www.michigan.gov/dnr

Jones Area State Game Areas Master Plan:

Crane Pond State Game Area, Fabius State Game Area, and Three Rivers State Game Area

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WILDLIFE DIVISION

KENNETH S. KESSON

IC 2039 (Rev. 04-21-2015)

Contents

Introduction

Purpose of the Plan

The mission of the Michigan Department of Natural Resources (DNR), Wildlife Division, is to enhance, restore, and conserve the State's wildlife resources, natural communities and ecosystems for the benefit of Michigan's citizens, visitors, and future generations. This master plan was written to fulfill this mission as it pertains to the three dedicated areas of Crane Pond State Game Areas (SGA), Fabius SGA, and Three Rivers SGA and for the purposes of this plan only, these areas will now be referred to collectively as the Jones Area SGAs.

The primary purpose of this plan is to set strategic direction and guide future management activities used to achieve desired conditions for the Jones Area SGAs. Obligations to the funding sources used to acquire and manage this area require that it be maintained for the purpose of managing wildlife, wildlife habitat and associated recreation including hunting and trapping. Other activities and uses of the area that complement or do not conflict with wildlife management have been considered and incorporated where appropriate. This plan also incorporates an adaptive management approach, in which wildlife biologists assess the effectiveness of their management efforts and make adjustments as needed while maintaining the goals and directions for management as set out in this plan.

This plan describes management activities on the Jones Area SGAs that is expected to take approximately ten years to complete. However in developing this plan, time frames beyond the decade-long interval and land outside the boundaries of the area were taken into consideration. Progress on the plan will be reported on annually. Also, the plan itself will be reviewed annually and, if needed, updated to keep it current. The management planned in this document is a good faith effort taking into consideration the current conditions, anticipated resources, and the state of knowledge at the time this plan was written. It is not guaranteed that the management activities outlined in this plan will be accomplished as outlined here-in; however, it is expected that current and future staff will make reasonable efforts to do so.

The master plan process provides the public with an opportunity, through public meetings and written communications, to have input regarding the future of areas managed by the Wildlife Division. Although public input was encouraged and considered in developing this plan, given the legal requirements and funding obligations for the area, this is not necessarily a consensus document.

Present Condition

Crane Pond, Fabius, and Three Rivers SGAs were combined due in part to the ecological features they all share as well as their close proximity. These SGAs are within about 5 miles of each other and share many similar characteristics from soils to wildlife communities. The close proximity to the Crane Pond Field Office located in Jones, MI was also considered when combining these areas into one plan. Being near the office allows staff to more closely monitor management activities, respond to issues, and provides opportunity for more intensive management than other outlying SGAs.

Area Location and Project Boundary

All three SGA are located within Wildlife Division's Southwest Management Unit. The Crane Pond SGA is located in Cass County and the area totals approximately 4,170.79 acres (IFMAP) centered at township 06S, range 13W and includes lands in the following sections:

Newberg Township (06S13W), Sections: 3, 4, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 26, 27, 28, 29

Penn Township (06S14W), Sections: 13, 24

The Fabius SGA is located in St. Joseph County with a total acreage of approximately 153.29 acres (IFMAP) centered at township 06S, range 12W and includes lands in the following sections:

Fabius Township (06S12W), Section: 35, 36

The Three Rivers SGA is located in Cass and St. Joseph counties, totaling approximately 2,103.00 acres (IFMAP) centered at township 07S, range 12W and includes lands in the following sections:

Cass County

Porter Township (07S13W), Section: 12, 13

St. Joseph County

Constantine Township (07S12W), Sections: 5, 6, 7, 8, 17, 18, 19

These areas are located in Southwest Lower Michigan roughly between Kalamazoo, Michigan and Elkhart, Indiana (see Figure 1 and Figure 2). Crane Pond SGA is bisected by M-40; it lies north of the intersection with M-60 and south of Marcellus. Fabius SGA is bordered on the west by US-131 and on the east by the St. Joseph River; it is located about 3 miles south of the city of Three Rivers. Finally, Three Rivers SGA is located about 2 miles south of M-60 along the county line between Cass and St. Joseph counties.

Much of the area is rural with scattered small towns and communities. The largest town in the area is Three Rivers, which is situated just north of Fabius SGA. Most of the urban growth of the town is moving north or located along US-131. Other towns nearby include: Constantine, Jones, Marcellus, Mottville, and Vandalia. There are numerous small lakes, streams, and rivers located in the area, most notable are Cory Lake, Donnell Lake, Curtis and Mill Creek (trout streams), and the St. Joseph River.

The dedicated boundary of the Jones Area SGAs (see Figure 3 and Figure 4) was approved by the Michigan Natural Resources Commission in 2004. The dedicated boundary includes

approximately 7,000 acres of land in private ownership, which may be suitable additions to the area in the future. Additional land within the dedicated boundary will only be acquired on the basis of a "willing selling - willing buyer". The dedicated boundary is designed to establish simple, recognizable boundaries and provide the largest possible contiguous blocks of State ownership. The dedicated boundary usually includes those parcels considered to be of high natural resource value but may exclude parcels of relatively low value such as previously developed lands. All of the current game area boundaries and electronic maps can be accessed on the Michigan DNR website.

Establishment of Area

Crane Pond SGA was originally approved and dedicated on November 10, 1939 by the Conservation Commission; however there was no associated land purchase. Essentially, the Department was lining up project areas where Pittman-Robertson monies could be funneled quickly as land became available.

The original project area included 7,881 acres in Newberg Township. The memo identified "quail – plentiful; pheasants – common; rabbits – plentiful; squirrels and raccoon – common". Initial land purchases did not occur until 1951, with 6 purchases totaling 754 acres. Land was added throughout every decade until the last acquisition in 2013, which brought the size of Crane Pond SGA to 4,237 acres. Management on Crane Pond has been to maintain the area for huntable game populations in compliance with the Pittman-Robertson Act since its' early beginning. As management paradigms change, so has management of the area.

The Three Rivers SGA (TRSGA) was dedicated by the Conservation Commission on August 25, 1947 without an associated land acquisition. However, on September 19, 1947 the first land was purchased: an 8 acre dam with flowage rights on Mill Creek along Millers Mill Road. The dam still exists today, but was severely damaged during a flood in the 1960's and has not held water since. Additional acreages were purchased in the late 1940s and early 1950s and in 1993, the last 40 acres was added to the TRSGA to bring its total acreage to 2,103. In the dedication memo, Mill and Wood creeks are mentioned as being valuable assets to the game area and worthy habitat for waterfowl and muskrats. Other species listed included rabbits, squirrels, and raccoons. The area has been managed for sustainable huntable populations of game species and recently more focus has been placed on managing the unique systems of this area.

The land for Fabius SGA was gifted to the state by Frank and Beulah Delong in 1981. The SGA was dedicated by the Natural Resources Commission on June 19, 1981 and included nearly 120 acres. Submerged islands in the St. Joseph River tax reverted to the state and account for roughly the remainder of the 153 acres. The NRC memo dedicating the land stated that this area will provide "expanded recreational opportunities of for citizens in the southwestern portion of the state by ensuring good access to the St. Joseph River and beneficial habitat for deer, waterfowl and fur-bearing animals." Management on this area has not deviated from this original purpose and will concentrate on maintenance activities into the future.

Legislation, Policies and Agreements Specific to this Area

There are no legislative or Department policies that restrict use or management of the area outside those imposed by the Pittman-Robertson Act. There are several easements for Establishment of Area.

Public Use

The SGAs are primarily managed for hunting recreation, mostly in the form of upland game species. There are several small lakes and streams that provide waterfowl hunting opportunity, but this is a secondary use when compared to the amount of upland game hunting. Deer hunting is by far the most popular form of hunting on all the game areas. Annual estimates of hunter densities on opening day of Firearm Deer Season average about 7 hunters per 100 acres. Small game hunting is popular in early fall prior to and into early Archery Deer Season and picks up again during the winter months. Spring turkey hunting activity is increasing, partly as a result of regulatory changes that have helped increase opportunities for hunters.

During the warm weather months, fishing is a very popular activity ranking a close second behind hunting activity. There are three boat access sites on the Crane Pond SGA which are very popular destinations by local anglers. Bogart and Kirk lakes are most popular and produce panfish, bass and pike. Curtis and Mill creeks on the Three Rivers SGA are designated trout streams and receive some attention from local trout anglers. Ice fishing is somewhat limited due mostly to the length of access trails and the large amount of snow received. Access trails are not maintained in the winter time so ice anglers venture down trails at their own risk.

During April and May each year, the areas receive a large number of individuals seeking morel mushrooms. In some areas on the Crane Pond SGA, activity is second only to firearm deer hunting. The mushroom crop draws many Michigan residents as well as visitors from Indiana, anecdotally about 30% of the mushroom hunters are from Indiana.

Camping is restricted to the fall through spring months and is most popular during the Firearm Deer Season. There are several annual deer camps scattered on Crane Pond and Three Rivers SGAs. There are several miles of work trails which provide some opportunity for hiking and other general outdoor recreation. We monitor public uses of all areas and address any uses that are not compatible with wildlife management.

Commercial Uses of the Area

State land rules prohibit all commercial use of state land except as permitted. Allowable uses will be evaluated on the basis of whether they are compatible or do not conflict with the intended use/purpose of the area. Commercial activities are only allowed when they are incidental to management efforts that are undertaken to achieve desired goals. The Wildlife Division does not assume the responsibility of demonstrating whether any proposed commercial uses are, or are not, compatible with the intended purpose of the area.

Sharecropping and timber harvest are two commercial activities allowed on the game areas. Sharecropping agreements are typically annual contracts between local farmers and the DNR aimed at producing some type of agricultural product beneficial to wildlife. The state retains a portion of the crop produced, usually as standing grain, to be used by wildlife.

Commercial timber harvest is an important tool used to manage forest resources on the game areas. Timber harvest techniques that set back succession, create forest openings, or salvage downed marketable timber are employed to enhance or create wildlife habitat. Some techniques used in the past include selective thinning, seed tree, and clear cutting aimed at regenerating certain forest types.

Facilities and Infrastructure

The infrastructure present on this area is an important component that provides public access and allows for management activities. All facilities will be maintained in safe and operable conditions throughout their useful life. Periodically, major repairs and/or renovations may be made to some that may extend their useful life. For a complete list and location of facilities by game area see Table 1.

Table 1 . Approximate quantity of facilities and infrastructure on each of the Jones Area SGAs.

