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APPENDIX

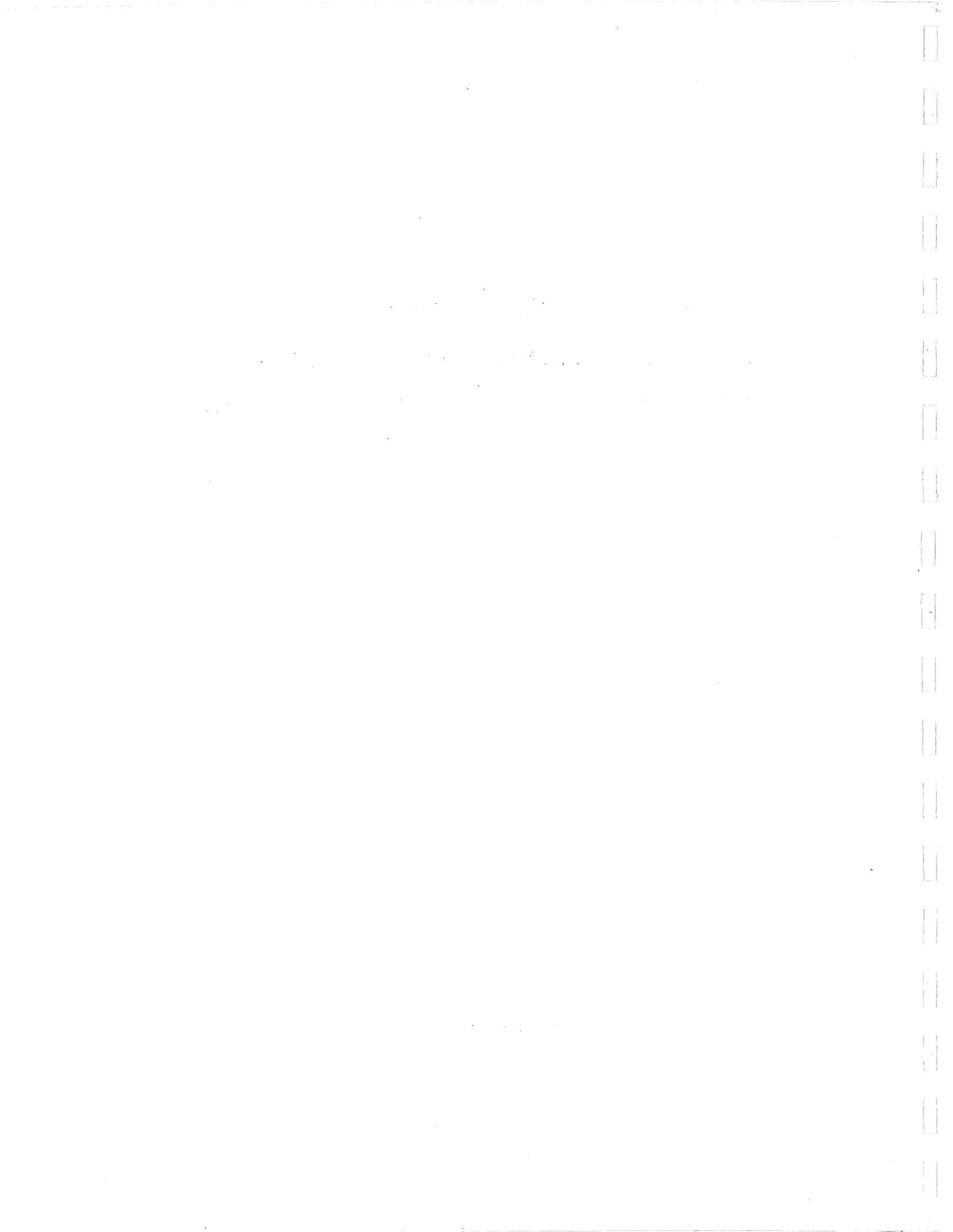
OFF-ROAD VEHICLE USE IN MINNESOTA

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APPENDIX I

OFF-ROAD VEHICLE
LITERATURE REVIEW

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I. Effects on the Environment

A. Soils

Little research has been conducted on the effects of recreational ORVs on soils. However, many studies evaluating the impacts of agricultural practices in soils have been done and these findings appear to correspond closely with the possible influences of ORV use on soils.

