrome.org/about-white-nose-syndrome). Apparent losses of 685 Indiana bats in Hailes Cave and 12,890 (previous population was 13,014) Indiana bats in the Williams Preserve Mine in New York were documented during the first winter WNS was observed at each site. Additionally, Indiana bat surveys conducted at hibernacula in New York during early 2008 estimated the population declined 15,662 bats, which represents 3.3% of the 2007 revised rangewide population estimate. The number of confirmed cases of WNS has increased significantly in the Ozark-Central Recovery Unit since 2011

(www.whitenosesyndrome.org/resources/map) and if trends continue, it is likely that additional reductions in the Indiana bat population will occur in this region.

WNS is thought to be transmitted by direct bat contact with an infected bat and by transmission of the causative agent from cave to cave. The distribution of WNS appears to be expanding in all directions from its epicenter in New York. Between 2007 and 2008, it was documented to have spread from a 9 km radius to a 200 km radius, and at the end of the 2008-2009 winter, it was documented in all major hibernacula in New York. Most recently it has been found throughout Missouri, northern Alabama, Illinois, and suspected in eastern Iowa. The Service and partners are conducting research to develop management strategies to reduce the spread and impacts of WNS. However, it remains a significant and immediate threat to the Indiana bat.

At the time the revised recovery plan was drafted in 2007, the causative agent for WNS had not yet been discovered and the additive impacts to the already declining Indiana bat were not yet considered. Given the documented deaths of Indiana bat due to WNS in the Northeast since 2006, the species is further threatened with extinction. Numerous research projects have been completed and are ongoing at a rapid rate since the first discovery of WNS, a national response plan has been completed (available at www.whitenosesyndrome.org), multiple states and agencies have approved or are in the process of developing response action plans, and various management actions have been undertaken with the hope of slowing the spread of the disease (e.g., cave closures, the development of decontamination protocols, etc.). Despite these efforts, there is no known cure for the disease and all bats in North America that hibernate in caves could be threatened with extinction.

Status within the Ozark-Central Recovery Unit

The Indiana bat population in the Ozark-Central Recovery Unit (RU) has declined significantly since 1990 (USFWS 2007). Prior to 2012, the majority of hibernating bats in the Ozark-Central RU were assumed to overwinter in Pilot Knob Mine in Missouri. Dramatic declines in the hibernating population at this site occurred since the early 1980s from an original estimation of approximately 100,000 in the 1970s to an estimation of 1,678 in the 2000s. The discovery of a previously unknown P1 hibernation site has increased the baseline size of the population in the Ozark-Central RU, but not the overall trend across the range of the species. The newly discovered site houses approximately 122,936 hibernating Indiana bats. Based on observations by private cavers, the site has been occupied by a similar number of Indiana bats since the 1970s and would have concurrently occupied both sites; these bats are not considered to be bats that moved from Pilot Knob Mine. After incorporating bats from the newly discovered site, the current 2013 population estimate for the Ozark-Central RU is approximately 197,707. Based on biannual hibernacula counts, the Indiana bat population in the Ozark-Central RU declined from 2005 to 2009 and has since shown a slight increase (1.1%). The next population census will take place during winter 2014-2015.

Since issuance of the programmatic BO and 2009 amendment, a large Indiana bat hibernaculum was discovered in Missouri. The number of overwintering Indiana bats using this site are included in updated population estimates provided in Figure 2. White-nose syndrome (WNS) has also continued to spread westward since issuance of the programmatic BO and the 2009 amendment (Fig. 3). Spread

of the fungus, combined with documented deaths of Indiana bats from WNS in several locations, further threatens the species with extinction.

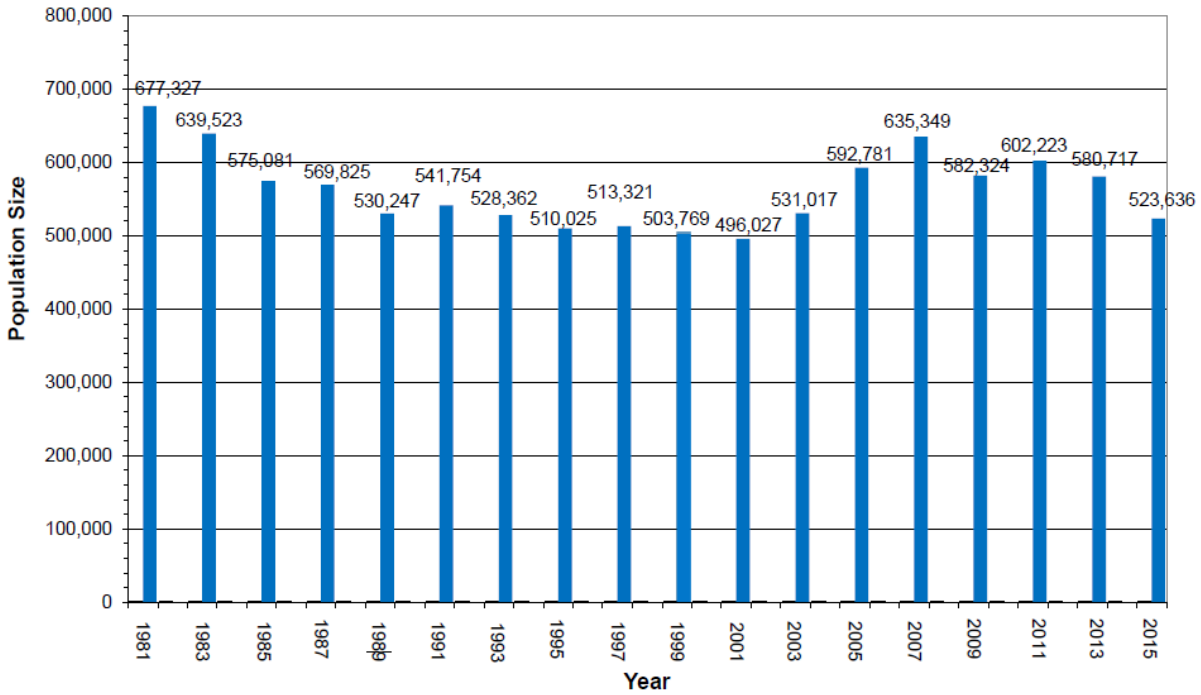


Figure 2. Indiana bat range-wide population estimates from 1981 to 2015 (Andrew King, pers. comm. 2015).

Status of the Listed Species within the Project Area

Male, female, and juvenile Indiana bats have been documented during the summer months within the Poplar Bluff Ranger District Proclamation Boundary, and there is potentially suitable habitat in the form of roosting and foraging habitat within the proposed project area that is proposed for removal. All captures have been near a major riparian corridor, with one site being in an upland situation. Some trees proposed for removal have characteristics suitable for Indiana bat roosting. Because mature trees in the project area have reached senescence, there will be ample time to develop these characteristics before harvesting is complete. Although no Indiana bats were captured in the project area during survey efforts, it is assumed National Forest lands within the project area may provide potentially suitable habitat and could be occupied by this species during the summer months, particularly along the Black River where there is an interspersion of open fields and woods.