	Boat launches	**Building owned**	**Parking lots**	**Roads/trails**	**Signs**	**Vehicle barriers**
State Game Area	*Number*	*Number*	*Number*	*Miles*	*Number*	*Number*
Crane Pond	3	3	33	7.5	500	43
Fabius	0	0	1	0.5	10	1
Three Rivers	0	1	13	5.5	200	24
Totals	3	4	47	13.5	710	68

Accessibility

Currently, there are no developed facilities that provide access to physically challenged individuals; however, there are locations where we can direct individuals expressing special access. Crane Pond SGA has several trails open to vehicular access. When a request is made to the local staff, every effort is made within reason to allow for access. There are sites that could potentially be developed for special needs accessibility, but due to the lack of interest, development has not been considered.

Figure 1. Location of project area within state of Michigan

Regional View of Jones Area State Game Areas

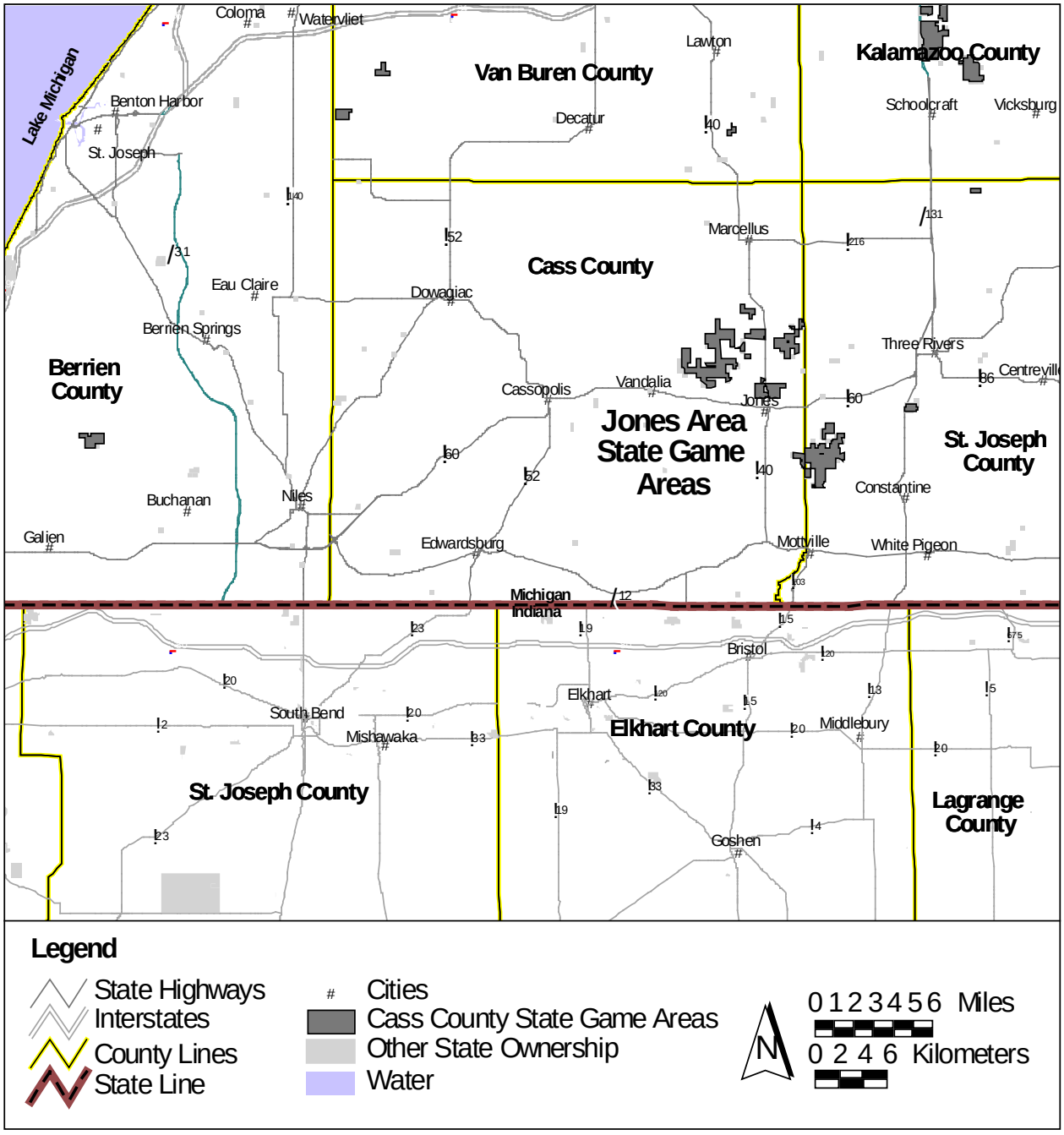
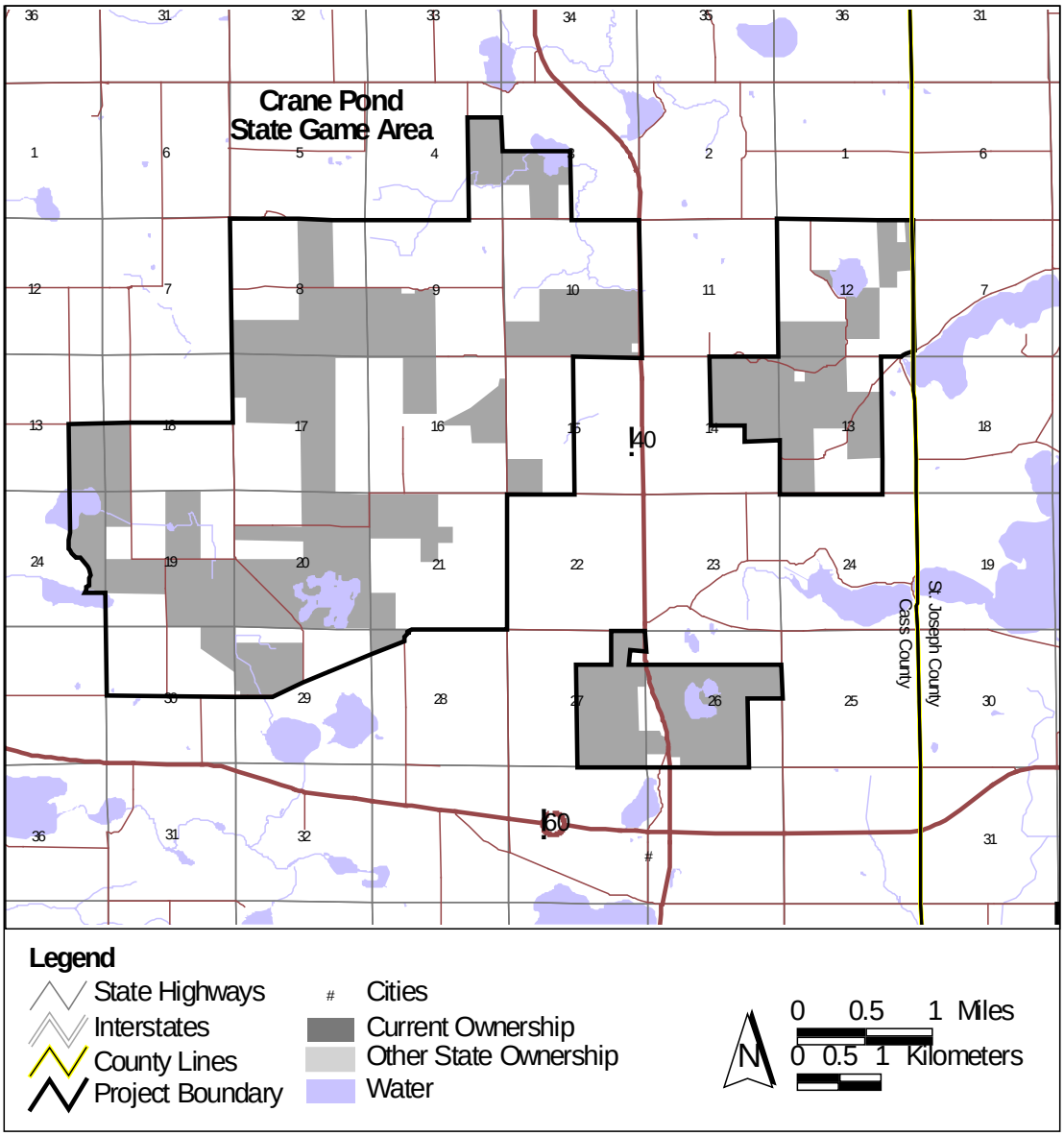


Figure 2. Location of project within region, showing the major features nearby.

Crane Pond State Game Area Planning Boundary



REPLACE THIS WITH YOUR AREA MAP FIGURE!

Figure 3. Local view of Crane Pond SGA showing project boundary and state-owned lands.

