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RECOMMENDATIONS FOR A PROGRAM OF SHARPTAIL HABITAT PRESERVATION IN WISCONSIN

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ABSTRACT

Wisconsin's sharptail population has declined in the long-term because of the disappearance of open and brushland habitats throughout the state. Only scattered remnants remain of the 12 million acres of prairie and savanna that once existed, leading to the statewide decline of the wildlife species dependent upon such plant communities. Fewer than a dozen of Wisconsin's 72 counties now hold viable sharptail populations, and surveys indicate that statewide breeding populations may total less than 2,000 birds. If present trends continue, sharptails may eventually be found only in those sites being managed for their benefit. Because designated management areas appear to be the key to the future existence of sharptails in Wisconsin, we must set aside and develop a sufficient amount of habitat to guarantee the survival of the species. This report recommends steps that, if implemented, will insure that the music of the dancing ground on a fresh spring morning will never be completely stilled.

Department of Natural Resources • Madison, Wisconsin

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INTRODUCTION

The prairie race of the sharp-tailed grouse (Pedioecetes phasianellus campestris) originally ranged from central Manitoba and Ontario south to central Iowa and northern Illinois (Aldrich 1963). But land use and vegetation changes caused the species to disappear from Iowa and Illinois, and the birds now occupy only about 30% of their former range in Minnesota and less than 10% in Michigan and Wisconsin (Miller and Graul 1980). The decline has not gone unnoticed, however, and the problems faced by sharptails in Wisconsin have been identified by several investigators over the past half century. Recognition of the problem resulted in the establishment of a management policy for sharptails and prairie chickens (Tympanuchus cupido pinnatus), and the development of a management plan for prairie chickens (Hamerstrom et al. 1957).

The prairie chicken has responded well to habitat restoration efforts and has shown a remarkable comeback in the state. The success of our prairie chicken program has become especially evident in the past few years, when the species reached its greatest abundance in 30 years in Wisconsin at about the same time that it became extinct in our neighboring state of Michigan. But the prairie chicken has always commanded a great deal of attention from wildlifers and the general public while the sharptail, perhaps because of its broader distribution and presumed greater abundance, received less interest. Prairie chickens almost certainly outnumber sharptails in the state now, however, so we should examine our sharptail management program and explore methods to make it more effective.

The recommendations in this report were designed to insure not sharptail abundance but sharptail preservation in Wisconsin. The former abundance of sharptails in Wisconsin resulted from land use changes over which wildlife managers had no control and can never duplicate. We can insure that sufficient habitat is available to maintain the sharptail as a viable component of Wisconsin's fauna.

FORMER AND CURRENT STATUS

The distribution of sharp-tailed grouse in Wisconsin during presettlement times is poorly documented. Trained observers were scarce, and most early records failed to distinguish between sharptails and prairie chickens. Schorger (1943) gleaned all references to prairie grouse from old newspapers and other publications and concluded that sharptails originally inhabited brushy or park-like areas throughout the state. Such habitat types were probably abundant during presettlement times, especially in the southern part of the region that eventually became Wisconsin. Curtis (1959) estimated that during the early 1800s, grassland and savanna type habitats existed on more than 12 million acres in Wisconsin. Although sharptails almost certainly did not occupy that entire area, a vast amount of potential habitat was available (Fig. 1).

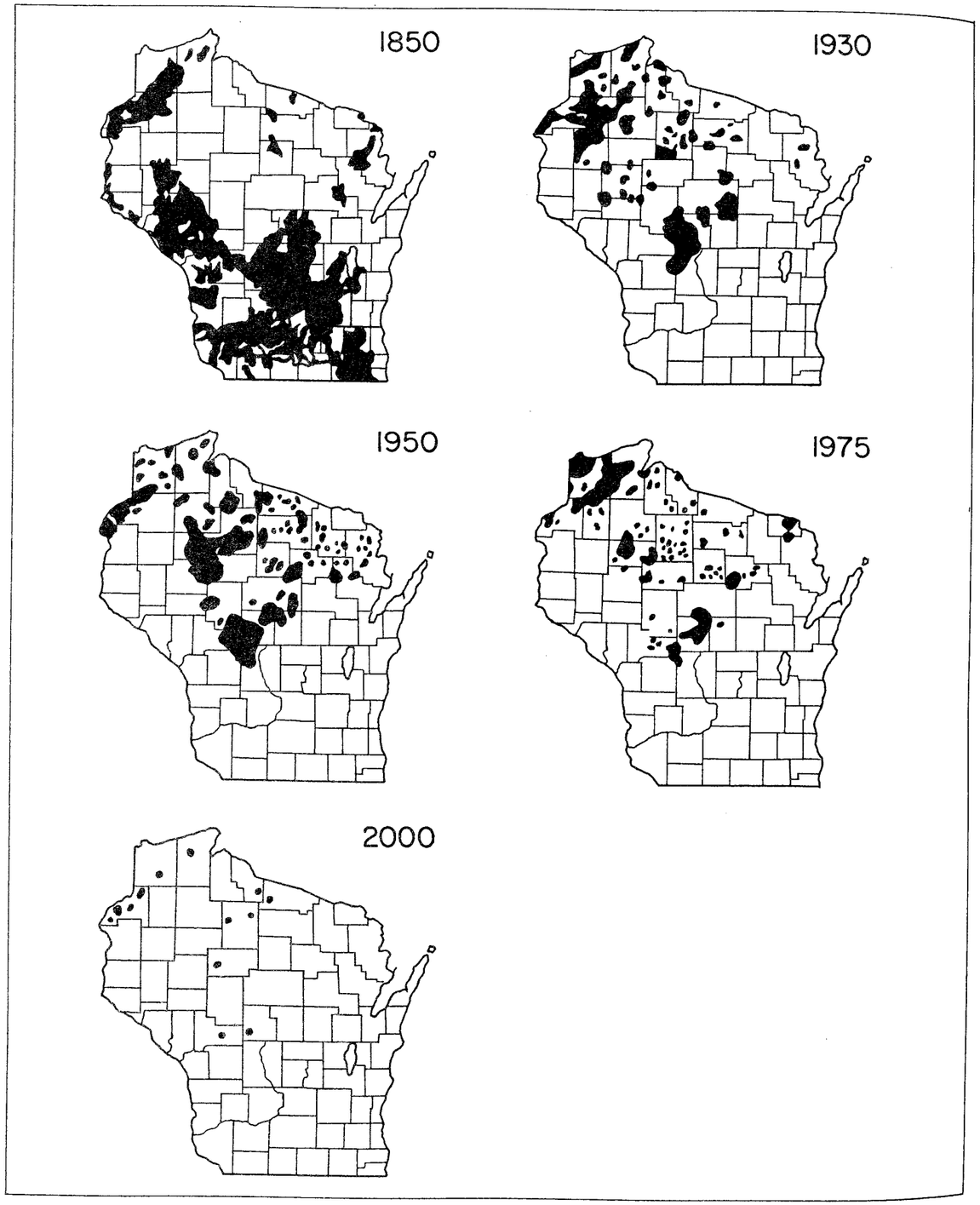

FIGURE 1. Changes in Wisconsin sharptail range, 1850-2000.