- Soil compaction and erosion are the major consequences of ORV use. Compaction, defined as "a change in volume for a given mass of soil due to mechanical or natural sources" (Barnes 1971) causes changes not only in the physical structure of soils but also in their chemical characteristics. A reorientation of the particles takes place, prompting soils to behave more as a plastic than as an elastic material. The amount of liquid greatly influences the compaction process and has both direct and indirect bearing on the changes caused by compaction in the bulk density, strength, temperature, air supply and nutrients of the soils. Finely textured soils such as clay hold more water than other soil types and are therefore less susceptible to compaction (Barnes 1971). Similarly, soils with high porosity are more compressible than those with low porosity. Bulk density and solid strength increase with compaction which in turn decreases soil permeability to water thereby reducing the soil's water-holding capacity. Thus, there is an increase in water runoff which can influence soil erosion.

Webb (1978) noted in his study of a California state ORV area that gravelly sandy loam, coarse sandy loam, sandy loam and clay soils all experienced increased soil strength and bulk density with a decrease in soil moisture.

Clay loam also increased in soil strength but had variably increased bulk density and no decline in soil moisture. Liddle (1978), in his study of vehicle tracks and pedestrian paths on sand dunes in North Wales, found that bulk density and penetration resistance are linearly related to the log of the number of passages of a car and of walkers. Cars cause a 30 percent greater increase in bulk density and a 100 percent greater increase in soil strength than do walkers. Also, water content of compressed soil in dry areas was greater than the adjacent undisturbed soil. Arndt (1966) noted a four-fold difference in soil strength between crop rows and traffic rows, illustrating the differences that bulk density has on soil strength. Similarly, Voorhees (1978) found that after 5 to 6 tractor passes bulk density increased by 20 percent in the 0 - 15 cm layer and 10 percent in the 15 - 30 cm layer with soil strength/resistance increased as much as 400 percent, significant 0-60 cm.

In addition to density and strength changes Webb (1978) noted increases in diurnal temperature fluctuations, a loss of organic matter and a decrease of soil nutrients in all 6 of the soils he studied. He observed a loss of vegetative cover due to compaction (and erosion) which decreased the thermal insulation of the soils. Soil moisture was thereby lost which in turn caused a rise in soil

temperatures. The decline in organic materials reduced the supply and availability of nutrients as well as lowered the soil's water-holding capacity. Liddle (1975) however, suggests that compaction is likely to increase the build-up of organic material. Barnes (1971) found that increases in both soil density and water content cause rises in thermal conductivity, diffusivity, and capacity. Similarly, he found that a decrease in the diffusion of nutrients occurs when there is a decrease in soil water content due to compaction. However, if water entry remains satisfactory and proper use of fertilizers are incorporated, moderate compaction is not necessarily detrimental to nutrient flow and plant growth.

Anaerobic conditions such as restricted oxygen transfer to microorganisms and roots due to reduced or destroyed pore spaces was noted by Barnes (1971) and Liddle (1975). Compaction may also alter the gaseous composition of soils if air porosity is reduced significantly.

Voorhees (1978) found wheel-induced compaction to be more persistent in individual soil structure units (clods) than in bulk soil. Wheel-tracked clods were more than 300% more resistant to crushing and had larger aggregate diameters. Although high-clod density can cause seedbed preparation problems both Arndt (1966) and Voorhees (1978) suggest that high-clod density can offer erosion control benefits. Deliberate pre-cultivation compaction is common in agriculture.