Since development of the 2009 amendment to the Programmatic BO, White-nose syndrome (WNS) has been confirmed in bats in Missouri in multiple locations and is now basically

considered state wide (Fig. 3).

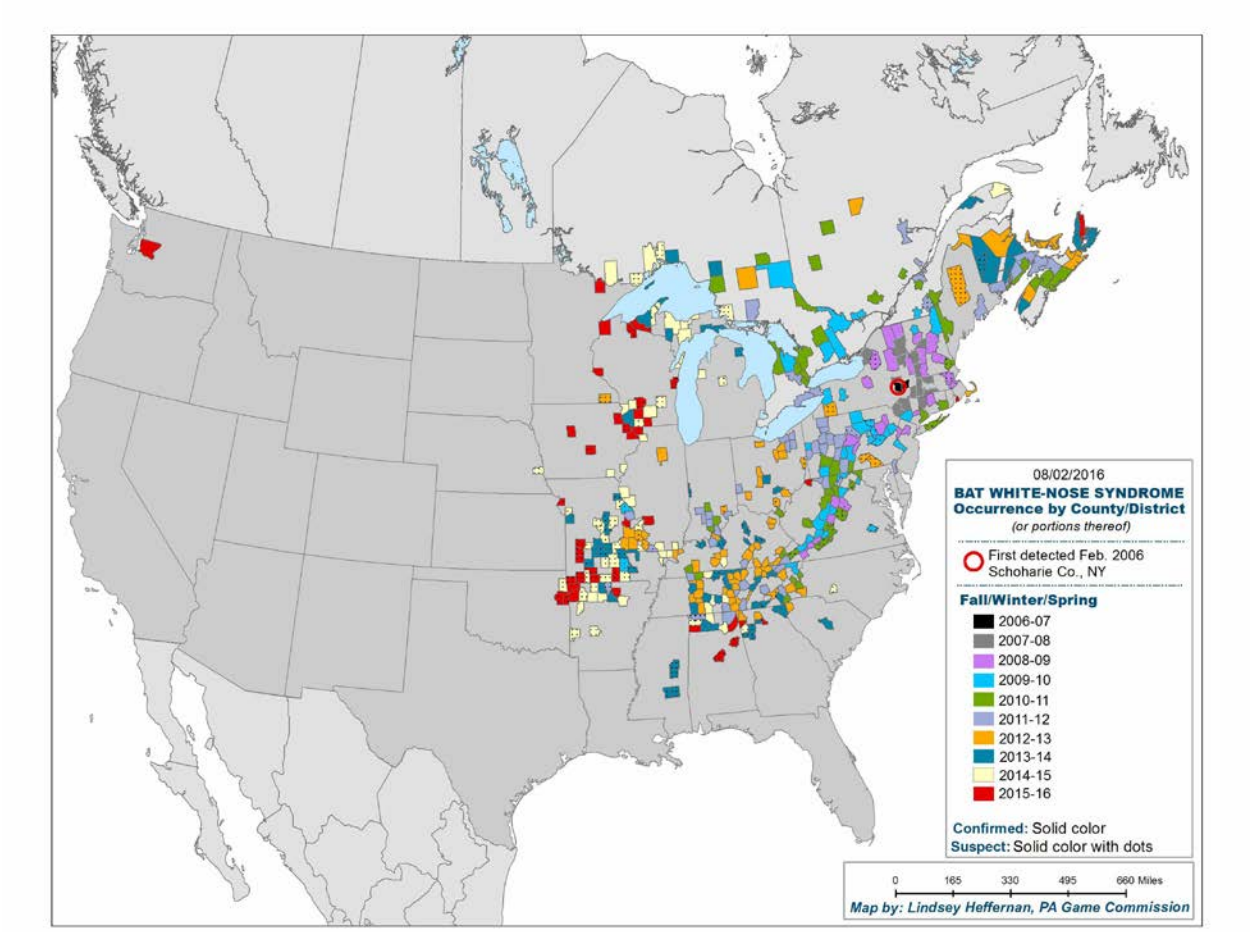


Figure 3. Documented occurrence of White-nose Syndrome (WNS) as of August 2, 2016. Map courtesty of Lindsey Hefferman, Pa. Game and Fish Commission.

Spread of the fungus into Missouri, combined with the documented deaths of Indiana bats in other locations from WNS, further threatens the species with extinction.

Environmental Baseline

The environmental baseline for the MTNF was established and fully described in detail on pages 12-13 and 34-45 of the Service's 2005 Programmatic BO. Since issuance of the Service's Programmatic BO, the environmental baseline on the MTNF changed only slightly.

In the early spring 2006, several tornadoes have destroyed forest land within the 29 county area of the MTNF. Approximately 3,000 acres of the MTNF was affected by these events, though the entire 3,000 acres was not entirely destroyed (Jody Eberly, MTNF pers. comm.). In 2008, wind storms affected approximately 50 acres of forest land on the MTNF.

Factors Affecting Species Environment within the Action Area

As noted above, WNS has caused documented mortality of Indiana bats across the eastern United States, and the disease has moved into the Midwest core of the species range. While WNS has apparently not yet been documented in Wayne and Butler counties (Fig. 3), it is likely to be present within in caves in or near the project area.

Effects of the Action

Many of the effects from the Blackwell Ridge project are expected to be beneficial over the long-term, and several of the activities are not anticipated to impact the Indiana bat. However, the following activities have the potential to result in impacts to the species: salvage harvest, commercial thinning, timber stand improvement, seed tree harvests, clearcut harvests, shelterwood harvests, overstory removal cuts, establishment harvests, group selection harvests, site preparation treatments, openland maintenance, and temporary road construction (Table 2). These impacts would be in the form of disturbance, injury, or mortality to roosting Indiana bats during spring staging, summer, or fall swarming periods. Because survey data indicates that there are no documented Indiana bat hibernacula within the project area, there are no anticipated effects to hibernating Indiana bats. Impacts to possible roost trees will be minimized by implementing the other terms and conditions associated with the reasonable and prudent measures (RPMs) provided on pages 75-81 in the programmatic BO. Because no maternity colonies are known to occur within or near the project area, individuals most likely to be impacted are males and non-reproductive females.

Based on our analysis of information provided in your BAE, we have determined that potential effects from these activities are consistent with those addressed in the programmatic BO and a full analysis of effects is hereby incorporated by reference.