The most extensive savanna habitat in the state was the oak opening, which originally occupied some 5.5 million acres in southern Wisconsin (Curtis 1959). Schorger (1943) reported that sharptails' preference for this habitat type was such that the name "bur oak grouse" was locally assigned to the species. But oak openings were dependent upon fire, and settlement brought an end to the annual burning of the prairies and savannas. As the oak openings grew into dense oak forests, sharptails disappeared. Schorger (1943) reported that the species had become rare in southeastern Wisconsin by the 1850s and was last recorded in Rock County in 1869. Although a few flocks reportedly existed in southern Wisconsin into the 1930s, most of the sharptail habitat in the region had grown out of existence or been destroyed well before the turn of the century.

Contrasted to the extensive oak openings that greeted settlers in southern Wisconsin, savanna habitats were less abundant in northern Wisconsin during presettlement times. The nonforested area was mostly pine barrens or open bog, and these types were believed to constitute the original sharptail habitat in the north. The total area of barrens and bogs that might have been available to sharptails is unknown, but a nearly contiguous block of pine barrens in northwestern Wisconsin was estimated to cover 1,500 mile^2 or roughly 1 million acres (Murphy 1931).

Although the arrival of settlers spelled the doom of sharptail habitat in the prairies and oak openings of southern Wisconsin, settlement of northern Wisconsin represented a boon to the species. Many early settlers shared the sharptails' dislike for extensive forests and welcomed the destruction of the virgin timber during the logging boom. The combination of large areas of logging slash and the efforts of pioneer farmers to clear their land resulted in catastrophic forest fires that sometimes consumed stumps and settlers alike. Despite their tragic consequences, wildfires continued to occur frequently until an effective organization for forest protection was established during the 1930s. Since Wisconsin's fire suppression program began, the total area burned has dropped from 500,000-10,000 acres/year (Wis. Dep. Nat. Resour. 1970).

During the logging and fire era, sharptails in northern Wisconsin moved out of the barrens and bogs and occupied the extensive areas of brushy cover that had suddenly become available. But after the frequent fires were stopped, forests quickly returned. Although most of the reforestation process occurred naturally, trees also were planted on numerous sites totalling more than 800,000 acres by 1956 (Stone and Thorne 1961). Rapid regrowth of the forest and concurrent loss of sharptail habitat did not go unnoticed, however Grange (1948) documented the habitat changes that occurred in central Wisconsin, and the biography of a dancing ground in "Sharptails Into the Shadows" (Hamerstrom et al. 1952) was a classic portrayal of a species in trouble.

But sharptail habitat continued to disappear, and 25 years later Vanderschaegen (1977) presented historical maps on sharptail distribution and described the progressive range shrinkage that had occurred. He reported a dramatic reduction in range between 1958 and his 1975 survey and concluded that most of the remaining range contained only scattered, insecure flocks.

Despite 4 decades of forest regrowth, Vanderschaegen's 1975 range map (published in 1977) still included some large blocks of contiguous sharptail habitat, especially in Douglas and Bayfield counties. Although sharptail abundance was recognized to vary considerably within those blocks, the species reportedly persisted throughout some entire townships. Such reports were unexpected, since earlier Hamerstrom et al. (1952) had not found a single block of excellent habitat as large as a township anywhere in northern Wisconsin.

Vanderschaegen's report was not based on any systematic field check of sharptail abundance, however, so his range map was not intended to be highly precise. The report was designed to focus attention on the precarious status of the sharptail and was successful in that role, contributing to the 1977 initiation of a study of habitat preferences (Gratson 1983) and to our investigation of sharptail status and distribution conducted from 1980-83.

Field work for this study was centered in northwestern Wisconsin, which contains perhaps 90% of the state's remaining sharptails (Wis. Dep. Nat. Resour. 1979). Information on sharptail population status within that region was obtained through spring counts of dancing grounds, a traditional index to prairie grouse populations. Dancing grounds were located during early morning roadside surveys by following the method described by Grange (1948). Because Wisconsin's remaining sharptail habitat is discontinuous, the survey was modified to cover patches or blocks of habitat rather than specific routes with regular stops.

Time and manpower constraints made it impossible to check all of the potential sharptail habitat in northwestern Wisconsin, so Wisconsin Department of Natural Resources (DNR) field personnel were consulted in choosing the best available patches for surveys. Approximately 70 townships throughout 10 counties were considered for checking, and some census effort occurred in 66 of the selected townships via annual surveys conducted during 1981-83 (Fig. 2).

Even though our searches were directed toward those areas having the largest sharptail populations, several of the surveyed townships contained only marginal habitat, and no dancing grounds were found. In fact, survey results indicated that viable sharptail populations may no longer exist within several counties, including some that formerly contained many birds. Sharptail populations in Ashland and Washburn counties, for example, were estimated at 1,000-2,000 birds in 1931 by Franklin J.W. Schmidt, an early grouse researcher (estimates published in Grange 1948). But our surveys revealed only irregular use of the last known dancing ground in Ashland County, and only a single dancing ground in Washburn County. Washburn County may have been without a regularly used dancing ground recently, because the only known dancing ground is situated in an area that burned in the Five Mile Fire, a 13,375-acre wildfire in April, 1977.

The results of this study will be reported in a later publication. Information gained, however, will be used here along with findings reported in the literature to provide an understanding of sharptail habitat requirements and factors to consider in managing this grouse of the brushlands.