Another form of soil disturbance closely tied with compaction is shear damage which may, in fact, be more damaging than compaction. Slippage between the strata or particles in planes parallel to the soil surface occurs. Harrison (1976) and Wilshire (1979) note that tire-spinning, associated with off-road vehicles, causes both compaction and shear damage. "Paddle" tires used for hillclimbing in soft soil displace huge amounts of soil, are responsible for quarrying effects (excavation of underlying rock) and cause rapid denudation of ORV areas (Wilshire 1979). The skid-steer design steering method associated with all six-wheel ATVs causes more ground disturbance than any other steering method. Although the large balloon ATV tire with its low pressure minimizes compaction, shear is increased as tire pressure is decreased. In other words, the narrower the tire the less the shear damage but the greater the compaction stress.

Several approaches toward preventing or minimizing soil compaction and shear damage have been presented in the literature. Most researchers advocate management techniques that limit ORV access to non-fragile soils. Least-sensitive soil areas should be designated, use should be restricted to prepared trails, and an awareness of seasonal variation in sensitivity to use should be maintained (Wilshire 1979). Harrison (1976) offers several suggestions: do not run back and forth in the same tracks, avoid wheel spin, use large radius turns (less skid) and maintain tire pressures at recommended figures (pressures should be increased, however, on dry, fragile soils). He advocates better operator instruction and training to avoid soil damage. Barnes (1971) notes that because many of the

undesirable features of compacted soils are highly conditioned by their water content, water management on compacted and high-clay soils is very important.

Besides the effects of ORVs on soil compaction and shear damage, soil erosion and sedimentation are other major consequences of ORV use. In fact, the soils property changes resulting from compaction contribute to accelerated erosion (Webb 1978). Three types of erosion often result from ORV use: 1) direct mechanical erosion by the vehicles themselves, 2) water erosion of denuded areas, and 3) wind erosion of surfaces destabilized by ORVs (Wilshire 1979). In his study of 500 ORV sites in 7 western states, Wilshire found numerous cases of extreme erosion problems. In 3 years of motorcycle use at one site, the runoff exceeded that of the control area by a factor of 8, and sediment yield was 15,000 tons/km²/year in comparison to an amount too small to measure. Similarly, 7 years after closure the erosion rates at another site were still 50 times the natural rate. Webb (1978) found erosion severe at a California state ORV area particularly in coarse-grained soils on steep slopes.

In addition to the sites directly affected by ORVs, adjacent areas are also impacted by erosion and sedimentation due to excessive runoff/flooding, headwater gullyng, siltation of lakes, lowered water tables, lowered water quality, and wind action (Wilshire 1979, Hill 1948).

Various management tools and techniques to prevent or minimize erosion problems are available. The Universal Soil Loss Equation (USLE) has been widely advocated to aid in predicting erosion rates at a site under a given set of conditions (USDA Soil Conservation Service 1977, Wischmeir 1974 & 1976, Meyer 1975, Webb 1978). Although originally developed to predict losses from agricultural lands induced by rainfall, the USLE can be applied to ORV areas. The factors included in the equation are rainfall, erosion potential, soil erodibility, slope steepness, slope length, cropping/vegetation management, and erosion control practices. One source (USDA 1977) notes that the effect of snowmelt can also be incorporated into the equation in areas where the contribution is significant. Most of the factors can then be manipulated to determine trail sites that will erode at a minimum rate. Similarly, alternative erosion control programs at a given site can be compared and evaluated for their effectiveness in minimizing erosion. Soils with severe erosion potentials can and should be avoided with guidance from the information provided from the USLE.

The USLE was designed to predict long-term average soil losses for specific combinations of physical and management conditions. It is inadequate for determining losses during specific storms or in specific years. The equation also ignores the erosion caused by runoff from adjacent lands, and estimates only a part of the total water-induced erosion -- sheet erosion. Thus, sediment would be greatly underestimated in cases where processes other than sheet erosion produce significant amounts of sediment.