Effects of the Action

Activities identified in Table 2 have the potential to result in impacts to the species if they are conducted during the active season (April 1 through October 31). These impacts would be in the form of disturbance, injury, or mortality to roosting Indiana bats during spring staging, summer, or swarming periods. Impacts will be minimized by restricting tree removal to the period between November 1 and March 31 whenever possible, as well as by implementing the other terms and conditions associated with the reasonable and prudent measures (RPMs) provided on pages 75-81 in the Programmatic BO.

Based on our analysis of information provided in your revised BA, we have determined that potential effects from these activities are consistent with those addressed in the Programmatic BO and are hereby incorporated by reference.

Table 2. Proposed activities having the potential to impact the Indiana bat.

Proposed Activities	Acres
Salvage and Sanitation Harvest	2,825
Commercial Thinning	892
Timber Stand Improvement	742
Seed Tree Harvest	1,160

Proposed Activities	Acres
Clearcut Harvest	278
Shelterwood Harvest	106
Overstory Removal Cut	51
Establishment Harvest	39
Group Selection Harvest	689
Site Preparation Treatments	4,214
Road Maintenance- 24 miles= 58.18 acres	58.18
Road Reconstruction- 15.6 miles= 37.81 acres	37.81
Temporary Road Construction- 21.2 miles= 51.39 acres	51.39
Total:	11,144

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. The effects of this project are limited to the project area, due to the limited nature of the proposed activities and geographic scope. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Any actions conducted on the MTNF lands will either be conducted by the USFS, or will require approval by the USFS and thus will require separate section 7 consultation. Therefore, cumulative effects, as defined in the ESA, are not expected to occur on MTNF lands

Conclusion

The actions and effects associated with the proposed Blackwell Ridge Project are consistent with these identified and discussed in the Service's Programmatic BO issued in 2005, revised in 2009, and extended in 2016. After reviewing the size and scope of the project, the environmental baseline, the status of Indiana bat, and its potential occurrence within the project area, the effects of the action; and any cumulative effects, **it is the Service's biological opinion that this action is not likely to jeopardize the continued existence of the Indiana bat**.

Incidental Take Statement

The Service anticipates that the proposed actions associated with the Blackwell Ridge Project will result in the incidental take of Indiana bat habitat as outlined in Table 3. The type and amount of anticipated incidental take is consistent with that described in the Programmatic BO and does not cause the total annual level of incidental take in the Programmatic BO (page 67-69) to be exceeded.

The Forest Service must implement all pertinent reasonable and prudent measures and implementing terms and conditions stipulated in the Programmatic BO to minimize the impact of the anticipated incidental take of Indiana bats, and to be exempt from the take prohibitions of section 9 of the Act. We have determined that no new reasonable and prudent measures, beyond

those specified in the Programmatic BO, are needed to minimize the impact of incidental take anticipated for the Blackwell Ridge Project.

This fulfills your consultation requirements for this action. Should the proposed project be modified or if the level of take identified above is exceeded, reinitiation of consultation as outlined in 50 CFR 402.16, is required.

REINITIATION NOTICE

This concludes formal consultation for the USFS's actions outlined in your request dated May 20, 2016. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

Table 3. Anticipated incidental take of the Indiana bat associated with the Blackwell Ridge Project .

Activity		Acres Affected in Fiscal Year 2016	Acres Affected in Fiscal Year 2017	Acres Affected in Fiscal Year 2018	Acres Affected in Fiscal Year 2019	Acres Affected in Fiscal Year 2020
Salvage Harvest Acres (even or uneven-aged harvest)		600 Cumulative for MTNF: 2407	600 Cumulative for MTNF: 3407	600 Cumulative for MTNF:2748	600 Cumulative for MTNF: 900	600 Cumulative for MTNF: 600
Hazard Tree Removal*	Acres Road & Trail Related	39.57 Cumulative for MTNF: 256.37	29.5 Cumulative for MTNF: 246.3	28.06 Cumulative for MTNF: 212.72	23.5 Cumulative for MTNF: 70.8	21.0 Cumulative for MTNF: 21
	Miles Fireline Construction	0 Cumulative for MTNF: 15.11	0 Cumulative for MTNF: 14.21	0 Cumulative for MTNF: 4.7	0 Cumulative for MTNF: 4.7	0 Cumulative for MTNF: 0
Activity		**Acres Affected in Fiscal Year 2021**	**Acres Affected in Fiscal Year 2022**	**Acres Affected in Fiscal Year 2023**	**Acres Affected in Fiscal Year 2024**	**Acres Affected in Fiscal Year 2025**
Salvage Harvest Acres (even or uneven-aged harvest)		600 Cumulative for MTNF: 3526	600 Cumulative for MTNF: 2088	600 Cumulative for MTNF:2091	600 Cumulative for MTNF:1600	640 Cumulative for MTNF: 806
Hazard Tree Removal*	Acres Road & Trail Related	5.5 Cumulative for MTNF: 5.5	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0
	Miles Fireline Construction	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0	0 Cumulative for MTNF: 0

Note: Acreages in this table were updated on February 4, 2015 as a result of correspondence with other MTNF Wildlife Biologists regarding new projects on their respective districts. This spreadsheet will be updated if on-the-ground actions deviate from these numbers to ensure the maximum allowable acreages by activity as listed in the PBO are not exceeded.

***Hazard tree removal** includes 1500 acres of recreation site maintenance per year; 2000 acres of trail maintenance per year; 100 acres of road construction/reconstruction per year; 800 acres temporary roads and skid trails per year; and 240 miles of fireline per year. **Hazard tree removals are generally individual trees being removed, not acres of forest being removed.** These numbers are inflated estimates of acres that could be affected across the MTNF throughout the 10 year project period.