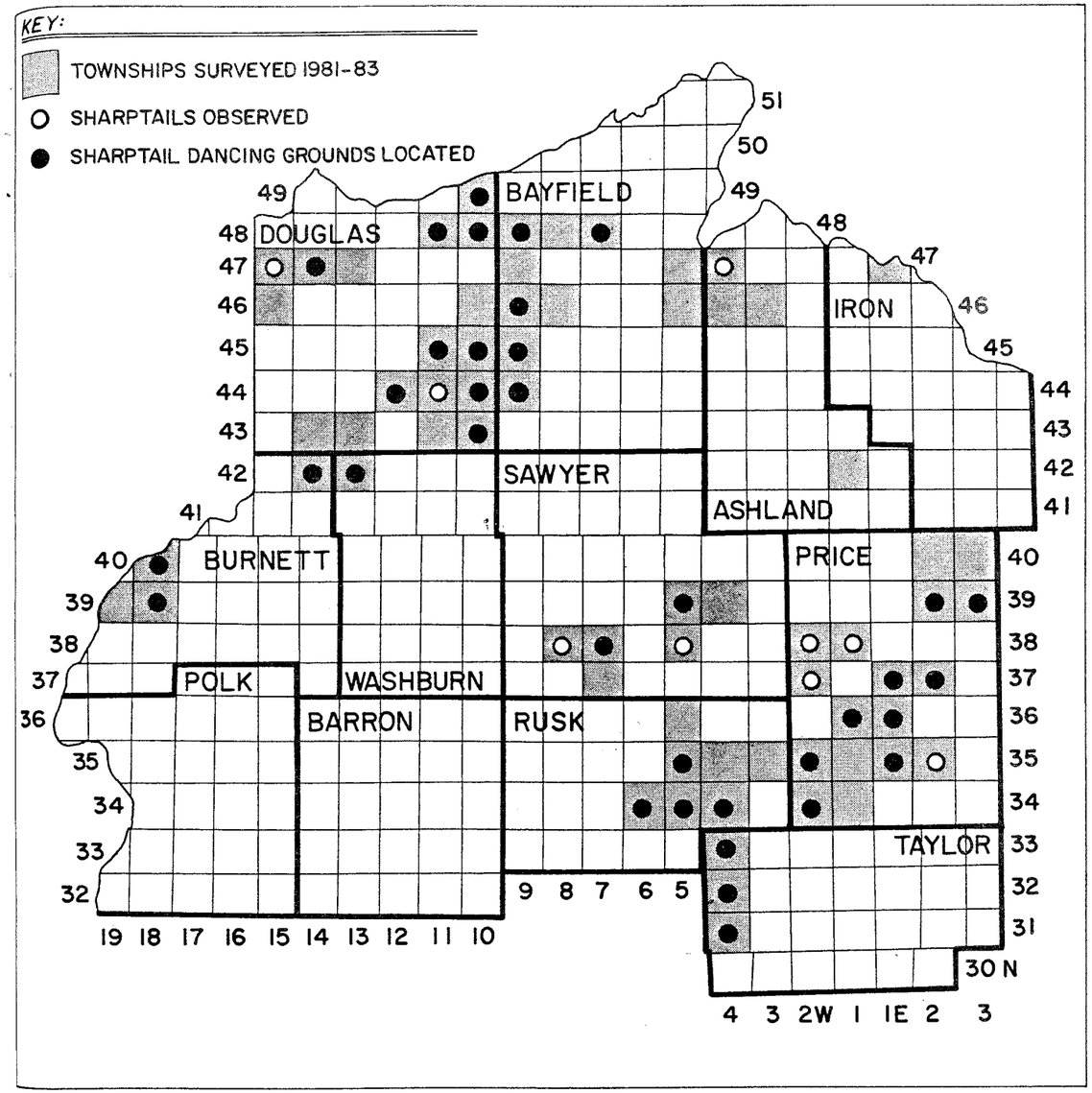

FIGURE 2. Results of sharptail dancing ground surveys conducted in northwestern Wisconsin, 1981-83.

SHARPTAIL HABITAT REQUIREMENTS

The range of the 6 subspecies of sharp-tailed grouse in North America encompasses a wide variety of plant communities, but each race appears to be adapted to a rather narrow set of habitat conditions. In the upper Midwest, those conditions are met in open brushland habitats that have been generally labeled as savannas or brush-prairies. Even though workers have applied more than one name to our type of sharptail habitat, they have agreed universally about its characteristic openness. In his prescription for an ideal block of sharptail habitat in Michigan, Ammann (1957) recommended that three-fourths of the land should be "essentially open." Open areas of pasture, cropland, or sedge-grass also predominated within township-sized portions of northwestern Minnesota that were considered ideal summer sharptail habitat (Berg 1981).

In Wisconsin, Grange (1948) described sharptail habitat as "prevailingly open" and then went on to list 29 plant species that he considered essential elements of sharptail range. Although Grange believed that certain plants must be present to have sharptails, he also recognized the importance of the structure of the vegetation, and his graphic representation of grouse distribution in Wisconsin displayed ecological thinking that was ahead of his time (Fig.3). The importance of habitat structure was further emphasized by Hamerstrom et al. (1952) when they described the various components of sharptail habitat as openings, low brush, and scattered thickets.

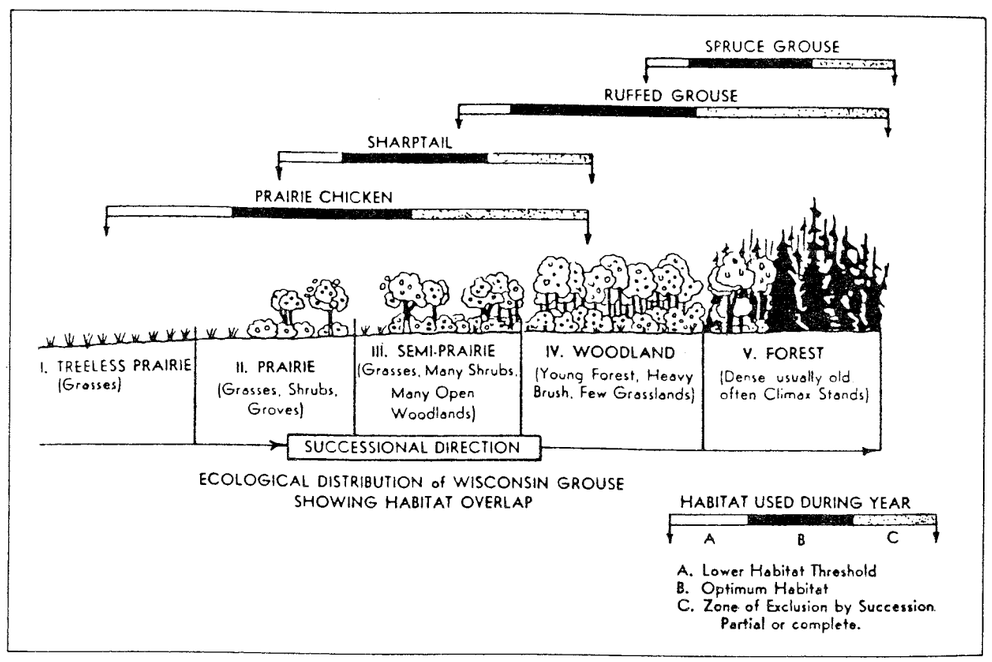

FIGURE 3. Habitat requirements for 4 grouse species in Wisconsin (adapted from Grange 1948).