Anderson (1951) recommends using H.E. Middleton's "Dispersion Ratio" and "Erosion Ratio" methodology which uses percentages and ratios of colloid, moisture equivalent, suspension and ultimate silt plus clay in determining soil erodibility.

While the USLE is used for developing an erosion management plan, specific types of control practices are available for implementing the plan. Much of Amimoto's (1978) handbook, which outlines the procedures involved in assessing the need for an erosion control plan and preparing the plan, addresses the various types of control practices using natural and/or manmade materials. The USDA report (1977) also lists management practices, their appropriate uses and installation instructions.

Establishing and maintaining a vegetative cover is generally viewed as the most effective way to minimize erosion (Amimoto 1978, Webb 1978, Anderson 1951, USDA 1977, Meyer 1975). This is important also for areas that have been modified by ORVs but are now closed to use. Anderson noted that by increasing cover density from 31% to 47%, erosion was decreased to 44 percent of the original rate. Applying mulches and chemical soil stabilizers to disturbed or potentially disturbed areas minimizes erosion. Mulches also provide a seedbed for encouraging vegetative cover.

Water diversion or retention (catchment dams, conduits, open channels, dikes), windbreaks, grade stabilizers (check dams), debris basins/sediment traps, and energy dissipators are other possible erosion and sediment control practices. In the event that erosion measures are not adequate, sediment control measures must be developed to intercept and remove sediment from the watercourse as close as possible to the source (USDA 1977). Individual site characteristics will dictate which practices are most appropriate.

Webb (1978) and Wilshire (1979) advocate closing trails before the soil mantle is removed, or also remove the soils and stockpile it for later replacement. Importing soil may be necessary if trails are already eroded to the bedrock. Other preventive/control measures include maintaining an awareness of seasonal variation in soil sensitivity to use, careful design of trails with use restricted to those trails, and minimizing exposure of bare soils in both time and space to adverse climatological conditions (USDA 1977, Wilshire 1979). For most soils Wilshire advocates using the Soil Conservation Service's 20 percent maximum slope criteria to avoid severe erosion hazard.

Booth (1941) suggests that algae provide a natural erosion control mechanism. For example a protective algal crust often forms on sandy, wind-blown soils during wet seasons and may completely hold soil against blowing. If the crust is not disrupted it can provide an important erosion barrier until abundant ground cover is established. However, the crust is often broken and then easily undermined.

Jaquish (1978) and Rasor (1976) provide examples of two areas where ORV use and management and control practices work hand in hand. The goals of both environmental protection and satisfying ORV recreation are being met. Moto-Mecca, a strictly off-road style "motorcycle farm" in Pennsylvania, is a private park on abandoned farmland where protection of the environment is combined with fun and profit. Before it opened, environmental protection controls were developed. Trails are regularly groomed and stabilized. "Controlling erosion is most important to us. Trails with gullies discourage riders.....Cyclists say it's the best thing that ever happened to them" (Jaquish 1973).

As a result of an innovative funding program the State of Washington has access to money for developing positive management techniques to encourage ORV use while overcoming environmental problems. In addition to monies received from ORV registrations, 1 percent of the tax revenues collected from gas used by ORVs is deposited into the outdoor recreation account of the state's general fund. Environmental safeguards that depart from conventional trail construction methods are built into the 700 mile ORV trail system. Although the safeguards are expensive, trailbikers do not object because they result in fine facilities and satisfying recreation. "Not only do trailbike enthusiasts desire a quality experience, they deserve one, and are willing to pay for the opportunity" (Rasor 1976).

B. Vegetation

Impacts to vegetation caused by ORV use fall into two classes, direct damage due to mechanical compaction, uprooting and shearing of plants and indirect damage from soil disturbance such as undercutting of root systems by erosion, creation of new erosion channels by accelerated run-off and wind erosion, burial by debris, and changes in the physical structure as well as reduction of the biological capability of the soil. Soil compaction and erosion were discussed in detail under soils and will only be addressed here in relation to specific impacts on vegetation. Although some research directly addresses the effects of ORV use on vegetation, similar to soils, most of the literature available is related to agricultural practices or snowmobile use.