Fabius and Three Rivers State Game Area Planning Boundary

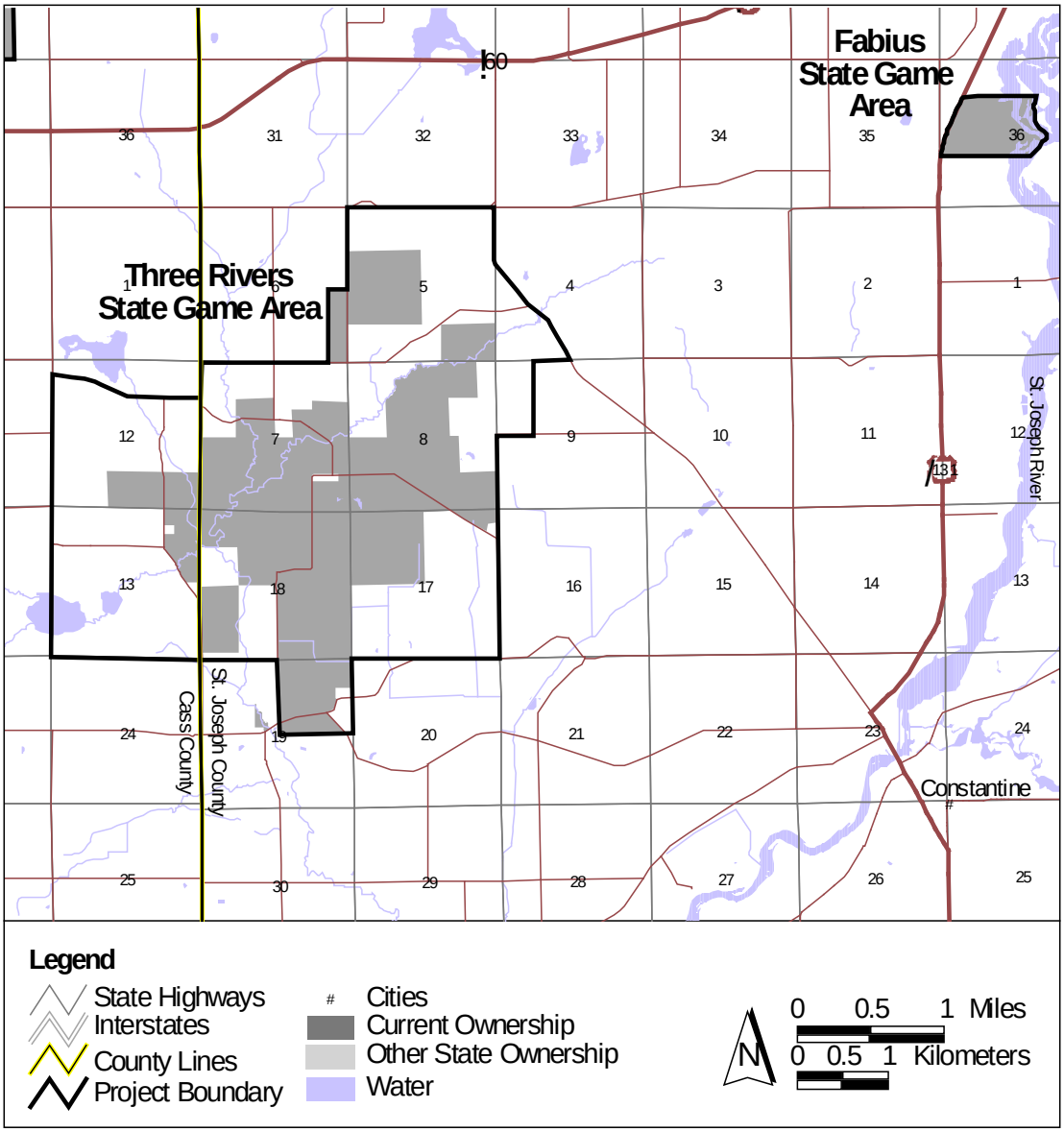


Figure 4. Local view of Three Rivers and Fabius SGA showing project boundary and state-owned lands.

Strategic Plan

When developing desired future conditions for management, it is necessary to consider the purpose for which the property was acquired by the State, current biological and land cover conditions (Appendix C), cultural resources and history (Appendix D) and future social and economic forces that could influence management strategies. The intended purpose for these SGAs is wildlife habitat restoration and management, as well as providing hunting, trapping and other low-impact recreational opportunities for the public; this will remain the overall focus of our efforts for the period of this plan.

Currently, most (73%) of the Jones area SGAs consist of forested systems subjected to various levels of fragmentation and human influence. The principles used to designate management strategies and activities on these areas will be: sound ecosystem management, wildlife and habitat management, and enhancing hunting, trapping and other low-impact recreational opportunities for the public to enjoy these areas. Openings in the form of small meadows to large agricultural fields are also found throughout the SGAs and will be maintained and enhanced where feasible. Several small, natural lakes, streams and wetlands are also found throughout the SGAs. Water levels and associated plant communities are influenced by surface water and ground water fluctuations. These areas will be protected and maintained as they occur on the landscape while offering access to the public for fishing or other low impact recreational usage as feasible.

Due in part to the high quality, agricultural values and the distance from industrial communities, the landscape surrounding the SGAs are not expected to change much in the next 50-100 years. Additional home construction and land fragmentation is expected, however, this will probably have little impact on the overall landscape, as most residents will likely maintain the fields and forests on their properties.

Some management options were eliminated from consideration on the game areas while developing this plan such as the development of hiking and skiing trails, or other activities that are not compatible with the intent of the purchase of the associated properties. Large scale restoration of historic vegetative cover was also considered but not pursued due to current obstacles, which would not allow for desired maintenance activities; primarily those associated with prescribed burning. Development of impounded water areas were considered and determined to be too costly and the benefits gained not worth the future maintenance costs. These options may be considered in the future; however, to enhance habitat and management capability of the resources as user needs, funding and management capacity change.

Recognizing that available funding and personnel resources are limited, the Wildlife Division has identified a strategy of prioritizing potential management options to the have the most “bang for the buck” with respect to the project planning and implementation process. Thus identification of projects that are deemed most important takes into account the benefit to the resources as identified by the local land manager, the desires of the SGA’s users and the potential of practices on the landscape level to have a positive impact on conservation of the resources, and to maximize recreational potential in a balanced fashion. In an effort to

prioritize management for species and systems, the Wildlife Division has developed a list of wildlife species upon which management emphasis will be placed. In the Southern Lower Peninsula 23 Featured Species (Appendix B) were identified of which 16 have habitat components on one or more of these SGAs.

Goals/Objectives/Actions

(listed as highest priority to lowest)

What follows is the strategic direction for the Crane Pond, Fabius, and Three Rivers SGAs. This plan describes the **goals** or desired future condition for the area, the **objectives** under each goal, and the **actions** associated with each objective. For the purposes of this master plan, the following definitions will be used:

Goal — A desired future condition of the area.

Objective — A management approach or strategy that the best science suggests can be used to move the area toward the Goal. An objective is a quantifiable input to be completed within a defined timeframe that contributes towards accomplishing the goal.

Action — An operational means to accomplish an objective. An action is a step needed to complete an objective and is described in sufficient detail to inform planning. An action is a quantifiable input to be completed within a defined timeframe that contributes towards accomplishing the objective.

Desired Future Conditions

GOAL I. *Deer Management Zones*

- **Goal I:** Is to maintain sufficient numbers of white-tailed deer to provide the opportunity for quality hunting and viewing without negatively impacting local agriculture or the habitat needs of other wildlife species.

  Rationale: 1) White-tailed deer are abundant on all three game areas; 2) Habitat management directed at deer will be beneficial for other game and non-game wildlife species; 3) Monitoring deer populations is relatively easy through conversations with hunters and data collected at the local check station; 4) Deer are a species that have the potential to positively or negatively impact several other species; 5) White-tailed deer are a statewide Featured Species; 6) The Wildlife Division completed a Statewide Deer Plan which identifies population and habitat management of deer as important goals.

  Assessment/Metrics: Analysis of crop damage permit information and information gathered from hunters through interviews and the local deer check station will be used

to monitor success of this goal. Other methods such as habitat exclusion devices, plant inventories, and seasonal deer counts may also be conducted as feasible.

- **Objective A:** Is to maintain and enhance previously identified priority zones for deer, known as local deer management zones (DMZs), on Crane Pond and Three Rivers SGAs. Habitat management will take place in the DMZ in order to maximize benefits to deer and deer hunting through the life of this plan.
    - **Action 1.** Create a new, updated map showing the identified DMZs with new field numbers and new aerial photography. Complete by summer of 2015.
    - **Action 2.** Update the DMZ map in the public display case at the CPSGA headquarters on an annual basis to highlight featured improvements for the public to reference. Complete annually by September of each year.
    - **Action 3.** Within each zone identify, implement and manage several areas to be enhanced to provide additional security and winter cover for deer and other wildlife species. Areas should consist of blocks of cover of at least ½ acre in size and preferably be 2-3 acres in size. Enhancements may include implementation of hinge cuts and downed tree structures, select timber stand improvement techniques, dense white pine and/or white spruce plantings, shrub thicket plantings, and planting of thick stands of tall native grasses and forbs. Complete analysis by spring of 2015, and implement and maintain annually throughout the life of this plan.
- **Objective B:** Is to provide at least 50 acres of annual agricultural food products and an additional minimum of 30 acres of forage based food products each year within the DMZ boundaries. The ultimate goal is to have diverse food sources throughout the DMZ that provide for, and supplement the nutritional needs of whitetail deer in all four seasons.
    - **Action 1.** Review annually, update and establish a rotational system for the maintenance of a minimum of 50 acres of annual food plots to provide food and cover for deer and other wildlife. Where possible food plot locations should be strategically placed close to one another, and paired for management purposes. If more than 60% of the residual crops still remain after March 1st into the next planting season, some food plots counted towards the acreage goals identified in the objective may be considered for fallowing for one crop rotation cycle
    - **Action 2.** Establish and maintain a minimum of 30 acres of clover, legumes or other desirable forage based food plots through replanting, herbicide treatments and annual mowing or haying operations. A mixture of annuals and/or perennials may be

used and cool season food plots may be placed adjacent to warm season food plots (grains) in strategic locations. Undesirable grasses will be eliminated from forage based food plots. These areas are to be evaluated for management needs and maintained annually.

- **Objective C:** Is to enhance natural food production and forest cover habitat components through sivicultural management regimes; including evaluation and enhancement of recent (2012/2013) harvest sites by implementation of appropriate post-harvest management strategies with the primary goal to manage these stands for wildlife habitat.
    - **Action 1.** Natural food production will be enhanced using timber stand improvement techniques that favor mast producing trees in DMZs. Areas identified in Goals V and VI as protected areas will receive low intensity management. In areas where more intensive management practices are appropriate, and which are classified as upland deciduous forest and oak forest in the MiFi inventory system, such practices will include: identifying buffered, group select harvest units from 1-5 acres in size, and conducting crop tree release and mast tree release practices; as deemed beneficial by the local biologist. However, any additional harvests or supplementary management in oak stands must have a plan that will maintain a minimum sustainable population of 15-25 med-large (>14" DBH) oak trees per acre; with a preferred ratio of 2:1, Red/Black to White (Quercus spp.), maintained where possible (Payne et. al. 1994). The target annual level of production for these stands is greater than 100 pounds of acorns per acre. Other mast producing trees and shrubs will also be actively managed for including: hickories, pear, apple, and other beneficial species depending on stand composition. Beech trees will be encouraged and maintained but not actively managed for due to the imminent spread of Beech Bark Disease throughout southern Michigan's forests (Bramer pers. comm.). Habitat improvements will begin in 2014 and progress will be made regularly through the life of the plan with a primary goal of improving forest resources for deer and other wildlife game species in the DMZ. Timber sale plans and treatments will be identified in conjunction with Goals V, VI and VII with recommendations for stand level management and long term rotations to be completed by 2020.
    - **Action 2.** Encourage regeneration of trees in previous harvest units (2012/2013 timber sale units) to favor mast producing species. In select sites this will be accomplished by implementing invasive species control, scarification, and the girdling and/or removal of competing species such as maple and cherry. Select inter-planting of native, hardwood nursery stock may occur in some locations, but management efforts will consist primarily of other methods. Initial management (scarification,

planting, removal of invasive species and undesirable trees) will be completed on these sites in the next two years, by 2016. Afterwards, sites should be evaluated for follow-up management for invasive species control every 3 years and WSI (Wildlife focused - Timber Stand Improvement) every 10 years. Such actions will be implemented for future harvest units as time and resources allow.