Breeding Habitat

The dancing ground is the focal point of sharptail courtship activity, and Berg (1981) suggested that it was the most important component of the sharptail habitat complex. The dancing ground is usually the most open portion of the complex, with woody vegetation being sparse or absent. Ammann (1957) reported that most of the dancing grounds he examined in Michigan had no woody cover, and Berg (1981) believed that sharptails in Minnesota required a 1/8-mile-diameter area relatively free of any woody vegetation. Researchers have examined the amount of woody cover that dancing sharptails will tolerate, with Ammann (1957) reporting that woody cover rarely exceeded 30% of the surface area of his Michigan dancing grounds. The sharptail's intolerance to trees near the dancing ground was also quantified by Berg (1981) in Minnesota when he reported that average distance from the center of a dancing ground to dense brush was 230 yd and to trees was 300 yd. He found abandonment of dancing grounds if conifer plantations within 1/4 mile exceeded 20 ft in height.

Even though height and density of vegetation appear to be important factors in the selection and eventual desertion of dancing grounds, courtship site preferences have been difficult to document with precision. Grange (1948) found so much variability in prairie grouse display grounds that he gave up an attempt to describe them. I used vegetation data for characterizing dancing grounds in this present study, but preliminary results appeared unsatisfactory. Aerial photos were used to identify and classify vegetation within a 1/2-mile radius of nearly all of the dancing grounds discovered during our 1981-83 surveys. Data analysis for 58 dancing grounds revealed substantial differences in the relative proportions of grass, brush, and trees within the mapped areas, with the amount of cover in each of the 3 life-form categories accounting for 0-50% of the area around individual dancing grounds. The data are being reviewed by our biometrical staff and may result in a better definition of a sharptail dancing ground.

Substantial variation in the amount and type of cover on dancing grounds might be interpreted as evidence that sharptails exhibit little discrimination in choosing their courtship sites. Shifting of dancing grounds in apparent response to changes in cover occurred during this and a previous (Sisson 1976) study, however, so preferences do exist for a particular vegetative structure for the courtship site. But those preferences may not be evident in our sample of dancing grounds because of the relatively broad range of habitat quality they represent. The variability we observed in dancing ground cover may simply be a reflection of differences in availability of "preferred" courtship sites. For example, a sharptail flock residing in a designated management area may be able to choose from among a number of acceptable courtship sites, while birds occupying a block of deteriorating habitat may be forced to use an opening of inferior quality for their displays.

Hamerstrom et al. (1957) found that lack of nesting and brood-rearing habitat was the major factor limiting prairie chicken populations in Wisconsin, and Kirsch (1974) subsequently reported that nest and brood habitat appeared to be the universal limiting factor throughout the range of the species. However, information on prairie chicken and sharptail nest sites (Gross 1930, Hamerstrom 1939, Ammann 1957) has indicated that chickens exhibit much narrower preferences than do sharptails in their choice of nest sites, so

availability of nest habitat does not appear to be the sole determinant of the ability of an area to support sharptails. Ammann (1957) reported that sharptail nests discovered in Michigan were found in sites that varied from 0-75% shading by woody cover. Shrubs evidently accounted for most of the woody cover at those nests, however, since an analysis of the vegetation at 10 Michigan nests averaged 43% shrub and only 4% tree cover. Likewise, Gratson (1983) reported that radio-tagged Wisconsin hens selected shrub-grass cover for 4 of the 5 nests found.

Even though sharptail nests have been reported in diverse habitats, hens evidently do select particular cover types for nesting, if they are available. Kirsch and Kruse (1972) reported that 5 of 6 North Dakota sharptail nests were found in 1-year-old burned prairie, and Ramharter (1976) reported 8 of the 10 nests discovered at Crex Meadows during 1972-73 were located in 1-year-old burned brush-prairie. A favorable nesting situation apparently exists during the spring following a burn because of an increased abundance of residual grasses and also because the cover is more upright and erect.

Sharptail brood habitat appears to be similar to that used for nesting, except that broods use cultivated lands that are generally avoided for nesting. Ammann (1957) thought that hens might move their chicks to heavier cover for brooding, but still believed that the average sharptail brood would not inhabit cover that contained more than 50% woody cover. Hamerstrom (1963) confirmed the importance of open cover as brood habitat when he reported that 80% of 200 broods observed in northwestern Wisconsin were in grassland or savanna-type habitats. He also noted that 14% of all brood records were on cultivated lands and concluded that broods may have been attracted to such areas because of the forbs and insects there.

Further confirmation of the importance of openings or cultivated land as brood habitat was obtained during 1983-85 as part of an investigation of sharptail harvest rates. Field work for that study occurred in several northwestern Wisconsin sharptail management areas and involved capturing and marking birds during the summer. Broods observed or captured during that study were consistently found on or near dancing grounds, food patches, or firebreaks, i.e., the most open habitat available.

Wintering Habitat

As winter weather conditions reduce the availability of food and cover to sharptails in open upland habitats, the birds are normally forced to move to forested or marshy habitats to satisfy their daily energy needs. The contrast between herbaceous production cover and woody winter cover was emphasized by Hamerstrom (1963), but Ammann (1957) indicated that the switch from summer to winter habitats is frequently neither abrupt nor continuous. Although increased snow depths usually cause the birds to move some distance when they cease foraging on the ground and start budding in trees, the availability of grain can enable birds to sometimes remain near their summer habitat. Snow conditions, which affect the availability of roosting sites, are also important in determining winter habitat use. Sharptails prefer to roost in dense marshy vegetation during snowless periods (Grange 1948), but during deep snow periods, they will use a variety of sites, ranging from upland forest glades to black spruce bogs (Ammann 1957).

SHARPTAIL MANAGEMENT CONSIDERATIONS

History of Management Activities

Sharptail management began in northern Wisconsin during the late 1940s and early 1950s, perhaps in response to concerns about diminishing habitat voiced by Grange (1948) and Hamerstrom et al. (1952). In an early report on the progress of sharptail management, Doll (1955) mentioned 10 designated management areas: Crex Meadows, Douglas County, Riley Lake, Reins Creek, Waubee Lake, Pershing, Ackley, Fish Lake, Moquah Barrens, and Dorothy Dunn (Fig. 4).