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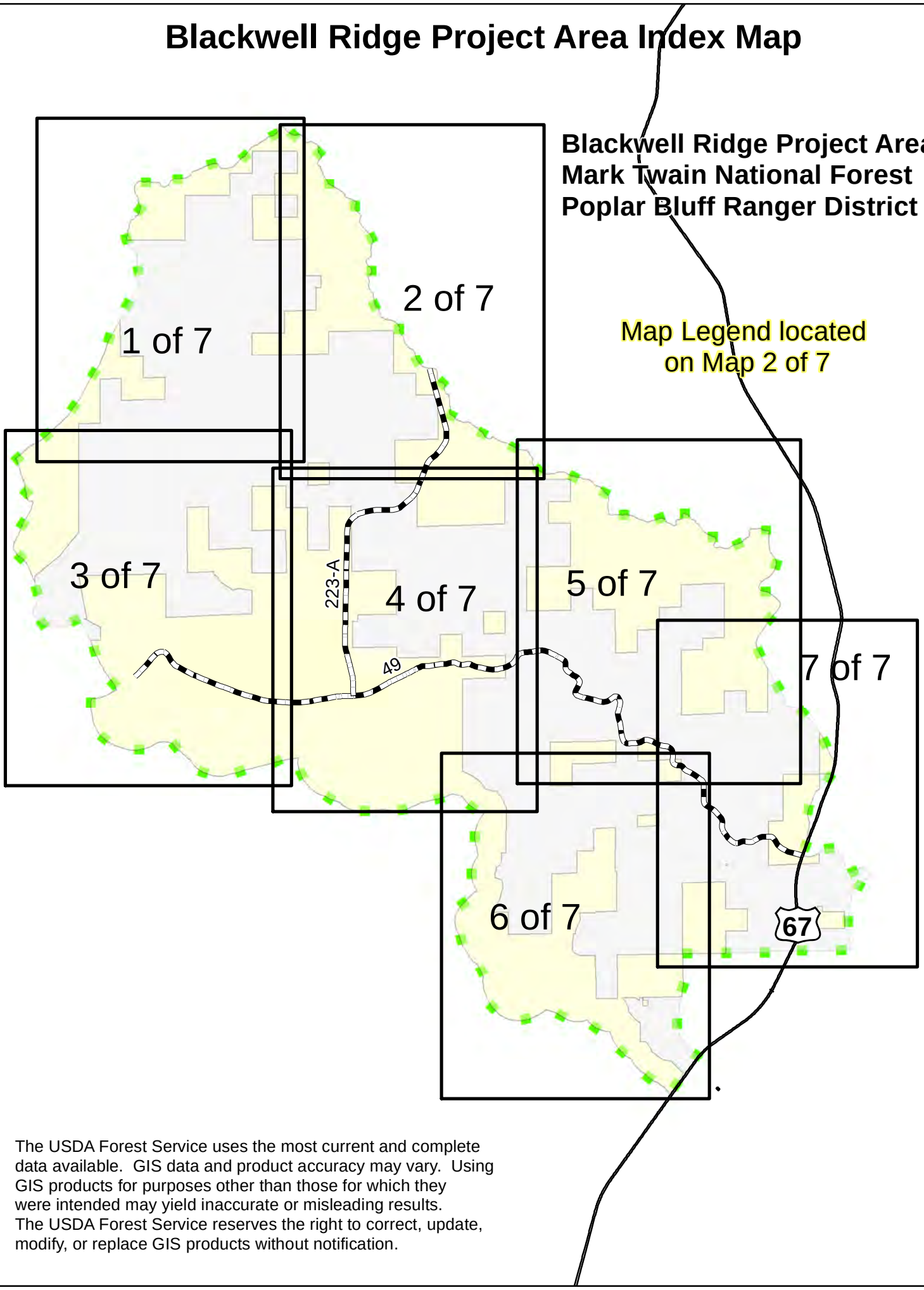
Appendix B- Maps of Blackwell Ridge Project

Blackwell Ridge Project Area Index Map



The USDA Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. Using GIS products for purposes other than those for which they were intended may yield inaccurate or misleading results. The USDA Forest Service reserves the right to correct, update, modify, or replace GIS products without notification.

Blackwell Ridge Project
Wildlife Activities Map
Mark Twain National Forest
Poplar Bluff Ranger District

Kneibert Tract

Turnbough Tract

Insert Map

Williamsville

N

1:70,000

3 1.5 0 3 Miles

The USDA Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. Using GIS products for purposes other than those for which they were intended may yield inaccurate or misleading results. The USDA Forest Service reserves the right to correct, update, modify, or replace GIS products without notification.