Direct impacts of ORV use on vegetation are localized but can be significant if not limited to designated areas. Wilshire observed that motorcycles are capable of opening broad trails through moderately dense chaparral nearly 2 meters high, clearing 1 hectare of land per 77 kilometers of travel. Four-wheel vehicles open trails through dense chaparral up to 4 meters tall, clearing 1 hectare of land per 23 kilometers traveled (Wilshire 1978). In an agricultural study, Fribourg reports that foot stamping to simulate wheel pressure resulted in death to pearl millet plants of 5, 10 or 15 centimeters in height (Fribourg 1975). Westoff maintains that the extent of damage depends mainly on the capacity and vulnerability of the ecosystem. Flat areas with stable, more compact soil such as moorlands are more resistant, whereas loose sandy soils and sand dunes are extremely vulnerable to trampling (Westoff, 1965). Westoff also notes that periodic trampling may be beneficial to vegetation

because it may encourage the growth of ecologically specialized species of interest.

An experiment involving snowmobile traffic showed that alfalfa stands were seriously damaged in areas of light and variable snowfall (Walejko 1972). However, most of the snowmobile research concerns indirect impacts to vegetation.

Vegetation is indirectly impacted by physical and biological changes in the soil. Restriction of root growth and seed germination in individual plants due to increased soil strength coupled with a loss of nutrients and water in the soil due to erosion and increased runoff result in harmful effects to plant activity. In addition, the removal of vegetation causes thermal changes in the soil which effect plant growth.

Several studies have been conducted to determine the effect of soil compaction on root growth. In a study of corn seedlings grown in Colo clay soil and sand, Phillips concluded that soil compaction (and not aeration) reduced seedling root growth through mechanical impedance when seedlings were grown at a constant temperature (Phillips 1962). Barley found that soil strength had an important influence on the penetration of clods by wheat and peapod roots over a range of values commonly exhibited by moist loams (Barley 1965). More specifically, Blake observed that alfalfa roots on non-packed soil plots displayed a more effusive distribution of fine roots among the main root branches at all depths than those on packed plots and that taproot branching in the surface 30 centimeters was more evident in samples from packed than non-packed soil plots (Blake 1976). Veihmeyer notes that the soil density above which roots do not penetrate is not the same for all soils, but that no roots were found at densities equal to or above 1.9 (Veihmeyer 1948).

Soil compaction limits plant activity indirectly by limiting the capability of roots (as shown above) and by decreasing the insoak of rainwater, trapping nutrients such that they are unavailable to plants and allowing nutrients to be washed away with run-off. In addition, because soil compaction decreases root development, any factor which slows down the ability of roots to absorb moisture and nutrients (such as temperature change) and to oxidize food sources for continued activities hinders plant survival (Barnes, 1971).

This is supported by Grimes in a study of the influence of soil strength on corn and cotton root development and water extraction. It was found that in low-strength Panoche soil, water extraction was linearly related to soil root proliferation at any depth. In the higher strength Hanford soil all water from the surface foot of soil was depleted and water removal from the second foot was disproportionate to rooting intensity. Grimes concluded that damage to vegetation from high soil strength can usually be attributed to reduced water and nutrient supply (Grimes 1972).

A study by Eck on the effects of fertilizer on restoring the productivity of Pullman silty clay under various degrees of soil removal, also supports the importance of the availability of

nutrients. In greenhouse experiments, it was found that applications of nitrogen and phosphorous to soil horizons up to 38 inches below surface produced yields equivalent to surface soil in all but the 13-19 inch layer of soil. Similar applications of fertilizer in the field over a period of three years in areas where 4, 8, 12 and 16 inches of soil were removed produced yields that were 107.4 percent, 100.1 percent 96.6 percent and 79.6 percent of the yields obtained in undisturbed areas respectively. Eck noted that in determining permissible depths of topsoil removal, physical condition of the exposed subsoil was important. If the soil is of coarse or medium texture few problems are anticipated, but if a high percentage of clay is present serious problems can arise. (The clay content of exposed soil in this study was 40 percent and had apparently little affect on yield.) (Eck 1965).