Sharptail Management Efforts

Ongoing

1 - Moquah Barrens
2 - Douglas County
3 - Namekagon Barrens
4 - Crex Meadows
5 - Fish Lake
6 - Amsterdam Sloughs
7 - Powell Marsh
8 - Spread Eagle
9 - Dunbar
10 - Riley Lake
11 - Kimberly-Clark
12 - Pershing
13 - Wood County
14 - Dike 17

Terminated

15 - Ackley
16 - Waubee Lake
17 - Thunder Marsh
18 - Dorothy Dunn

No History of Sharptail Management

19 - Reins Creek
20 - Mead
21 - Dewey Marsh
22 - Ashland Airport
23 - Firebreak, Bayfield County
24 - Governor Knowles State Forest
25 - Firebreak, Douglas County
26 - Brule River State Forest

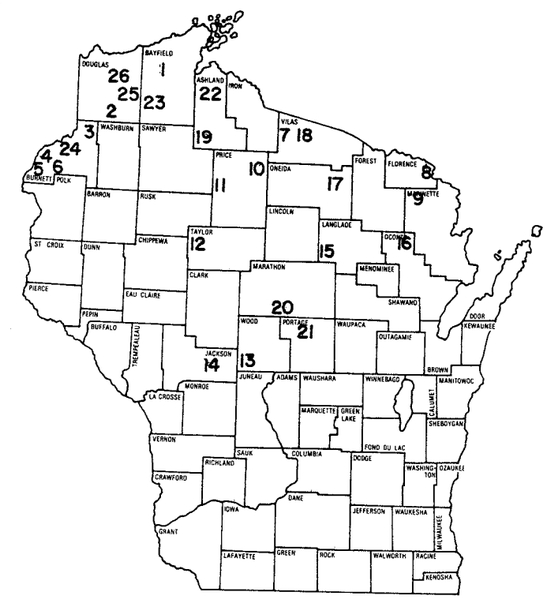

FIGURE 4. Distribution and status of habitat development activities in managed sharptail areas in Wisconsin.

The 10 management units were located primarily in northern Wisconsin and collectively contained about 65,000 acres. Good progress in designating areas for sharptail management evidently continued throughout the 1950s, since a later report by Newman (1959) indicated that 116,406 acres in 20 units were being managed for sharptails in Wisconsin. Although the specific sites were not identified, 3 were reportedly owned by the state, 10 were leased from counties, and 7 were managed through cooperative agreements with land management agencies.

Despite the impressive gains in Wisconsin's sharptail management program that were being logged on the printed page, a concomitant increase in sharptail habitat did not occur on the landscape because some of the units designated for management were sharptail areas only "on paper." Management on several of these areas never went beyond the dedication phase. This is understandable, however, because records indicate that the assessment regarding the potential capability of an area to support sharptails sometimes followed, rather than preceded, its designation as a sharptail management area. Closer inspection of several potential sharptail areas later revealed that some were too small or too far down the path of forest succession to be considered good candidates for management.

As sites were dropped from the ranks of sharptail management areas, others were added over the years, bringing the total in the most recent list (Vanderschaegen 1977) to 16 sites. Sites that had not been mentioned on previous lists include: Kimberly-Clark, Dunbar, Spread Eagle, Dike 17, Powell Marsh, Dewey Marsh, Thunder Marsh, Wood County, and Mead (Fig. 4). The apparent stability in the total number of managed sharptail areas over the past 2 decades is misleading, however, since Vanderschaegen's list included several areas where little or no management was undertaken and other sites where sharptails were never the target.

Vanderschaegen (1977) reported sharptail numbers to be increasing in some managed areas and decreasing in others. Because sharptail management has not always been effective in producing a population response, I related habitat treatments and sharptail numbers on the managed areas to determine if variations in management intensity were responsible for differences in success. Records were inadequate for a meaningful analysis, however, even though available data indicated that those sites where we have worked the longest and hardest to keep the birds generally support the largest populations. But management success also appeared to hinge upon other factors, such as the size of the project and its distance from other blocks of sharptail habitat. And because managers were using similar techniques -- burning, herbiciding, cultivating -- to develop sharptail habitat regardless of location, management success was apparently less dependent upon how those techniques were applied than upon where they were applied. Because history has demonstrated that choosing the correct site can ultimately determine management success, we must carefully select areas to manage for sharptails.

Management of Insular Populations

Most of Wisconsin's remaining sharptail habitat exists in patches separated by large expanses of unsuitable habitat that appear from the air as islands of open land in a sea of forest. The plight of the sharptail is not unique, however, since many species have become restricted to small patches of their former range, as human activities cause their preferred habitats to become smaller and more isolated.

Resource managers are now aware of the insular character of many wildlife habitats, and some have begun to employ island biogeographic theory in their management plans (Whitcomb et al. 1976, Robbins 1979). The focal point of the theory is the equilibrium model of MacArthur and Wilson (1967), which proposes that insular populations represent a state of equilibrium between immigration and extinction rates that are influenced by island area and isolation between islands. The theory has proven valuable in the design of wildlife preserves, and Samson (1980) proposed that it could provide the foundation for a management policy for North American nongame birds.

The value of the theory rests upon its ability to explain species turnover, and models were developed that could be used to predict the probability of an immigrant population becoming established and its expected extinction time. Employing the extinction and survivorship models, Fritz (1979) partially predicted spruce grouse occupancy of habitat patches based on the size of the patch and its distance from an occupied patch. Fritz compared sites known to be used by spruce grouse to areas that appeared suitable but were not used and found that unoccupied patches were significantly smaller and significantly farther from occupied patches than were other occupied patches. He also observed the percent of occupied patches to decrease linearly as distance from the nearest occupied patch increased.

Available evidence indicates that habitat patch size and spatial arrangement are also important determinants of sharptail distribution in Wisconsin. Sharptail flocks that have disappeared recently were situated in habitats that were either very small or very isolated or both. The importance of habitat patch size to sharptails had also been previously demonstrated in Michigan during that state's stocking program. Ammann (1957) reported that successful transplants depended on the availability of large blocks of habitat. The role of isolation in the extinction of individual sharptail flocks has also been previously recognized, especially by Grange (1948) who said that the species exhibited "no ability whatever to survive in small detached colonies outside the limits of their contiguous range."

Because sharptail flocks residing in small, isolated habitat blocks face a high risk of extinction, any investment to maintain habitat in such locations might be considered chancy. Thus, the size of a habitat patch and its connection to other patches should weigh heavily when choosing sites to manage for sharptails. Even those sites already dedicated to sharptail management should be examined in the light of equilibrium theory because habitat connectivity has changed considerably over the years. Results of such an

examination are depicted in Figure 5, a generalized comparison of the expected survival of sharptail populations on each designated management area. Although the figure is empirical and not the product of a population model, it should prove useful in deciding whether or not to invest sharptail management funds in a location based upon the expected survival of the resident population.