- **Action 3.** Encourage browse and cover for deer by regenerating aspen by clear cutting existing aspen stands and increasing the aspen component in mixed stands. Aspen stands will be identified for sale with other units (see Goal VI) or managed opportunistically throughout the life of the plan.

- **Objective D** is to provide 250 acres of grassland cover to provide secure areas for fawning, escape cover and bedding areas for deer (this will be accomplished in conjunction with Goals II and III) by 2025.

  - **Action 1.** Currently several small warm and cool season grass fields exist throughout the SGAs which will continue to be enhanced and maintained through prescribed burning, disking or mowing on a rotational basis. Non-native cool season stands will be reviewed for possible conversion to warm season or native cool season grasses in grass stands that are larger than 15 acres. Sites will be evaluated and maintained annually throughout the life of the plan.

  - **Action 2.** Work on Goal II and Goal III will help accomplish this objective.

- **Objective E** Address management of deer numbers by way of annual Public Land Antlerless license quotas for the lifetime of this plan.

  - **Action 1.** Annually provide enough antlerless deer tags to ensure that hunters interested in taking antlerless deer have the opportunity.

  - **Action 2.** Annually monitor antlerless harvest and adjust quota as necessary to maintain sustainable deer populations while balancing hunter demands.

GOAL II. *Diverse Grasslands and Prairie Management*

- **Goal II:** Enhancement of grassland bird habitat and the establishment of a population of ring-necked pheasants and / or bobwhite quail located on the Crane Pond SGA at the Savage Prairie.

  Rationale: 1) Grassland birds as a group have experienced serious population declines throughout the eastern US in recent years with many being listed as species of concern;

2) pheasants and quail were once plentiful in the area and have been observed near this location (quail hen with chicks in summer of 2013 - Kesson); 3) there is interest among local hunters for an area dedicated to upland game bird management; 4) there is an active chapter of Pheasants Forever in Cass County; 5) ring-necked pheasants are a statewide Featured Species; 6) bobwhite quail have been identified as a Species of Greatest Conservation Need (SGCN) in the State Wildlife Action Plan (WAP); 7) habitat generated for grassland species will provide cover for deer under Goal I, Objective D; 8) the Pheasant Restoration Initiative has identified Cass County as one of several restoration areas Statewide.

Assessment / Metrics: Information gathered from users regarding presence or absence of pheasants and other grassland birds will be the primary way to assess management. Bird surveys may be implemented under the direction of the local biologist, with partners or staff as time and workload permits. This site will be identified as a priority area as a MNFI survey/monitoring site for the cSWG Diverse Grasslands program from 2014-2017.

- **Objective A:** Is to enhance and maintain 125 acres of contiguous, native, diverse grassland habitat on Crane Pond SGA's Savage Road prairie by fall of 2016 (Figure 5).
    - **Action 1.** Work with regional burn staff to coordinate rotational prescribed burns of the grassland stands in the prairie unit on an annual basis. If a prescribed burn cannot be completed in a given year for a management unit, after a 3-4 year period of no management, disk 1/3 of the burn units in the late fall with the offset or field disk, and continue this practice of disking 1/3 of the grassland burn units on a 4 year rotational basis (1/3 each year, with a rest on year 4) until prescribed fire can be implemented into the management regimen. The disking practice should be completed in the fall, vary in intensity based on site conditions and will be supplemented with early spring mowing and herbicide application practices as needed to suppress woody or invasive species. Develop a proposed burn timetable / disk schedule by fall of 2014 and update the management schedule annually.
    - **Action 2.** Work with Enbridge to secure the removal of the hedgerows bisecting the Savage Road prairie to create one contiguous grassland unit which is un-fragmented for the benefit of grassland birds and other wildlife species. (Completed in summer of 2014.)
    - **Action 3.** Treat pockets of invasive species in grassland units and field borders by implementing the use of appropriate herbicide application methods, prescribed mowing, blowing off of mowers and other equipment between fields, and planting of cover crops where appropriate. Sites will be evaluated annually and maintained as

needed throughout the life of the plan to minimize presence of invasive species in and immediately around the prairie unit.

- **Action 4.** Remove the majority of the tall trees (>15 feet) surrounding wetland areas inside the perimeter of the grassland unit to enhance the potential for seasonal wetland use by puddle ducks for nesting, brood rearing, and to reduce aerial predation by raptors. A few dead trees or large, mast producing, wolf trees will be left in select locations to provide habitat for woodpeckers, and small mammals. (To be complete by the fall of 2016.)

- **Action 5.** Convert ½ of the existing non-native cool season grass planting to a native cool season grass and forb mixture (spp. such as Prairie brome, Poverty Grass, Can Wild Rye, June Grass, VA Wild Rye & Native Forbs); convert the remaining ½ to a native, diverse short grass prairie planting (spp. such as little bluestem, side oats grama, silky wild rye, prairie drop-seed and forbs). These practices will serve as regional demonstration sites for diverse, native, grassland management and enhance the site for use by multiple grassland wildlife species. Conversion and planting to be completed by fall of 2015.

- **Action 6.** Once established, maintain the native cool season grass stand using light disking, prescribed fire, or hay sharecropping. If sharecropping is used to manage the stand, cutting will only be permitted outside of the primary nesting period for grassland bird species and fields will be mowed from the center outwards towards surrounding refuge areas; after July 15th and no later than August 15th and only one cutting will be permitted each year.

- **Action 7.** Annually plant the perimeter of the prairie unit (the firebreaks) to annual food plot items such as corn, sunflowers, sorghum or millet. These areas will be replanted and maintained annually to provide winter food and cover for upland game birds, brood rearing habitat and a food source for other wildlife species.

- **Action 8.** Change the location of the current food plots to the unconnected, adjacent fields to the north and east for development of a mixed food plot items for the benefit of deer and other wildlife species. Addresses Goal 1, Objective B, Action 1. Fields to be converted to food plot use starting in spring of 2014.

- **Action 9.** Convert food plot fields currently in middle of prairie unit to diverse grassland, identified in Action 8. Plant the hedgerow removal areas to diverse grassland, identified in Action 2. Complete by 2015.

- **Action 10.** Convert the non-native cool season grass strip to north of prairie) planting (in wet csg area) to a diverse, wet – mesic prairie mixture. Complete restoration by fall of 2015.

- **Action 11.** Create various soft edge practices at strategic locations along the perimeter of the grassland unit as indicated on the map via a combination of strategies including: hinge cutting, planting of small clumps of native shrubs, cut back border practice and natural regeneration practices. Complete initial management practices by winter of 2017 and continue to follow-up and manage the sites for the life of the plan.

- **Objective B:** Is to repair damage done to the Savage prairie planting from the Enbridge pipeline replacement operation of 2013.

  - **Action 1.** Work with Enbridge to develop a custom seeding mixture and restoration plan to be used to restore areas of the prairie unit impacted by the pipeline installation project of 2013. (Planting completed in 2014, currently monitoring)

  - **Action 2.** Monitor restoration work of environmental contractors to ensure ecosystem function is restored to the site after seeding including monitoring and control of invasive and non-native species that may impact the larger prairie planting. This will be ongoing for several years after disturbance.

Figure 5. Future desired condition for Savage Prairie on Crane Pond SGA.

GOAL III. *Wood Creek Management Unit*

- **Goal III:** Is to increase the potential for a sustainable population of eastern massasauga rattlesnakes located along Curtis and Wood creeks at the Three Rivers SGA.

  Rationale: 1) Eastern massasauga rattlesnakes (EMR) have been found on adjacent private land and along Mill Creek on the SGA; 2) this location has three Element Occurrences (Kost 2009) within a short proximity to each other; 3) Eastern massasauga rattlesnake is a statewide Featured Species, and a candidate Federal species; 4) other Featured Species such as white-tailed deer, wild turkey and red-headed woodpecker will benefit from management of this area.

  Assessment / Metrics: monitoring for the presence or absence of Eastern massasauga rattlesnakes and use by other target species.

- **Objective A** is to restore periodic burns to 150 acres of mixed cover types including; prairie fen, dry-mesic southern forest, and southern wet meadow located between Curtis and Wood creeks on Three Rivers SGA by 2018 (Figure 6).

  - **Action 1.** Identify and survey the burn unit boundaries in the Wood Creek burn unit within the boundaries of Norton Road, Wood and Curtis creeks taking into account logistics needed for fire equipment and delineate the savannah management unit by winter of 2014.

  - **Action 2.** Establish permanent burn line around the area identified in Action 1 by 2017.

  - **Action 3.** Continue recommendations to conduct periodic burns with initial burns limited to EO stands until entire area can be prepared. Complete burn recommendations annually.

  - **Action 4.** Following a series of burns determine if additional plant species need to be added to the prairie and savanna to improve quality. This will likely occur around 2020. If fields cannot be burned a disking program similar to the one outlined in Goal II, Objective A, Action I shall be implemented with a target of 30% bare soil after management will be implemented. Disking will occur after the beginning date of hibernation of the EMR in the fall

- **Objective B:** Is to conduct management efforts to manage and enhance habitat in the prairie fen, dry-mesic southern forest, savannah restoration area, and southern wet meadow areas located between Curtis and Wood creeks on Three Rivers SGA (Figure 8).
    - **Action 1.** Conduct post-harvest improvement on red pine harvest area by treating for invasive species and planting desirable species as needed by winter of 2018.
    - **Action 2.** Establish and enhance 20 acres of diverse, native prairie on existing small fields within management area by 2015.
    - **Action 3.** Conduct timber sales and / or manual removal process - aimed at thinning savanna stands leaving select oak trees and work to thin unmarketable trees and control invasive species by 2017.
    - **Action 4.** Survey for, prioritize, and implement an invasive species control strategy in the management unit by 2015.