Soil temperature is another indirect impact to vegetation, however, little factual information is available on the effect of temperature on plant activity (Barnes 1971). Independent studies of snowmobile traffic on alfalfa and bluegrass by Foresman and Walejko indicated that snowmobile traffic affected vegetation by reducing insulation afforded to underlying grass by snow cover. Forseman observed soil temperature reductions of 2 - 3oC in track versus non-track areas. (No soil compaction was reported in either experiment) (Forseman, 1976, Walejko, 1973). In a study of the effects of vegetation removal on the microclimate of sand dunes, Liddle reported the presence of a dynamic interaction between the effects of vegetation removal, temperature, soil moisture and compaction. The effect of vegetation removal in areas without soil compression was to increase soil temperature by a range up to 15oC. This effect was reduced or eliminated in areas of soil compaction (Liddle 1974).

The overall effect of the above findings is a reduction in the regrowth of vegetation. In studying the effects of tractor, forage chopper, and loaded wagon traffic on summer annual grasses, Fribourg discovered that dry matter regrowth of sorghum and pearl millet were decreased by traffic. Reduction of 15 to 20 percent, often 30 percent and on occasion 50 percent were observed. The greatest reduction could be attributed to the first wheel passage; additional traffic had less effect (Fribourg 1975).

The management tools recommended for soil maintenance would also apply as mitigation for vegetation impacts. In addition to those techniques previously mentioned, Wilshire suggests that hillclimb be reduced by constructing switch back trails as a measure to reduce erosional impacts and that non-erodible structures or surfaces be installed on the trail to reduce bare soil exposure (Wilshire 1978).

C. Wildlife

Most studies addressing the influence of ORV use on wildlife have focused on snowmobiles. Some of the information, however, may be helpful when assessing the impacts of (other?) ORV's on wildlife.

Mechanical compaction by snowmobiles increases the density and the temperature of the snow mass which affects small mammal activity and survival (Jarvinen and Schmid 1971, Schmid 1971, Schmid 1972). The studies, conducted in Dakota County, Minnesota, indicate a marked increase of winter mortality in small animals beneath compacted snow. In heavy use areas snow densities were so high that it was doubtful if any animal movement could occur at the snow-ground surface. The compaction also creates a high resistance to penetration, thus prohibiting snow roosting by birds. Increased snow hardness, however, could favor surface movement of deer, fox, and other larger mammals. In single snowmobile trails the densities were higher than on unused snow which could curtail animal movement in the subnivean space. Subnivean air spaces formed by vegetation supporting overlying snow are also often destroyed under snowmobile trails. In addition, there is the possibility that air beneath packed snow may become toxic because of abnormal carbon dioxide accumulation.

The insulative quality of snow cover is reduced due to the decrease in snow depth caused by snowmobile packing. Thermal conductivity is thereby increased. Depth reduction and increased thermal conductivity are the major causative factors of destruction of mild climate beneath packed snow; subnivean organisms are subject to greater temperature stress which may cause mortality.

Adams (1975) studied the effects of lead and hydrocarbons from snowmobile exhaust on brook trout in a Maine pond. Three weeks following ice-out, lead content in fish held in cages was 15.7 times those of control fish in 1972 and 8.8 times in 1973. These levels are up to four times the Canadian limit for lead in fish food (no U.S. Public Health standards set as of 1975). Similarly, hydrocarbon levels, which were undetectable prior to snowmobiling, were 1 ppm in exposed fish after snowmobile use. Trout held in aquaria for three weeks in melted snow containing exhaust concentrations also showed lead and hydrocarbon uptake -- 3.3 times more lead than the controls and a 0.1 to 1.0 ppm hydrocarbon reading, compared to 0 ppm in control fish. Stamina tests (the ability to swim against a current) conducted after three weeks in the aquaria showed mean swimming time for exposed trout was reduced to about half that of the controls. Adams suggests that reduced stamina would possibly be more severe under field conditions.