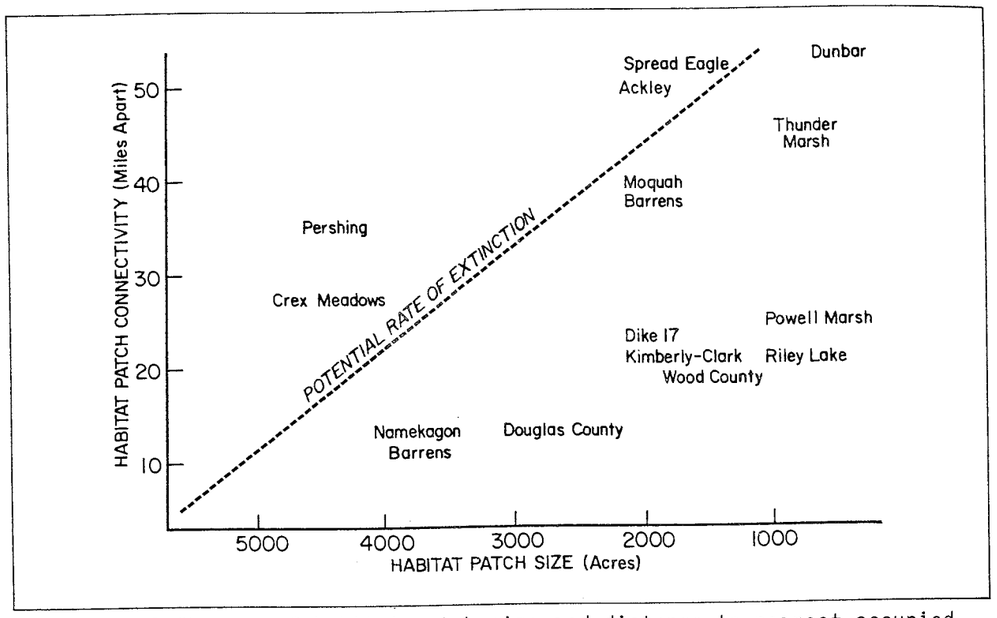

FIGURE 5. Influence of habitat patch size and distance to nearest occupied patch on the expected survival of the sharptail flock on designated mangement areas in Wisconsin.

Establishing Management Objectives

Because sharptail management is an intensive form of land management, a priority system should be established in select management areas that insure the best possible return on our investment. Although financial or labor constraints will limit the amount of land that can be dedicated to the species, perceived shortages of such resources should not prevent us from meeting our primary goal -- insuring the survival of the species in the state. The species could perhaps be perserved by maintaining suitable habitat in a single location, but a management program of that sort would entail a high risk of extinction. Management of several sites would enable the maintenance of a larger population and also provide security against extirpation in case of a natural disaster.

Although it would be better to have several sharptail areas rather than just one, history has shown that the number of management areas is a poor indicator of population status. Therefore, instead of insuring that a certain minimum number of tracts are dedicated to sharptails, a more appropriate objective might be the maintenance of a certain number of birds or a certain acreage of habitat. Such an objective has already been established on a statewide basis in the Comprehensive Fish and Wildlife Management Plan, which calls for management of sufficient units of land to maintain a minimum fall population of 5,000 sharptails. That objective may be overly optimistic based upon sharptail population data gathered in northwestern Wisconsin, but better information on fall populations is needed before any change is recommended. Meanwhile, however, we should establish a breeding population objective because better data exist for spring populations, and dancing ground counts will probably remain our primary gauge of population status.

Our sharptail management objective should be reasonably attainable, both biologically and socioeconomically. Thus, the question is not simply "how many sharptails do we need?" but also "how many acres can we keep open by prescribed burning?" Based on estimated sharptail densities and our present management capability, a minimum breeding population of 500 sharptails on managed lands in Wisconsin appears to be a reasonable objective.

Attaining Management Objectives

To maintain a spring population of at least 500 sharptails, we need a minimum of 50,000 acres of secure breeding habitat. Although that acreage goal represents less than 1% of the 5.2 million acres that Leopold (1931) estimated to be prairie grouse range in 1930, it represents nearly twice the amount of habitat presently available on dedicated sharptail tracts. Potential locations for gaining the additional needed acreage are listed in Table 1, and priorities were assigned to the various sites as an aid in choosing the scope of our sharptail management program. Completion of work in priority 1 areas should result in 42,000 acres of habitat in 7 counties, while completion of work in priority 1-3 areas should provide 64,000 acres of habitat throughout 17 counties.

While additional sharptail areas are needed, highest priority should probably be given to completing the development of sharptail habitat on our existing management units. Work has been ongoing in some of these areas for 30 or more years, but our job remains unfinished. Although habitat development has frequently been delayed by problems in acquiring land, selling timber, and shifts in personnel or priorities, we must concentrate on completing our planned habitat work as soon as possible. Any opportunities we might have to enlarge our existing management units or claim new ones may depend upon our ability to demonstrate our skills as land managers. Like the Biblical servants who had been entrusted with their master's money, we will never be made rulers over many sharptail areas unless we have been found faithful in managing a few.

Table 1. Recommended priorities for managing sharptail habitat (acres) in various locations in Wisconsin.

County	Site	Patch Size*	Patch Connectivity**	Public Ownership	Sharptail/ Waterfowl	Historically Savana	Sharptail Breeding Habitat Goal and Recommended Priority 1	2	3
Ashland	Ashland airport	-	-	-	-	-			2,000
Bayfield	Moquah Barrens	-	+	+	-	+	6,000	2,000	
	Firebreak	-	+	+	-	+	9,000		
Burnett	Crex Meadows W.A.	+	+	+	+	+	5,000		
	Namekagon Barrens W.A.	+	+	+	+	+	4,000		
	Fish Lake W.A.	-	+	+	-	+		2,000	
	Amsterdam Sloughs W.A.	-	+	+	-	+		600	
	Governor Knowles S.F.	-	+	+	-	+	4,600		
Douglas	Douglas County W.A.	+	+	+	-	+		1,000	
	Firebreak	-	+	+	-	+		2,000	
	Brule River S.F.	-	+	+	+	+			2,000
Florence	Spread Eagle W.A.	-	-	+	+	-	1,200	1,400	
Iron	Little Turtle W.A.	-	-	+	+	-			2,100
Jackson	Dike 17 W.A.	-	+	+	+	-		800	
Langlade	Ackley W.A.	-	-	+	-	-			100
Marinette	Dunbar W.A.	-	-	+	-	-	2,000		
Oneida	Thunder Marsh W.A.	-	-	+	-	-	2,500		
Price	Riley Lake W.M.A.	-	-	+	-	-			2,000
	Kimberly-Clark W.A.	-	-	+	-	-			2,000
Rusk	Ladysmith vic.	-	-	+	-	-	6,000		
Sawyer	Radisson vic.	-	-	+	-	-	500		
Taylor	Pershing W.A.	+	+	+	+	+		2,000	
Vilas	Powell Marsh	-	-	+	+	+			
Washburn	County Forest	-	-	+	+	+	1,200		
Wood	Wood County W.A.	-	-	+	-	+			
TOTALS							42,000	11,000	11,000