Above: Mill Creek fen and Three Rivers State Game Area

Future Desired Condition of Wood Creek Burn

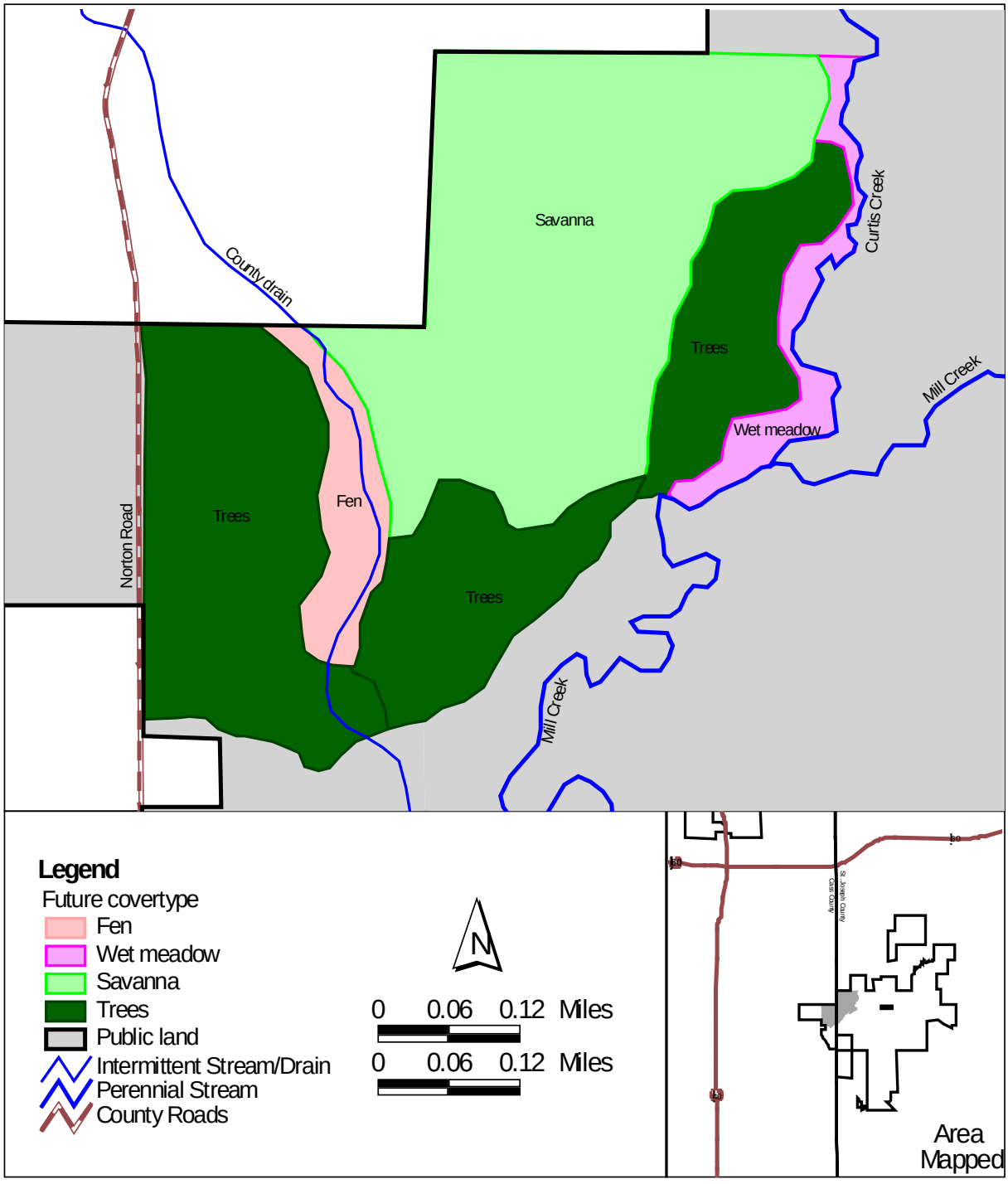


Figure 6. Future desired condition of Wood Creek Burn unit on Three Rivers SGA.

GOAL IV. *Manage Norton Road Fen for MSB*

- **Goal IV** Is to restore and enhance suitable Mitchell's satyr butterfly (MSB) habitat to the Three Rivers SGA by 2020.

  Rationale: 1) There is currently a known population of MSB on private land to the west of Norton Roadfrom Three Rivers SGA; 2) Past surveys have indicated that Mitchell's satyr were located on Three Rivers SGA; 3) Potential exists to restore habitat on private lands in areas adjacent to this location 4) Mitchell's satyr butterfly (MSB) is a SGCN and identified as a Featured Species; 5) MSB is both a State and Federally listed endangered species; 6) fen and wetland management in this vicinity will benefit other species of wildlife such as: copper belly watersnake, massasauga rattlesnake, wild turkeys and American woodcock.

  Assessment / Metrics: annual surveys conducted by MNFI and/or DNR staff.

- **Objective A** is to restore and enhance an additional 20 acres of fen / wetland complex along the east side of Norton Road on Three Rivers SGA by 2020.

  - **Action 1.** Determine and delineate the extent of potential project area by fall of 2016.
  - **Action 2**. Conduct analysis on the project area to identify threats and management needs to maximize suitability for MSB and related species by fall of 2015.
  - **Action 3.** Develop a maintenance plan for the project area and implement the maintenance and management program developed under Action 2 by summer of 2016.

GOAL V. *Protect High-value Conservation Areas*

- **Goal V:** is to identify and ultimately protect the high value conservation areas on State Lands identified in this plan using a landscape based, conservation focused, modified multiple-use module (MUM); particularly on the forested units, wetland areas and other areas of high conservation priority (Noss 1987, Harris 1984). Once identified through this analysis, portions of the Game Areas will be divided into core areas, corridors for connectivity and dispersal, buffer zones, and moderate intensity management units. This will allow land managers to focus management using a landscape conservation approach on the Game Areas, thus prioritizing efforts and identifying management sites for beneficial management practices such as timber harvests, habitat corridor development, designation of old growth and other unique management areas.

Rationale: 1) several areas on Crane Pond and Three Rivers SGA have been identified as element occurrences by MNFI; 2) the Wildlife Action Plan lists many SGCN that utilize ecosystems present on the properties identified in this plan; 3) additional featured species, and State and Federally listed species are, or have been, historically present on these lands; 4) species that use hardwood forests are likely to benefit from wildlife focused, sivicultural management practices (Jackson et al 1984); 5) secondary old growth communities and other unique ecosystems and features need to be identified and conserved using maintenance focused management pratcices(Johnson et al 1990). 6) Goal V will validate and justify actions taken with respect to implementation and identification of management units as identified in Goals VI and VII.

Assessment / Metrics: The landscape conservation analysis (MUM) will be field proofed, partially based on, and crossed referenced with base data from the State of Michigan (SOM) Geographic Information System (GIS) and MiFi forest inventory systems.

- **Objective A** is to use and combine MNFI data regarding sensitive species and systems, incorporate local knowledge / observations, and existing records to delineate priority sites for management in mature forest and other high priority conservation systems (wetlands, seeps, savannahs etc.).
    - **Action 1.** Conduct GIS analysis using MNFI and other geospatial data to identify and designate core areas for management based on the Natural Features Inventory conducted by MNFI and published in 2009, observable physical features such as wetlands, and other special features on the landscape. Analysis to be completed by 2015.
    - **Action 2.** Connect identified core areas using GIS polygon and buffer tools to develop habitat connectivity zones between core areas with similar characteristics. Create maps for each classification of core areas i.e. old growth oak hickory, wet meadow etc. (use and incorporate IFMAP and/or MNFI classification system for delineation purposes where appropriate). Analysis and map to be completed by 2015.
    - **Action 3.** Use GIS buffer tools to identify and designate buffer zones around the core areas and corridors identified in Goal V, Objective A, Action 1 and 2. The area of the buffer zone will be based on quantifiable factors, the results of scientific research and / or best management practices as applicable. Not all features will require a buffer zone to be adequately protected and this may vary greatly depending upon the feature being analyzed. Analysis and map to be completed by 2015.

- **Action 4.** Once designated; core areas, corridors and buffer zones will be protected and receive limited management. Maps will be created and maintained for these areas once the evaluation process is completed. Maps to be completed by 2015.

- **Action 5.** Areas outside of community or feature based designated core areas (i.e. species of concern population clusters or isolated features) such as isolated wetlands will be identified and buffered but may not be connected with corridors if the circumstances on the landscape make this unrealistic. Such areas will simply be identified, buffered and protected with less emphasis on habitat connectivity within the same system classification but may include linkage through adjacent systems depending upon distance, topography and other unique circumstances of the site or feature. Analysis and maps to be completed by 2015.

GOAL VI. *Identify and Manage Unique Forest Ecosystems*

- **Goal VI** Is to map, manage and maintain secondary old growth, mature forest and other special concern forest element occurrences for the benefit of a diversity of forest dwelling birds, mammals and game species; to maximize habitat suitability for target species. Management will focus on maintaining biodiversity and ecological functions of these sites.

  Rationale: 1) Seventy-three percent (73%) of the combined SGAs covered in this plan are forested and the focus of wildlife management and recreation will be centered on the forest resource and associated wildlife species, a plan is needed to prioritize, and guide activities in these areas; 2) several areas on Crane Pond and Three Rivers SGA have been identified as element occurrences by MNFI; 3) the Wildlife Action Plan lists many SGCN that utilize mature forest systems including: blue-spotted salamander, Eastern box turtle, wood thrush, and Indiana bat; 4) Featured species such as pileated woodpecker, wild turkey, and American woodcock will benefit from management favoring large blocks of forests..

  Assessment / Metrics: Information gathered through periodic monitoring by MNFI and/or DNR staff will be used to assess the success of management. The relationship of all vertebrate wildlife to stand size [and composition] is assumed to be reasonably indicated by bird species richness (Thomas 1979). Surveys for edge, forest interior and area sensitive bird species will be highly beneficial to determine effectiveness when managing for either secondary old growth and / or large connected stands of timber.

- **Objective A** is to incorporate the landscape management conservation model (MUM) used to identify priority sites in Goal V; to identify sites and develop management plans

for mature forest, rare forest ecosystems and communities, and secondary old growth forest systems on the Game Areas.

- **Action 1.** Sites will be mapped, classified and divided into management units. These areas will be identified and delineated; as outlined in Goal V, Objective A. To be completed by 2015.
- **Action 2.** Develop maintenance management plans for sites identified in Action 1 with the following goals for identified units: minimizing negative human impacts to the site, maintaining native species, eliminating invasive species, maximizing diversity, using natural management regimes (i..e. prescribed fire where appropriate), non-intrusive microhabitat improvements to maximize habitat suitability for target species, minimizing fragmentation and protecting sites from road construction and ATV use. Unit plans and recommendations to be completed by 2017 and implemented throughout the life of the plan.