Turnbough Tract Proposed Wetlands

1:10,500

0.2 0.1 0 0.2 Miles

Legend

Project Boundary

Wildlife Habitat Area

Proposed Wetland

Proposed Openland

Pond Treatments

Pond Maintenance

Pond Rehabilitation

Utilities

Pipeline

Powerline

Railroad

Roads

US Highway

State Highway

County Road

Forest Service Road

Pond or Waterbody

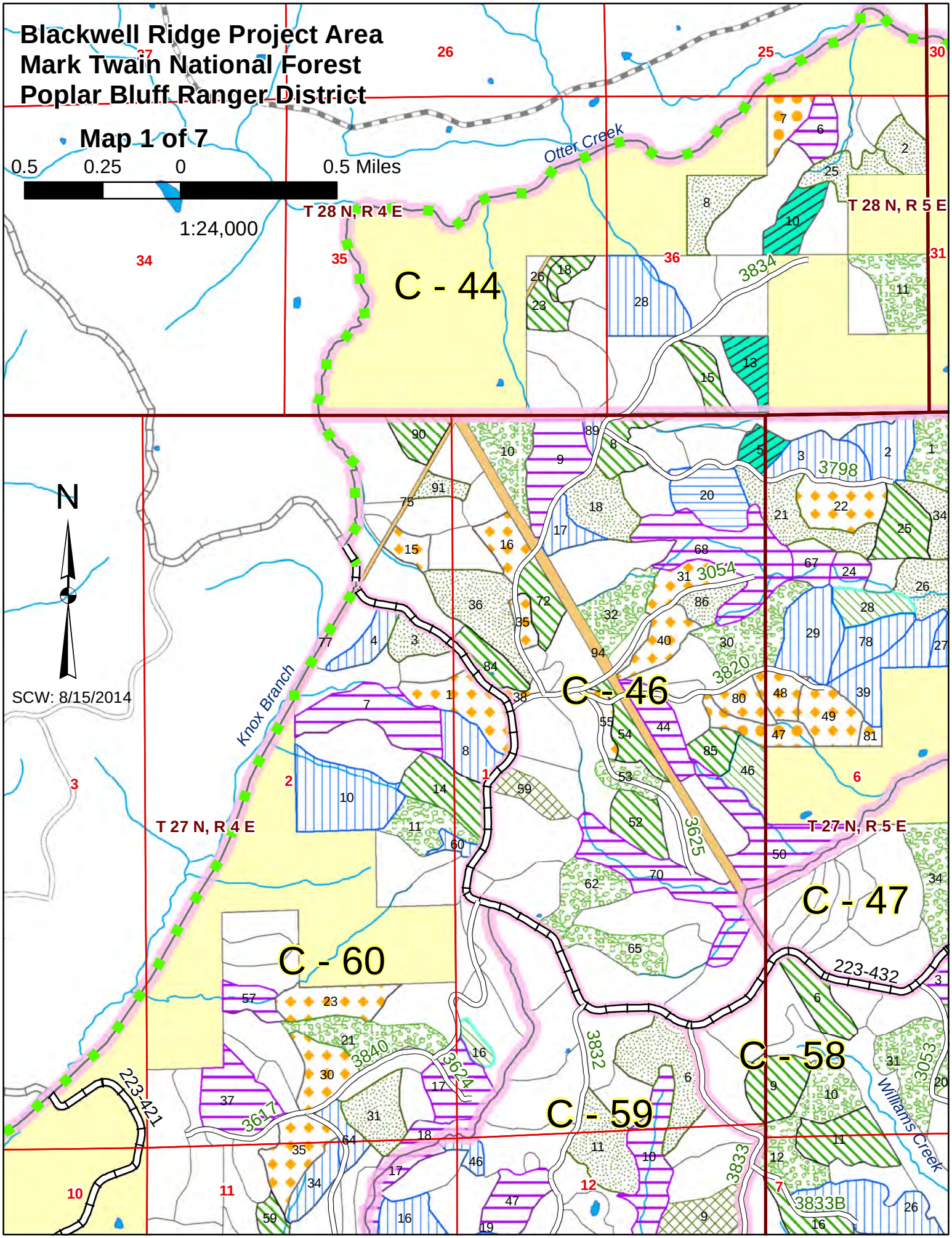
Stream or River

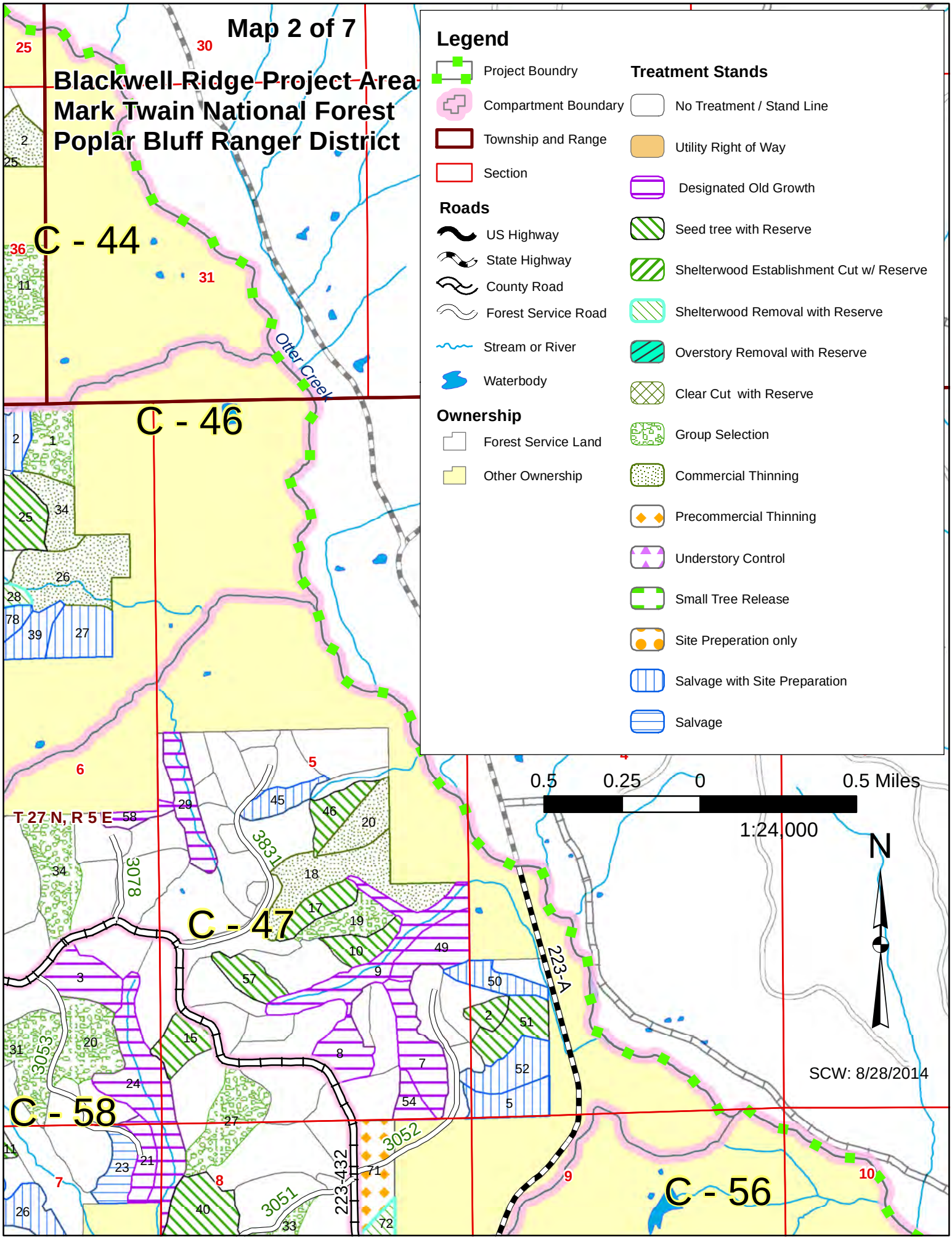
Ownership

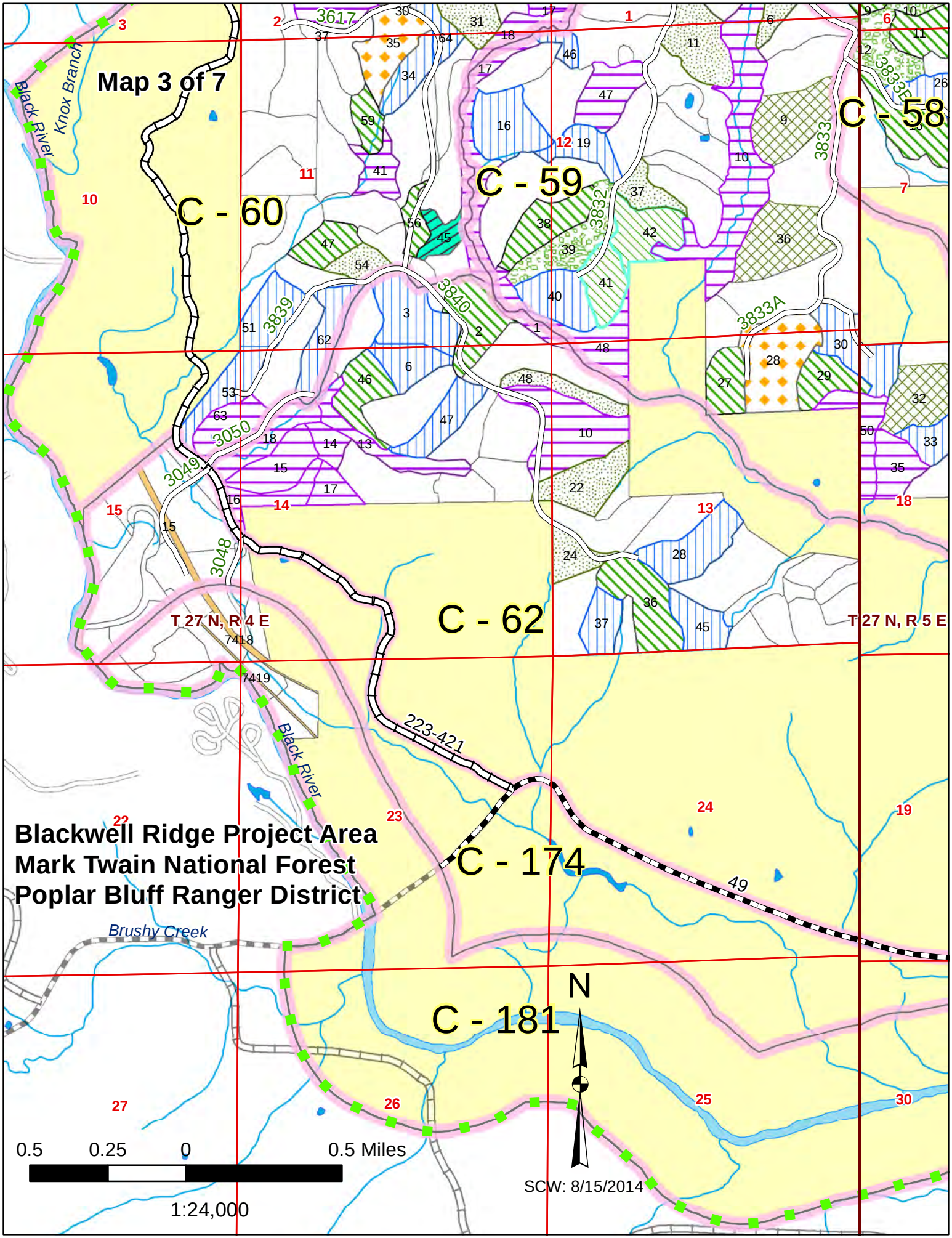
Other Ownership

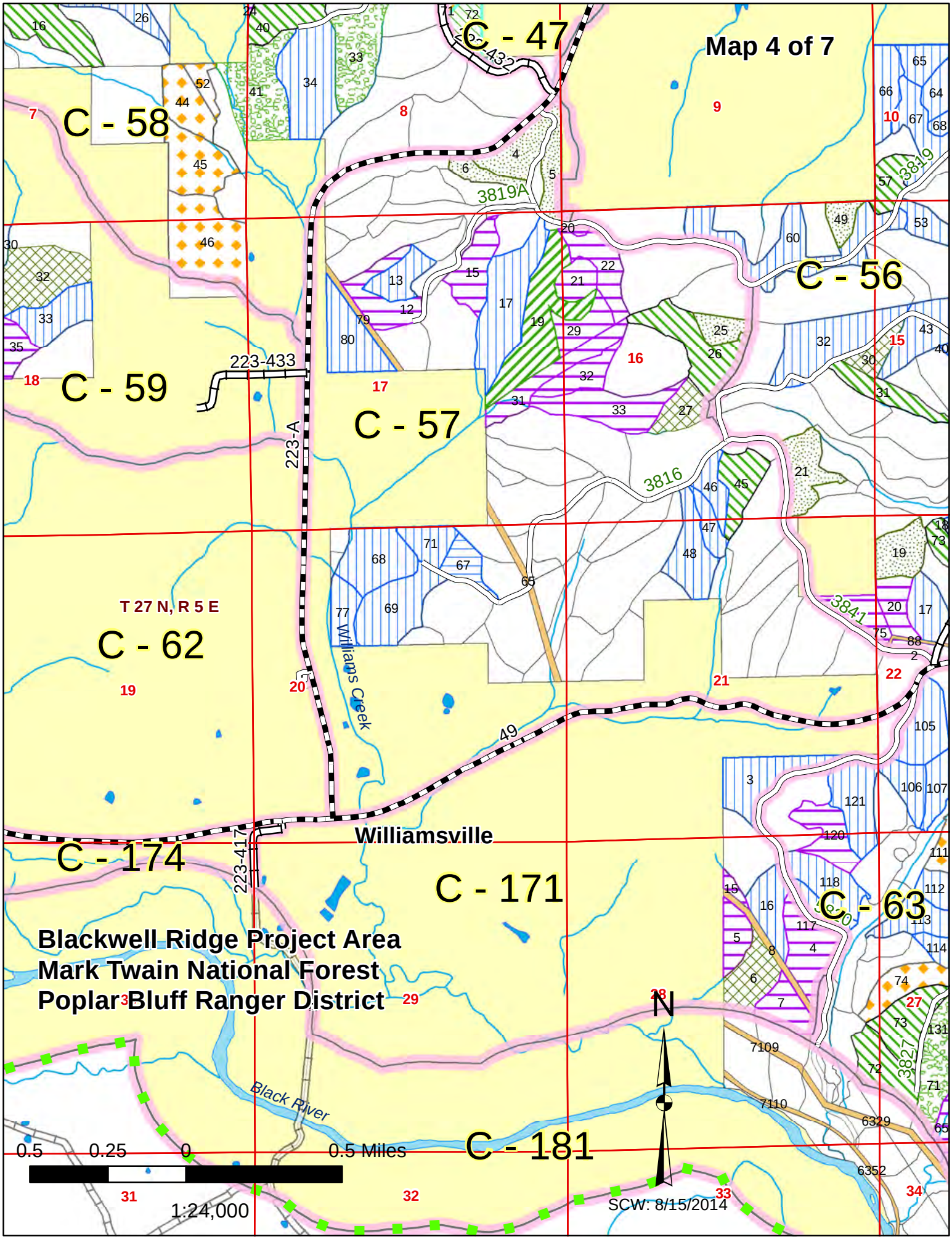
Forest Service Land

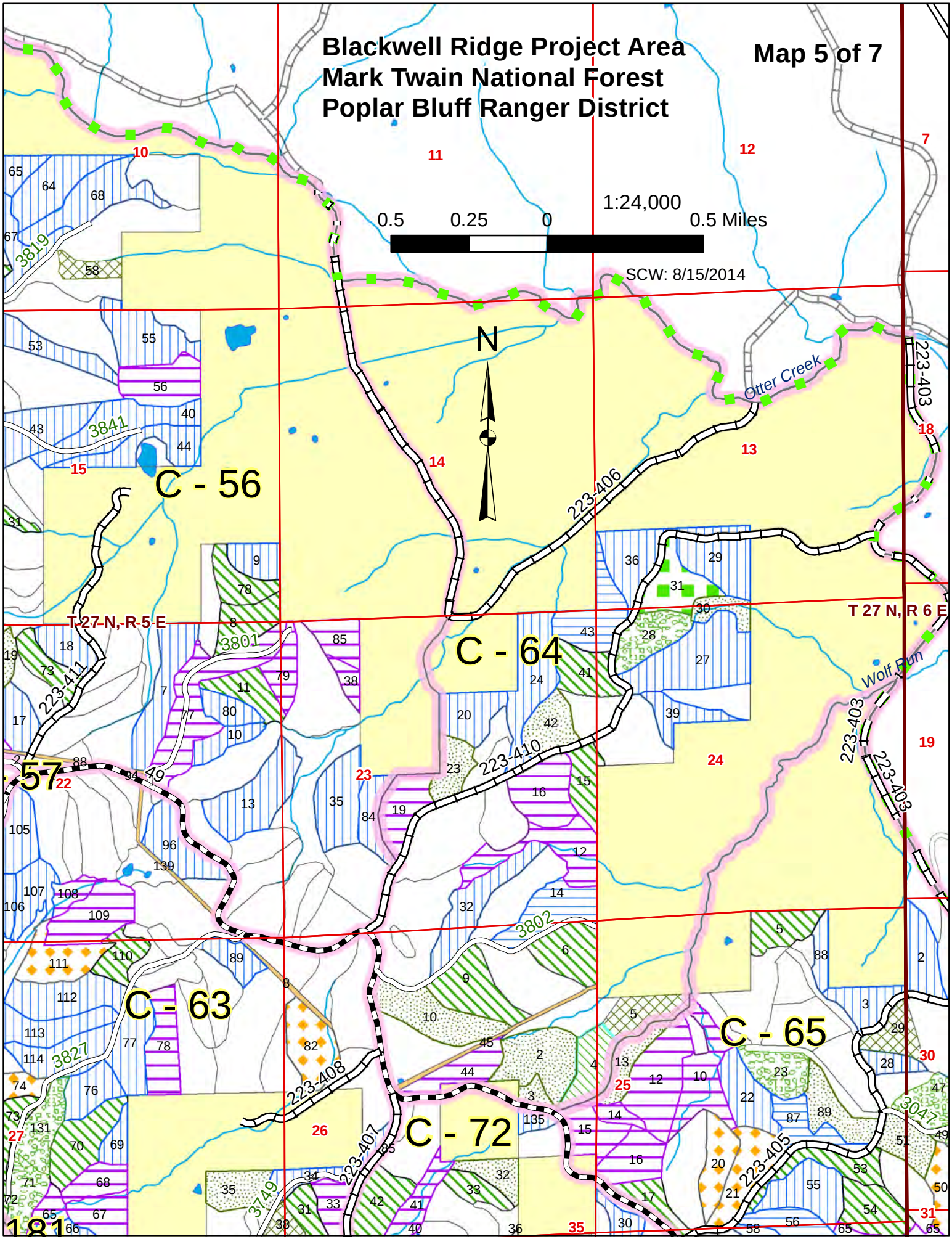
Date: 2/23/2015

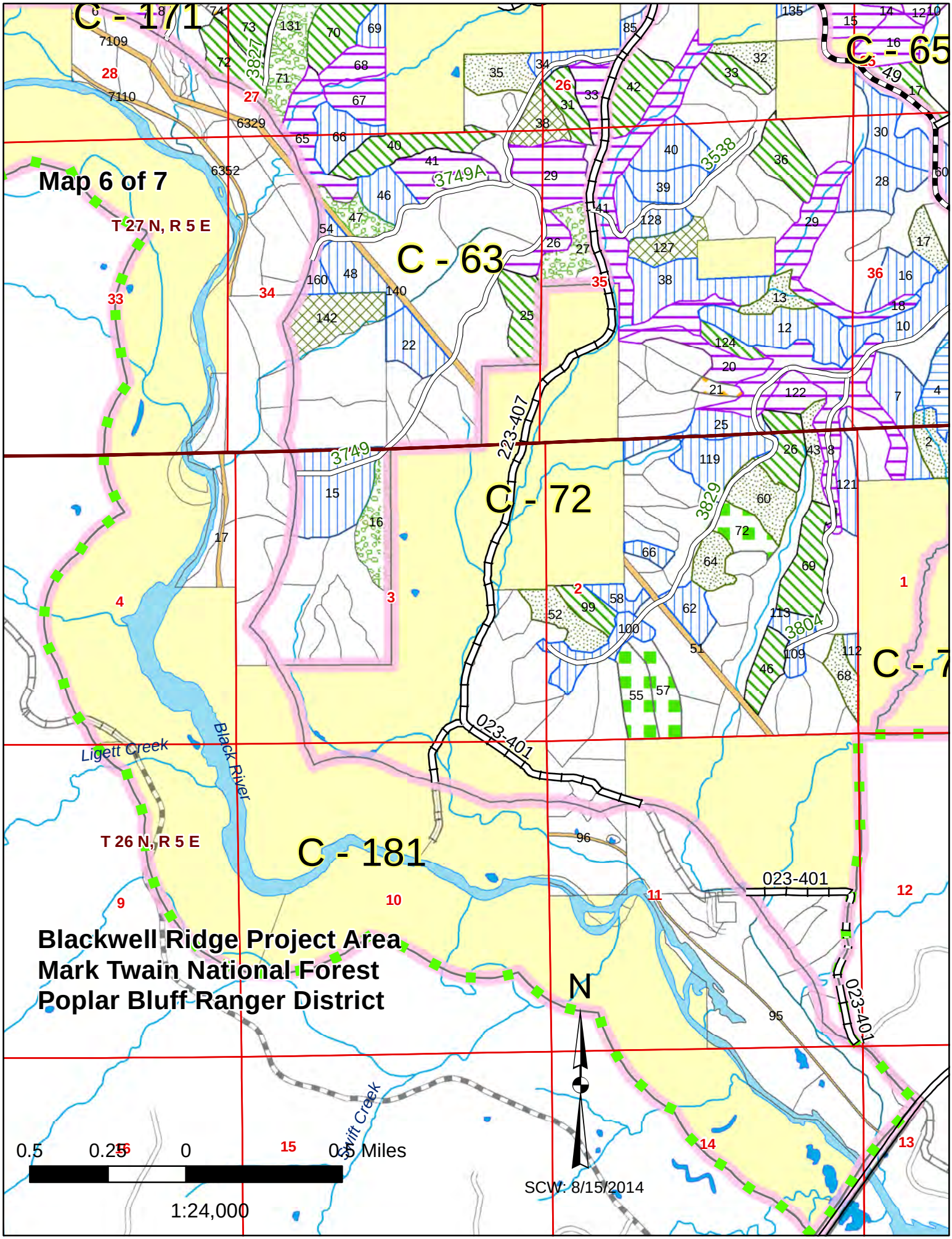

Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
Map 1 of 7
0.5 0.25 0 0.5 Miles
1:24,000
N
SCW: 8/15/2014
T 28 N, R 4 E
T 28 N, R 5 E
T 27 N, R 4 E
T 27 N, R 5 E
Otter Creek
Knox Branch
Williams Creek
C - 44
C - 46
C - 47
C - 58
C - 59
C - 60
3834
3798
3054
3820
3625
3840
3624
3832
3617
3833
3053
3833B
223-421
223-432