* More than 2,00 acres (+) or less than 2,000 acres (-) of upland grass-brush habitat available.
** Less than 10 mi (+) or more than 10 mi distant (-) from another occupied patch of sharptail habitat.

If we assume that our sharptail habitat objective is adopted and additional acres will be dedicated to sharptail management, the most cost-effective method to gain those acres might be to expand some of our existing management units rather than to select new ones. Existing units offer several advantages that impact management efficiency, including (1) a nucleus of birds, (2) firebreaks partially in place, and (3) reasonable proximity to personnel and equipment needed for habitat work. But gaining any additional acres may be difficult in some designated sharptail management units, such as Douglas County and Namekagon Barrens Wildlife Areas that involve county-owned land. Any expansion of those areas would require an agreement by the counties to lease more land to the state, a concession the counties may be reluctant to make because of the relatively poor financial return those lands provide. Even on most of our state-owned sharptail areas, it will not be easy to gain additional land, because habitat development plans already include the entire property. Any expansion of sharptail work on these areas would thus necessitate a revision of project boundaries and acquisition of the needed parcels. Although such revisions are possible, it may be difficult to purchase land where the sole justification is a relatively small increase in an existing sharptail flock.

Our best opportunity to increase the habitat goal on existing sharptail areas probably rests with those units where present land ownership would allow for some expansion. That situation prevails in one state-owned area, Crex Meadows, and in Moquah Barrens and the Riley Lake Wildlife Management Area, both located on National Forest lands. Sharptail habitat goals on Crex and Moquah Barrens are already high, however, and it does not seem appropriate to raise them when considerable effort will be required to meet the present goals (Table 1). Riley Lake, however, contains only about 700 acres of upland habitat within the prescribed burn area and a higher goal appears necessary here to provide adequate nesting and brood-rearing cover. Sharptail numbers in this area have been declining in recent years, and the decline may be related to the scarcity of brushy uplands in the area. Without some modification in the plans for this area, the future existence of this flock appears to be in jeopardy. The salvation of this flock could depend upon the completion of the planned purchase of a 1,700-acre block of private land located immediately southwest of the management area. That parcel contains additional uplands and a large flowage that may permit the Forest Service to develop a combination waterfowl/sharptail management area.

Because our habitat goal would not be met even if development work on our existing management areas was completed, several additional areas should be selected where savanna-type habitats can be created and maintained. The candidate areas listed in Table 1 are not the only potential sites, but are representative of the type of area that should be chosen. Those potential sites given higher priority are located within the area that was originally barrens, and all are situated on publicly owned lands. While those characteristics may not be required in a candidate management area, they should be considered.

If an area was formerly a savanna, then climate and soils should be conducive to re-creating that type of vegetation. Publicly owned lands were given higher priority on the list because sharptail management areas must be large,

and it does not seem likely that the Department will purchase even one large block of private land for sharptails. Limiting our list of candidate properties to public lands, of which there are more than 5 million acres in Wisconsin, should not severely handicap our choice of sites.

Hamerstrom et al. (1957) suggested that it might be feasible to buy or lease only a portion of the land within a sharptail management area, a practice they termed "ecological patterning." Although the concept has been appropriated into an Extensive Wildlife Habitat Program for pheasants and ducks, sharptails are less suited to the program because of their larger acreage requirements. In addition, the techniques used to maintain habitat, such as burning and herbiciding, generally obligate the manager to secure high land control.

An opportunity does exist, however, to test the value of ecological patterning for sharptails on the fuel breaks located within the extensive pine areas of northwestern Wisconsin. The fuel breaks are 1/4-mile-wide strips of land withdrawn from pine production and permanently maintained in a grass-brush type to provide a fixed firebreak. The firebreaks are used by sharptails, and they may be the key to the bird's persistence in sites that are largely unfavorable, even though Ammann (1957) stated that long, narrow clearings are not acceptable habitat. We tried several years ago to map and dedicate a continuous firebreak, but the diverse ownership patterns and production losses associated with such a large area made it impossible to put together any overall plan. Although recognition of the need for fuel breaks still exists, recent discussions have touched on conversion of firebreaks to tree species that are fire resistant and saleable, and the use of "floating" breaks, neither of which would provide much benefit to sharptails. Because firebreak philosophy is still emerging and the long-term value of such openings to sharptails is unclear, we should monitor sharptail use of one or more portions of an existing firebreak to better determine their value.

Both Grange (1948) and Ammann (1957) indicated that several factors should be considered in deciding whether an area should be designated as a prairie grouse management area. Both listed the factors they felt to be important. Grange included size, location, soil type, drainage, contour, land history, and plant arrangement, while Ammann noted presence of birds, cover quality, area size, successional stage, ease of cover manipulation, and accessibility. Although Ammann suggested that an area of 1 mile^2 or 640 acres may be sufficient to support sharptails, Grange recommended a 2,000-acre minimum size. Grange also recommended that upland soils in the managed area should be sands, since manipulation of the vegetation on heavier upland soils would be more expensive. Ammann did not specify a particular soil type for a proposed management area, but a comparison of his map of sharptail management units with a soil map of Michigan reveals a decided preference for sandy soils.

Even if a proposed area meets the criteria for a sharptail management area, the decision to dedicate the tract to sharptail habitat preservation is often difficult. Ammann (1957) recognized that land use conflicts would play a major role in such decisions and concluded that the best opportunity was on lands "unsuited to farming or the growing of timber." Lands that cannot produce a decent crop of potatoes or pine trees will probably likewise not yield a bumper crop of prairie grouse; however, they typify land within several of our existing management areas. Land that nobody wants has become

difficult to find, and most of the proposed sites involve a significant sacrifice of timber production. Sharptails may be unwelcome in most of the proposed sites because they represent lost income.