- **Objective B** is to maintain the ecological integrity of a minimum of 500 acres of mature upland forest identified in Goal VI objective A and a landscape level conservation analysis of Jones SGAs.
  - **Action 1.** Several upland forest stands located on Jones SGAs have been identified as ecologically important and will be set aside for management purposes as areas where limited treatments will occur. These areas will be reviewed, identified and delineated; as outlined in Goal V, Objective A. To be completed by 2016.
  - **Action 2.** Mature upland hardwood systems identified in Action 1 will be managed as secondary old growth forest stands. These areas will be managed to maintain and /or enhance their ecological integrity (Johnson et al 1990). No merchantable timber will be removed from these areas. Management will focus on: minimizing negative human impacts to the sites, invasive species control, fire prescription or suppression (depending upon the site), restoring seasonal wetlands, aquatic habitats and other microhabitat improvements (downed log structures, wolf tree release etc.). Unit plans and recommendations to be completed by 2017 and implemented throughout the life of the plan.

- **Objective C** is to maintain the ecological integrity of a minimum of 500 acres of mature lowland forest, tamarack swamp, associated wet meadow and wetland complex as identified by the MNFI inventory and landscape level conservation analysis of Jones SGAs.

- **Action 1.** Several lowland hardwood stands have been identified on Jones SGAs as ecologically important. These areas will be reviewed, identified and delineated; as outlined in Goal V, Objective A. These stands will be managed to maintain their unique characteristics in conjunction with associated non-forested wetland areas. To be completed by 2016.

- **Action 2.** Ecosystems identified in Action 1 will be managed to maintain and /or enhance their ecological integrity. No merchantable timber will be removed from these areas. Management will focus on invasive species control, prescribed fire or suppression (depending upon the site), restoring lowland / aquatic habitats and other microhabitat improvements (hibernacula construction, downed log structures, wolf tree release etc.). Unit plans and recommendations to be completed by 2017 and implemented throughout the life of the plan.

GOAL VII. *Identify and Manage active management - Forest Units*

- **Goal VII** Is to manage and maintain forest habitat for a diversity of forest dwelling birds, mammals and other species, sufficient to propagate the representative species outside of protected areas identified in Goal VI.

  Rationale: 1) Seventy-three percent (73%) of the combined SGAs covered in this plan are forested and the focus of wildlife management and recreation will be centered on the forest resource and associated wildlife species, a plan is needed to prioritize, and guide activities in these areas; 2) Developing management plans for potentially marketable timber resources demonstrates responsible use of our renewable resources to the public; 3) funds from timber sales and activities associated with them can improve the local economy and provide additional funds for resource management; 4) when planned correctly sivicultural practices can have a beneficial impact on wildlife resources and be a useful tool for wildlife management; 5) the Game Areas receive heavy use by multiple constituents throughout the year and improvements outside of the DMZ enhance the public's use of these resources across the landscape ; 6) Featured species such as white-tailed deer, wild turkey, and cottontail rabbit will benefit from management across a wider area; 7) Implementing practices beneficial to target wildlife species outside of the DMZ reduces the demand for limited resources (space) and spreads out hunters thus reducing hunting pressure in concentrated areas (DMZ) which may improve safety of users and be beneficial to the target species' population biology.

  Assessment / Metrics: Direct observation of ecological response and sivicultural measurements can be used to measure effectiveness of harvest rotations and

management recommendations. Information gathered from interviews with Game Area users, check station data and direct observations will be used to determine effectiveness of increasing recreational access and species population response to the wildlife timber stand improvement practices (WSI).

- **Objective A** is to incorporate the landscape analysis outlined in Goal V to identify forested sites outside of conservation areas for active management and implementation of sivicultural practices or other forms of habitat management to benefit a wide range of game and non-game species.
    - **Action 1.** Use GIS analysis tools to identify and delineate forested stands with similar characteristics outside of conservation areas identified in Goal V and VI. Cross reference stands identified with MiFI tools, and on the ground observations; to delineate forestry management units and prioritize sites based on physical features and wildlife management goals for the area. Complete by 2016.
    - **Action 2.** Develop forest unit wildlife management goals identifying sound, measurable objectives for each stand delineated in Goal VII, Objective A, and Action 1. Objectives will be developed to prioritize game species wildlife production and habitat management, while addressing special features of the site and protecting rare species or systems not identified in analysis completed in Goal V, Objective A. This will be accomplished through a combination of site visits, cruising and surveying of stands by the assigned land manager. When possible this process will be completed in conjunction with the local forester; however, the wildlife biologist, WLD, shall retain full management authority of these stands. Unit plans and recommendations to be completed by 2018 and implemented throughout the life of the plan.
    - **Action 3.** Identify marketable stands from Goal VII, Objective A, Action 1 and develop a timber harvest strategy and a harvest schedule for these stands incorporating objectives for wildlife management identified in Goal VII, Objective B, Action 2 and the forest management plan (Appendix E). Stand harvest rotation length and specifications will be identified clearly and these units will be put on a long term, rotating harvest / management schedule. When possible this process will be completed in conjunction with the local forester; however, the wildlife biologist, WLD, shall retain full management authority of these stands. Harvest unit plans and recommendations to be completed by 2019 and implemented throughout the life of the plan.

GOAL VIII. *Manage Openings and other Special Habitat Features*

- **Goal VIII** Is to manage and maintain special unique habitats and landscape features such as openings in areas outside of the previously identified DMZ (Goal I) and outside of areas identified as conservation areas (Goals V & VI).

  Rationale: 1) the Game Areas receive heavy use by multiple constituents throughout the year and improvements outside of the DMZ enhance the public's use of these resources across the landscape ; 2) Featured game species such as white-tailed deer, wild turkey, and cottontail rabbit will benefit from management across a wider area; 3) implementing beneficial practices to target wildlife species outside of the DMZ reduces the demand for limited resources (space) and spreads out hunters thus reducing hunting pressure which may improve safety of users and be beneficial to target species' population biology.

  Assessment / Metrics: Information gathered from interviews with Game Area users, check station data and direct observations will be used to determine effectiveness of increasing recreational access to the wildlife resource.

- **Objective A** is to manage small fields for food plots outside of DMZ focus areas to enhance benefits for game species such as: deer, turkey, furbearers and small game species. Food plots will be designed to enhance recreational opportunities for Game Area users.

  - **Action 1.** Establish, update and review biennially, a management system for the maintenance of a minimum of 30 acres of food plots to provide food and cover for multiple wildlife species. Food plot items may include small grains, corn, beans, cereal rye, legumes, mixed plantings and experimental food plot items. Food items may consist of perennials or annuals or mixtures of such items for the benefit of multiple wildlife species.

- **Objective B** is to manage herbaceous openings outside of DMZ focus areas for benefit of game and non-game species.

  - **Action 1.** Conduct review of current and historic openings and identify units for possible beneficial management activities based on local knowledge, needs and objectives. Add areas to the annual management map which is to be posted on bulletin board for the public. To be completed by 2015.

  - **Action 2.** Develop and manage several small openings (< 2 hectares) for wildlife to be maintained in grass and legume cover. Openings will be mowed from July 4th – Aug 15th or March 1 – April 15th for maintenance annually. Target species include:

whitetail deer, wild turkey, American woodcock and cottontail rabbit. To be completed by 2015.

- **Action3.** Identify, develop and manage 1 opening (> .5 acre in size) on each Game Area to be managed for a wildflower meadow planting to primarily benefit native pollinator and songbird species. Sites will be planted to native wildflower mixtures and maintained by disking every four years in the fall to rejuvenate the stands after an initial five year establishment period. Plantings may also be used for seed sources for future restoration projects and should originate from Midwestern genetic stock and consist primarily of native Michigan species. To be completed by 2015.
- **Action 4.** Identify, develop and manage 2 openings (> .5 acre in size) on Crane Pond SGA and 2 openings on Three Rivers SGA in a short grass, early successional community to create a designated area for management of singing and roosting grounds to benefit American Woodcock. To be completed by 2015.

- **Objective C** is to manage abandoned openings (new or previously abandoned – prior to 2014) for the benefit of game and non-game wildlife species.
  - **Action 1.** Identify and manage openings to allow successional management to proceed to secondary forested communities. To be completed by 2016.
  - **Action 2.** Identify and mange openings to be planted to native hardwoods, conifers, shrubs or other beneficial species. To be completed by 2017.
  - **Action 3.** Identify and manage openings for early successional habitat management. To be completed by 2018.

Monitoring and Adaptive Management

An adaptive approach to management is used to plan and execute the management of Wildlife Division lands. Adaptive management promotes changes to the plan when and where appropriate. Management decisions are based on current conditions and on how well the results of past management are moving the area towards its goals.

Each year, an annual report will be completed that describes progress toward implementing this master plan. Part One of the annual report will include unforeseen revisions that became necessary to add to this plan during the reporting period. If no revisions are necessary, Part One will be used to certify that this master plan is current.

Part Two of the Annual Report will document the accomplishments completed during the reporting period. The objectives and actions shall be assessed in terms of the quantity or quality of the target accomplishment and the time frame in which it was to be completed.

Part Three of the Annual Report will document how management activities were monitored to assess their effectiveness in bringing about the desired future conditions. This monitoring may take the form of assessments, trials, or experiments, which may be either formal or informal investigations. The effectiveness of the management approaches to achieve a goal shall be measured by the assessment value described in the plan with each goal. It is expected that assessment of a goal probably will not begin until completion of all objectives relevant to that goal. It is also possible that the desired response to the treatments may lag substantially behind the completion of prescribed management, requiring a delay of the assessment. However, regardless of biological lag times, this report should be written prior to the end of the planning cycle and the writing of the new plan. When assessments are made, the results shall be reported in part three of the master plan annual report

Recreational and Commercial Uses

Recreational and commercial uses on the area that are not incidental to our management for the purposes described above are generally not allowed. These uses can be allowed, however, under the following circumstances:

1. The uses must not interfere or conflict with the wildlife conservation purposes of the area described above.
2. The DNR has no obligations to determine if requested uses would conflict or interfere, the burden of determining must remain with those requesting the uses.
3. The requested uses cannot be exclusive of other allowable uses and must not result in the DNR losing management control of any portion of the area.
4. A lack of a specific prohibition in rules and regulations for the area does not constitute approval of the activity.
5. The DNR always reserves the ability to disallow activities previously allowed as wildlife conservation needs dictate.

Additionally, the DNR will continue to monitor any existing commercial and recreational uses for interference with the intended purposes of the area as described in this plan.

Acquisition and Disposal of Land

Additional land will be acquired only on a willing seller – willing buyer basis. Table 2 lists in general terms locations where additional acquisition would be of benefit.