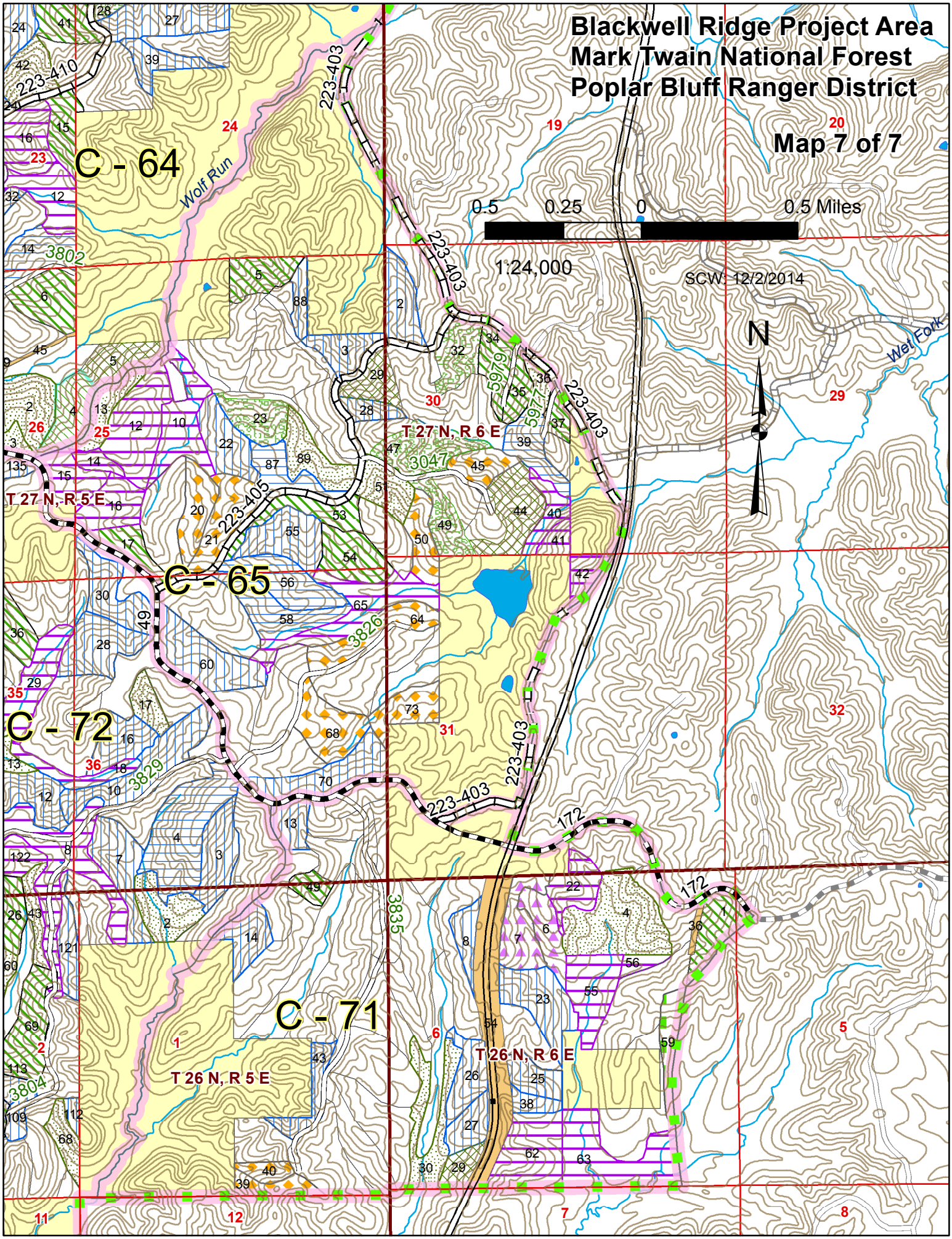

Map 2 of 7
Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
Legend
Project Boundry
Compartment Boundary
Township and Range
Section
Roads
US Highway
State Highway
County Road
Forest Service Road
Stream or River
Waterbody
Ownership
Forest Service Land
Other Ownership
Treatment Stands
No Treatment / Stand Line
Utility Right of Way
Designated Old Growth
Seed tree with Reserve
Shelterwood Establishment Cut w/ Reserve
Shelterwood Removal with Reserve
Overstory Removal with Reserve
Clear Cut with Reserve
Group Selection
Commercial Thinning
Precommercial Thinning
Understory Control
Small Tree Release
Site Preperation only
Salvage with Site Preparation
Salvage
C - 44
C - 46
C - 47
C - 58
C - 56
Otter Creek
T 27 N, R 5 E
3078
3831
3053
3052
3051
223-432
223-A
0.5 0.25 0 0.5 Miles
1:24,000
N
SCW: 8/28/2014


Map 3 of 7
Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
C - 58
C - 59
C - 60
C - 62
C - 174
C - 181
T 27 N, R 4 E
T 27 N, R 5 E
Black River
Knox Branch
Brushy Creek
223-421
49
3617
3833
3833A
3832
3840
3839
3050
3049
3048
7418
7419
N
0.5 0.25 0 0.5 Miles
1:24,000
SCW: 8/15/2014


Map 4 of 7
C - 47
C - 58
C - 56
C - 59
C - 57
C - 62
C - 174
C - 171
C - 63
C - 181
T 27 N, R 5 E
Williamsville
Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
223-432
223-433
223-A
223-417
3819A
3819
3816
3841
3827
Williams Creek
Black River
49
N
0.5 0.25 0 0.5 Miles
1:24,000
SCW: 8/15/2014


Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
Map 5 of 7
1:24,000
0.5 0.25 0 0.5 Miles
SCW: 8/15/2014
N
C - 56
C - 64
C - 63
C - 65
C - 72
T 27 N, R 6 E
T 27 N, R 5 E
Otter Creek
Wolf Run
223-406
223-403
223-411
223-410
223-408
223-407
223-405
3819
3841
3801
3802
3827
3749
3047


Map 6 of 7
C - 171
C - 65
C - 63
C - 72
C - 181
T 27 N, R 5 E
T 26 N, R 5 E
3827
3749A
3538
3749
223-407
3829
3804
023-401
Ligett Creek
Black River
Swift Creek
Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
N
0.5 0.25 0 0.5 Miles
1:24,000
SCW: 8/15/2014


Blackwell Ridge Project Area
Mark Twain National Forest
Poplar Bluff Ranger District
Map 7 of 7
0.5 0.25 0 0.5 Miles
1:24,000
SCW: 12/2/2014
N
C - 64
C - 65
C - 72
C - 71
Wolf Run
West Fork
T 27 N, R 5 E
T 27 N, R 6 E
T 26 N, R 5 E
T 26 N, R 6 E
223-410
223-403
223-405
49
172
3802
3804
3826
3829
3835
3047
5979
5977