Sharptails cannot be produced at a profit, but that is only part of the problem. Perhaps a bigger handicap in preserving land for sharptails is the investment required to keep a piece of land suitable for the birds. Even if a manager believed sharptail habitat preservation to be the highest and best use of a piece of land, it would be pointless to dedicate the parcel to that goal without having the funds to develop and maintain suitable habitat. A shortage of management funds has probably been one of the more important obstacles to completing habitat development work on federal and state lands, and it has prevented a program from even being considered on most county-owned lands.

Counties are the primary owners of public land in the state. The 267,000-acre Douglas County Forest, for instance, is only slightly smaller than all of the DNR lands within northwestern Wisconsin. Despite the large acreage of county-owned land, nearly all of the sharptails that reside on those lands are restricted to spots such as leased wildlife areas and managed firebreaks that are maintained for their benefit. Although such areas already account for a significant portion of the land now being managed for sharptails, opportunities do exist for additional areas, especially in those counties that historically contained vast amounts of savanna habitats. Washburn County, for example, formerly harbored many sharptails, but no longer can boast of a single dancing ground on secure habitat. If a parcel was to be dedicated to sharptails in that county, it would probably have to come from the 148,000 acres owned by the county rather than from the 5,000 acres owned by the state. And if the county was willing to provide the land, the state should then be obligated to develop and maintain the area for sharptails and to provide a periodic report to the county on the progress of management activities. Multiple use philosophy may lead one to believe that it would be unnecessary for the state to purchase the right to conduct management operations on county lands, but real world economy dictates that compensation should be made for lost revenue.

Although the doctrine of multiple use has allowed managers to incorporate goals other than profit into their management strategies, economics will continue to be a major factor in the decision-making process. And management projects designed to benefit a single species are usually among the least cost effective. Such projects can be difficult to justify, even when the target species is threatened or endangered. Wherever possible, we should prioritize those activities that benefit the greatest number of wildlife species. Thus, in expending dollars for sharptails, development of sharptail/waterfowl habitat planned for the Fish Lake Wildlife Area should receive preference over development of a sharptail management unit within the Brule River State Forest, even though both may be needed to obtain our habitat objective.

SUMMARY AND CONCLUSIONS

Sharptail numbers have progressively declined over the past 5 decades and recent evidence indicates that there may be fewer than 2,000 breeding sharptails in Wisconsin. Changes in natural vegetation and land use have caused sharptails to disappear from most of their former range. Although extinction of the species in the state is unlikely, the strong possibility exists that the birds may eventually be found only in those sites being managed for their benefit. Even if this "worst case" scenario does not occur and a few birds persist on private lands, we still must select and manage enough land to insure a viable sharptail population in Wisconsin.

Some progress has been made in dedicating lands to sharptail habitat preservation, with the number of management units increasing from 3 in 1950 to 16 in 1975. But a list of sharptail management areas is a poor indicator of species security, because sharptail areas have appeared and disappeared over the years. In fact, the history of sharptail management in Wisconsin provides ample evidence that dedicating a tract of land to sharptail preservation provides no guarantee of the future existence of the species on that property. Only when the program moves beyond the dedication phase and into actual land management will the species become secure.

A successful program of sharptail preservation in Wisconsin can perhaps best be viewed as the antithesis of wilderness preservation, because our choicest wilderness areas are the products of the least disturbance, while our best sharptail areas appear to be those that have been disturbed the most. Although designation of an area as wilderness often means the manager's work is finished, dedication of an area to sharptail preservation requires that a manager perform some real work. Grange (1948) equated sharptail management to "dirt farming," and that comparison is still valid today. Furthermore, just as the farmer's work is never done, neither is that of the sharptail manager. In the absence of natural fire, dedication of a tract to preserving sharptails involves a frequent, permanent commitment to habitat manipulation.

Because sharptail habitat maintenance is an intensive form of management, the amount of land that can be preserved for the species is limited. Discussions with wildlife managers experienced in the use of prescribed fire have suggested that prevailing labor and weather factors should permit controlled burning of up to 20,000 acres annually, which would equate to a management ceiling of 80,000 acres. But less than 25,000 acres of habitat are presently available on designated management units, and a habitat goal of 60,000 acres would require land acquisition or initiation of a habitat development program on private lands. Thus, a goal of 50,000 acres of sharptail breeding habitat appears to be a reasonable compromise between what we are doing now and what we might do under optimum conditions. Adoption of that habitat objective should provide a sharptail breeding population of at least 500 birds and fall populations exceeding 1,000 birds on managed sites. This objective requires that we:

1. Expedite habitat development on high priority management units to insure the continued presence of the species on those sites and to enhance our opportunities for future expansion of savanna habitats.

2. Expand the habitat development goals on sharptail management units given high priority and eliminate the sharptail objective on small, isolated units that fail to provide reasonable expectations of management success. Maintaining sharptails in areas such as Ackley, Dunbar, Spread Eagle, or Thunder Marsh appears to be hopeless.

3. Examine additional sites for suitability as sharptail management areas. Candidate sites on public lands having sandy soils should receive the highest priority in the selection process.

4. Encourage development of those management units that benefit the greatest number of wildlife species. Creation of waterfowl/sharptail habitat should receive preference over development of habitat designed to benefit sharptails exclusively.

5. Enlist the services of the sharptail advisory committee in recommending action and reviewing progress of habitat development on all designated management areas. The committee would serve as a recovery team in selecting additional sharptail units, prioritizing sites and activities, and improving the continuity of the sharptail management program.

6. Extol the virtues of prescribed fire to the public. We can continue to maintain our excellent fire prevention program, but the attitude that fire is evil and a destroyer of wildlife habitat cannot prevail if we hope to restore and maintain sharptail habitat in Wisconsin.

7. Establish prescribed burning teams, and remove unnecessary restrictions on burning to expand the use of fire as a management tool. It is inappropriate to apply the same set of rules to DNR use of prescribed fire and public use of burning because the DNR has a substantial investment in firebreaks, equipment, and manpower that permits burning safely under conditions that would be hazardous for the untrained or ill equipped. Fire is our most acceptable method of controlling succession and could be employed to a much greater degree within all of our wildlife areas. Individuals trained and experienced in fire use should provide the safest and most economical treatment of the desired acreage.

8. Enlighten the citizenry about the importance of savanna habitats in Wisconsin's history and the need to maintain part of that heritage not just for sharptails, but for our children and grandchildren to experience and enjoy. Our history is filled with examples of advocates rising up to defend a wildlife species whose existence is threatened by habitat loss. But who will speak for the sharptail?

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