Table 2. List of highly valued parcels for acquisition during the lifetime of this plan.

Section	Description	Acreage	Justification
Cass County, Newburg Township (06S,13W)			
Section 16	NW ¼ and SW ¼, SW ¼	140	Acquiring this land will block in a large portion of the Crane Pond SGA and only require negotiating with two owners.
Section 17	E ½	160	
Section 21	NW ¼ , NW ¼	40	This parcel is owned by one of the previous owners and could be included in acquisition of entire property
	W ½	145	One owner that is surrounded by state land.
Section 29	N ½	75	This would nearly complete the state ownership of Forked Lake by including the southern end of that lake.
St. Joseph County, Constantine Township (07S,12W)			
5	S ½, SW ¼	100	This would connect the northern parcel of SGA to southern.
7	W ½, NW ¼	80	Acquisition will assist with access issues to existing state land as well as protect a ½ mile stretch of Curtis Creek.
8	SW ¼, NW ½	40	This is an in holding surrounded on 3 sides by state land.
17	All	450	There are 2 owners of this land that is adjacent to state land. Much of the habitat is lowland hardwoods and open agricultural.
18	E ½, SW ¼	80	This parcel would connect portions of the SGA between Purgatory and Norton roads. It also includes about ½ mile of water access to Mill Creek.

No parcels in the Jones Area SGAs are recommended for disposal or divesture.

Public Input

To seek public input into the revised Master Plan we will hold a public announcement and place the draft plan on the website and provide contact information for the public to submit comments to. This process will allow the public to provide feedback and input into the management process on the Jones area SGAs. We will also be implementing a comments or suggestions area near the information board to allow feedback and suggestions from visitors.

Operational Planning

Implementation of the goals, objectives and actions is this plan will be accomplished predominantly through the Work Plans, Work Item Proposals (WIPs), and Operational Budgets. All three of these processes are implemented on an annual basis.

Review and Approval

This plan was available for public review and comment on the DNR website between May 1, 2015 and May 31, 2015. During this period 2 comments were received and considered before finalizing this plan. The final plan was approved on June 25, 2015 and will be reviewed within 10 years of the approved date.

REFERENCES

Albert, D. A. 1995. Regional Landscape Ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: USDA, Forest Service, North Central Forest Experiment Station. 250p.

Bramer, J. 2013. Personal Communication, SW Michigan Forester at Michigan Dept. of Natural Resources.

Harris, L. D. 1984. The fragmented forest: island biogeography theory and the preservation of biotic diversity. University of Chicago Press, Chicago. 211pp

Jackson, J. J., G. D. Walker, R. L. Shell, and D. Heighes. 1984. Managing Timber and wildlife. Bulletin 845, Cooperative Extension Service, College of Agriculture, University of Georgia, Athens.

Johnson, K. N., J. F. Franklin, J. W. Thomas, and J. Gordon. 1991 Alternatives for management of late successional forests. Representative to U.S. House of Representatives Committee of Agriculture Subcommittee on Forestry, Family Farms and Energy, and Committee on Merchant Marine and Fisheries Subcommittee on Fish and Wildlife Conservation and Environment, Washington. 59pp.

Kost, M.A, S.A. Thomas, Y. Lee, D.L. Cuthrell, M.J. Monfils, P.J. Badra, M.R. Penskar, and H.D. Enander. 2009. Natural Features Inventory and Management Recommendations for Crane Pond Three Rivers, and Fabius State Game Areas. Michigan Natural Features Inventory Report Number 2009-10, Lansing MI. 85 pp.

Noss, R. F. 1987. Protecting natural areas in fragmented landscapes. Natural Areas Journal 7:1-13.

Payne, N. F, F. C. Bryant. 1994. Techniques for Wildlife Management of Uplands. McGraw-Hill, biological resource management series, New York, New York.

Thomas, J. W., C. Maser, and J. E. Rodiek. 1979 Edges. Pages 48-59 *in* J.W. Thomas, tech. ed. Wildlife habitats in managed forests. U.S. Forest Service Agricultural Handbook 553, Portland Oregon.

Appendixes

Appendix A: *List of Featured Species for Crane Pond, Fabius, and Three Rivers SGA.*

Species Name	Crane Pond	Fabius	Three Rivers
American bittern	Yes	No	No
American woodcock	Yes	No	Yes
beaver	Yes	Yes	Yes
bobolink	Yes	No	Yes
cottontail rabbit	Yes	Yes	Yes
eastern meadowlark	Yes	No	Yes
mallard	Yes	Yes	Yes
massasauga rattlesnake	Yes	No	Yes
pileated woodpecker	Yes	Yes	Yes
red-headed woodpecker	Yes	No	Yes
ring-necked pheasant	Yes	No	No
sandhill crane	Yes	Yes	No
scaup	Yes	Yes	No
white-tailed deer	Yes	Yes	Yes
wild turkey	Yes	Yes	Yes
wood duck	Yes	Yes	Yes
Mitchell's satyr butterfly	No	No	Yes
osprey	No	Yes	No
red-shouldered hawk	No	No	Yes

Appendix B: Environmental Conditions and Biotic Inventory

The project area is located in Subsection VI.2. Kalamazoo Interlobate, sub-subsection VI.2.1. Battle Creek Outwash Plain and sub-subsection VI.2.2. Cassopolis Ice-Contact Ridges, as described by Albert (1995). Land formations in and around Cass and St. Joseph counties were heavily influenced by glaciers during the last ice age. Three distinctive features evident throughout the area include; moraines, till plains, and outwash plains. Moraines are found mostly in the western and northern portions of Cass County and extend slightly into the northwest corner of St. Joseph County. Outwash plains comprise much of St. Joseph County and portions of Cass County between the moraines.

Water features vary between the two counties, due in part to glacial influences. Numerous kettle lakes are located throughout the moraine region of both counties. Some notable lakes include Cory, Long, Pleasant, and Magician lakes. Other lake features associated with outwash plains include Portage, Diamond and Donnell. The St. Joseph River is the largest river and flows through St. Joseph County from east to west and forms the southern border between the two counties. Typical of the outwash plain, many small drainage streams and rivers can be found throughout St. Joseph County.

The climate of Cass and St. Joseph counties is moderately influenced by Lake Michigan. Average annual temperatures range from a high of around 60˚F to a low of 40˚F. Average winter temperature is around 25˚F and average summer temperature around 70˚F. Annual liquid precipitation is about 34 inches with annual snowfall varying between 45 to 75 inches depending on proximity to Lake Michigan. Growing season length is between 140 – 190 days, with last frost occurring around May 3 and first frost around October 10.

The topography and water resources of Crane Pond SGA are rolling hills and kettle depressions associated with the glacial moraines. Some of the higher elevations of Cass County are located on the Crane Pond SGA. Several small lakes and vernal ponds are scattered throughout the SGA. Fabius SGA is often referred to as the “Big Hill” by locals. The hill rises slightly from US-131 and then drops off toward the St. Joseph River. Compared to the other two SGAs, Three Rivers SGA is mostly flat with a broad drainage bisecting it. This relief is very similar to what would be expected of outwash plain.

As a result of the origin and topography, soils vary greatly across the SGAs. Well to moderately drained soils, consisting of loamy and sandy materials are most common and include the following series; Spinks-Oshtemo, Riddles, Kalamazoo, and Cassopolis. These soil series represent almost 70% of the soils on the combined SGAs. These soils are suitable for a variety of habitat management scenarios from food plots to forests, however are poorly suited to wetland development.

Historically, the Kalamazoo Interlobate contained areas of extensive tall grass prairies. Nearly 50 prairies were known in this region. Oak savannas were common along the end moraines, with oak forests more common elsewhere. Swamp forest, wet prairies, marshes, and extensive wet meadows were common along the several drainages. Historic vegetation on the moraines was beech-maple, oak-hickory with kettle depressions supporting hardwood swamps, tamarack swamps, shrub swamps, and bog. Both natural and anthropogenic fires were probably important disturbances in the prairies and oak savannas, while wind throw was probably the most important disturbance on the moraines. The description of circa 1800 land cover

vegetation is useful as a benchmark for understanding the potential conditions that might be encouraged in an area, but restoring pre-European settlement conditions should not necessarily be viewed as the management goal for the area (Figure 6).

Vegetative changes began with the first European settlers in the early 1800s. Prairies were settled first, and many acres of grassland were plowed under for crops. Removal of the forests followed as more settlers came to the area trying to establish family farms. Many of the farms established in the former forested land failed due to poor soils. These abandoned farms slowly reverted back to forested lands throughout the 1900s. Grain farming continues in the historic prairies, while livestock farms can be found on more of the hilly, poor soil portions of both Cass and St. Joseph counties. The economies of both counties depend heavily on agricultural and timber resources, which are demonstrated by the present day landcover (Figure 7). Although residential development continues to be a threat, this area will likely remain mostly rural into the future.

The historic landscape features of prairies, savannas, swamps and expansive hardwood forests provided an abundance of wildlife habitats. Early recorded accounts mention wolves, panthers, bears, elk, and bison, in addition to the many wildlife species found in the area today. Currently, deer and turkey are abundant throughout the SGAs. Squirrels and rabbits are abundant and there is a healthy assemblage of furbearing species as well. Upland game birds besides turkeys include woodcock and a few pheasant. Ruffed grouse and bobwhite quail where once found in the area but are currently absent. On the small lakes wood ducks, mallards and Canada geese are common throughout the year.

In 2009, the Michigan Natural Features Inventory conducted surveys for exemplary natural communities and rare terrestrial and aquatic animals (Kost 2009). This effort resulted in the discovery of 35 new Element Occurrences (EO) and updating 19 previously identified EOs. In addition, Michigan's Wildlife Action Plan (WAP) lists species that are in greatest conservation need (SGCN). Several are found on the SGA which depend on some of the vegetative cover types presently found. Currently, habitat exists for 19 herptiles listed as SGCN including the Eastern box turtle. Cooper's hawk, wood thrush, and cerulean warbler are among the 38 species of birds found on the SGA's. Indiana bat, flying squirrel, and gray fox, along with 7 other mammals, round out a list of SGCN that can be found on the SGA's.

There have been some known occurrences of threatened, endangered, or special concern wildlife species on Crane Pond and Three Rivers SGA. On the Crane Pond SGA, Indiana bat and Eastern massasauga rattlesnakes have been recorded. Eastern massasauga rattlesnakes in addition to copper-bellied water snake and Mitchell's satyr butterflies have been observed on the Three Rivers SGA. Habitat conditions may exist for others, however they have not been recorded as occurring on any of the SGAs.

Many of the threats to management in the area are similar to those in other parts of the state. Several invasive plant species such as multiflora rose, autumn olive and garlic mustard have encroached upon portions of the SGAs. Management aimed at removing these species is continuing at a slow pace. New species, such as phragmites, have recently been identified, and attempts to treat the sites were initiated quickly. Non-native wildlife, such as feral swine and mute swans, are infrequent on the areas and management will take place to remove them if and when discovered.

Jones Area State Game Areas
Historical Landcover (circa 1800)

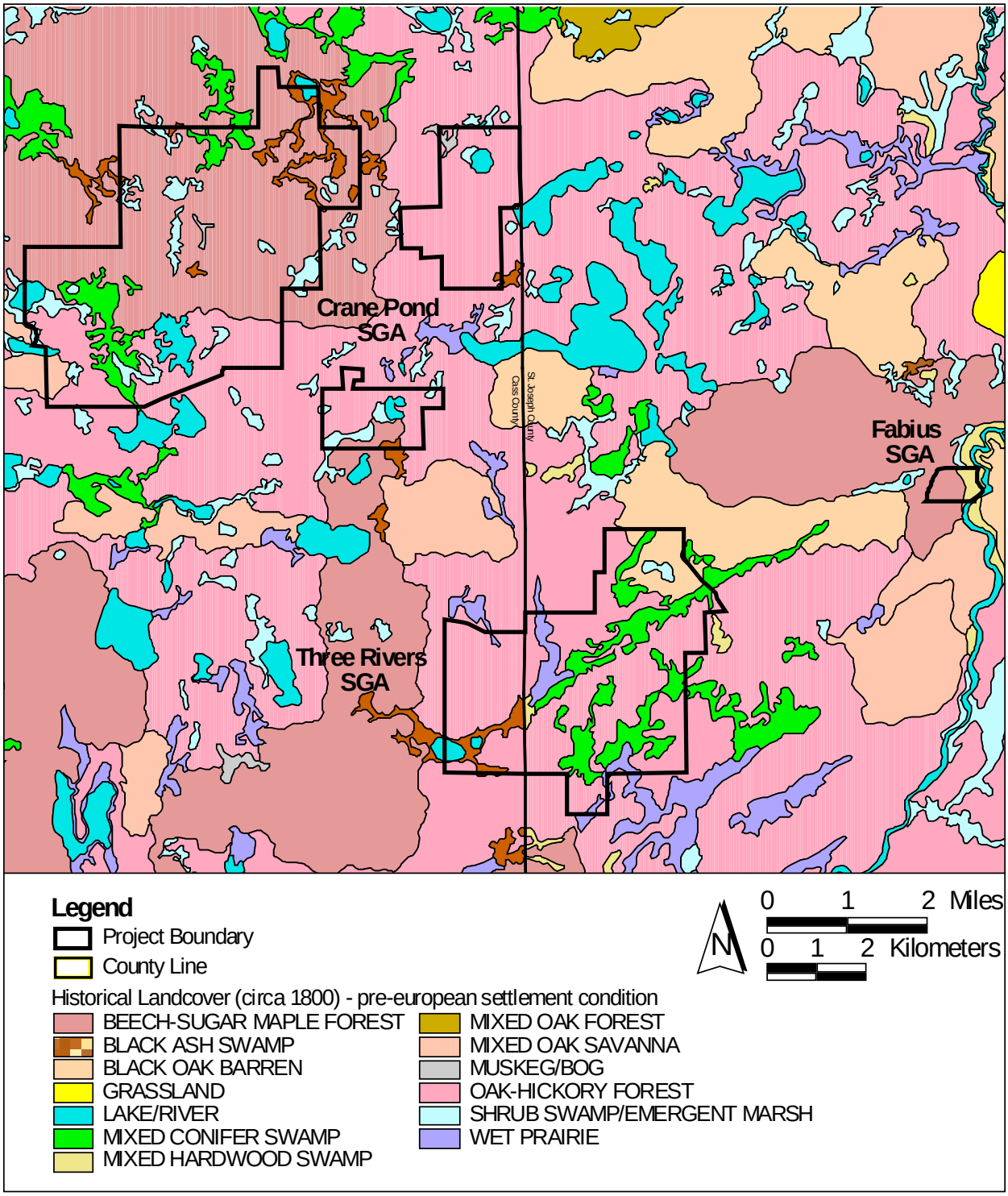


Figure 6. Historical Landcover (circa 1800) and project boundary of Jones Area SGA.

Jones Area State Game Areas
Current Landcover (circa 1992)

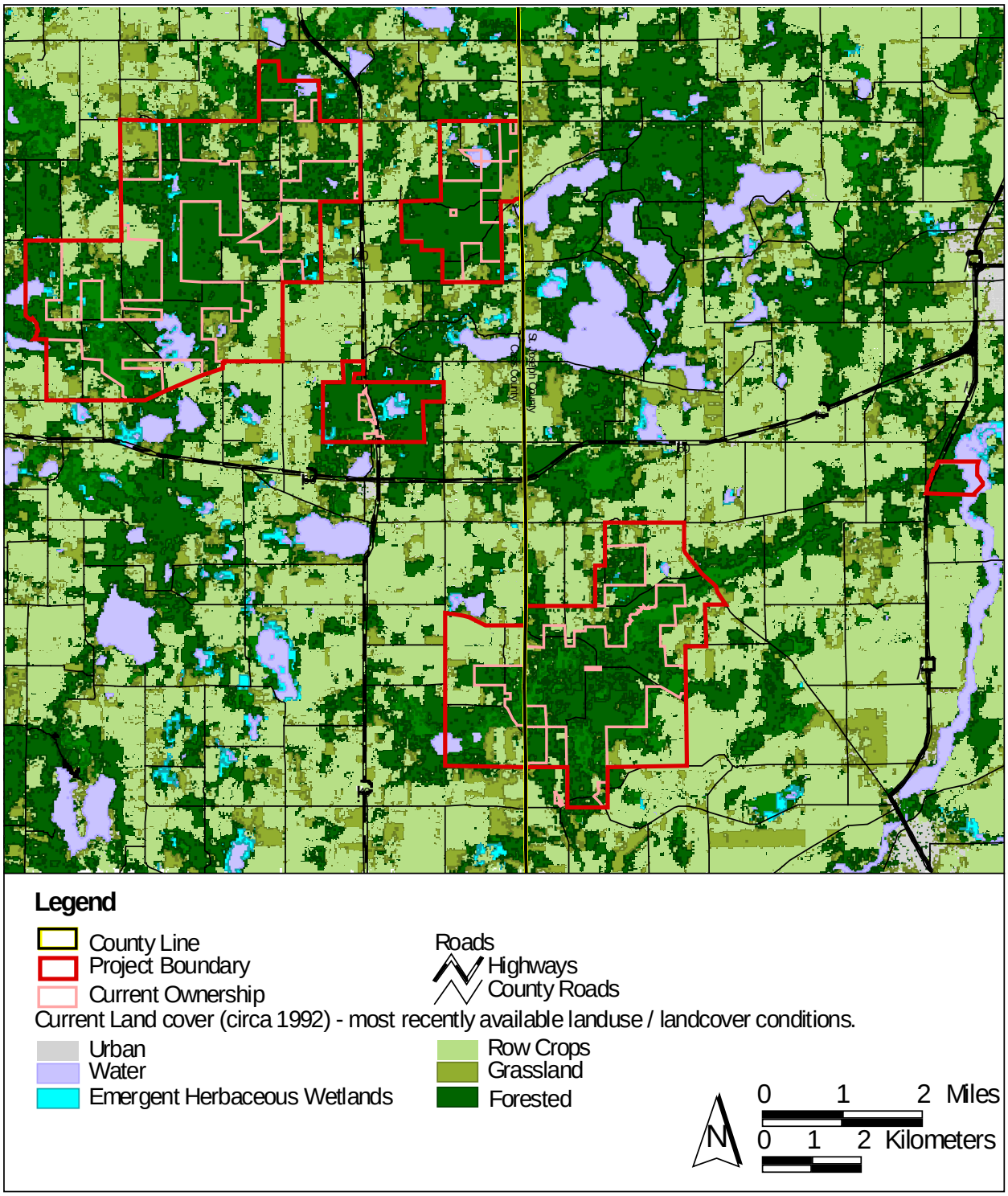


Figure 7. Current landuse/ landcover and project boundary for Jones Area SGA.

Appendix C: *Cultural Resources / History*

Many of the early inhabitants were attracted to the area by the rich, natural resources associated with the St. Joseph River. The Miami Tribe of the Algonquin Nation frequented the area as they traveled along the river on the Sauk Trail (Currently US-12). By the early 1600s, the Iroquois drove the Algonquin further south due in part to competition over furs.

During the mid 1600s, French explorers began using the river to push inland. A fort and a trading post were established in present day Niles. This settlement served as a home base for many explorers, most notably Rene-Robert Cavalier De La Salle. LaSalle made a march through the region from Fort Miami (St. Joseph) up the Paw Paw River into western Kalamazoo County. As stories of rich natural resources and fertile farming land spread east as a result of early European exploration, interest in settling this part of the state intensified. The first settlers started arriving in the early 1820s and found small bands of Potawatomi farming the area. By the 1830s, many of these small bands were displaced by settlers.

Farming was the primary livelihood of the area until the 1850s when the railroad was established. With the establishment of the railroad, lumbering became an important industry for the area and continues to be to this day. The railroads and abundant water resources helped make this area attractive for manufacturing, especially in Cassopolis and Three Rivers. Presently, farming is still a major industry of the area with seed corn production dominating farms in St. Joseph County and livestock production dominating in Cass County. In addition, the Lake Michigan influence creates favorable growing conditions for grapes, blueberries and apples in western Cass County. Manufacturing continues to employ many around Three Rivers and Cassopolis.

Aside from several dump sites and former homesteads, there are no significant cultural resources located on any of the SGAs. Dump sites are typical of lands that were formerly farmed and consist of old broken bottles, toys, and other household items. Some old building foundations can be found on the SGAs, but most have been buried or collapsed for safety reasons.

The Wildlife Division strives to do no harm to culturally significant assets on our lands. Consequently, we may consult with the State Historic Preservation Office (SHPO) as needed or when required to avoid, minimize and/or mitigate effects that may be caused by our management.

Since no sites of archeological significance are presently known to occur on any of the SGAs, SHPO consultation may not occur. Should any potentially significant resources be identified by future surveys or during the course of management activities, however, SHPO will be consulted and management modified as necessary.