D. Water

As is the case with wildlife, most of the research conducted on the effects of ORV's on water quality and quantity focus on snowmobile impacts. In addition to monitoring the effects of lead and hydrocarbons on trout, Adams (1975) noted the influence of snowmobile exhaust on water quality. Although the amount of fuel burned in his study is unrealistic for all but a few small lakes in well-populated areas, his findings are noteworthy. He stressed that the increased use of out-board motor activity in summer combined with the increased snowmobile use in winter could significantly raise lead and g/hydrocarbon levels. The cumulative boat and snowmobile effects must be considered.

Pond samples showed an increase in lead content from 4.1 ppb before snowmobiling to 88 ppb in 1972 and 135 ppb in 1973 at ice-out, well above the U.S. Public Health standards of 50 ppb for drinking water and the American Fisheries Society recommendations of 10 ppb for fish life. In 1972, 9 to 15 ppb of lead (three times normal) persisted for three weeks in surface and seep samples, while in 1973 lead levels dropped, reportedly, within 72 hours after ice-out and returned to normal after six days. An oil slick was visible around the edges of the pond for about one week after ice-out each year. Hydrocarbon levels increased for 0 ppm prior to snowmobiling to 10 ppm at ice-out.

Hogan's study (1975) of an area frequently traveled by snowmobiles in the Mohawk Valley of New York assesses the impacts of snowmobiles on water quantity. He found that water storage of snow compacted by snowmobiles is 1.3 to 2.3 times greater than undisturbed snowpack. The greater the number of traverses, the greater the water content. As snowmelt progressed he noted the relative amount of water in the snowmobile trails increased as compared to that in adjacent undisturbed snow. Although this increase may be trivial in the northeastern United States, in arid areas where blowing snow is common and evaporation of snowpack often exceeds infiltration, this increase may be beneficial; it may enable strips of vegetation to begin growth in the tracks. According to Hogan a more important result of snow compaction is the time delay in melting to zero snow cover. This delay is very beneficial because it provides a persistent cover which protects steep often unvegetated areas until after maximum runoff has passed.

Harrison (1976) found that water pollution is a problem only with all-terrain vehicles (ATVs) and then only if they are used extensively on still, inland waters. Accelerated erosion due to ORV use may cause water pollution.

E. Noise

Noise impacts to consider in relation to ORV use are noise level increases in the vicinity of vehicle operation and the effects of ORV noise on humans (operators and bystanders) and wildlife.

Before delving into the noise literature a brief discussion of noise level measurement is provided. Sound levels presented below are reported in dBAs (a measurement designed to simulate the human hearing mechanism's frequency response.) The detection of sound is dependent on the frequency (pitch) and level of noise emitted, distance, the path from source to receiver (atmospheric conditions, vegetation and other competing noise sources) and the level of sensitivity of the receiver. Spherical divergence causes sound pressure to decrease with distance at a logarithmic rate, such that the sound pressure level measured at distance x will be 6 dB lower than that measured at $1/2 x$. Transmission of outdoor sound is modified by absorption in air molecules and to a less significant degree by precipitation, wind and temperature gradients and the presence of trees, grasses and shrubs (Harrison 1974, 1975).

Noise Level Increases Background Information

Experiments conducted by Harrison (1975) at Wayne Hoosier National Forest in Brownstown, Indiana measured the effects of jeep and motorcycle operation on the ambient (background) noise distribution in the immediate vicinity of ORV tracks, and the distance under normal forest conditions at which this noise could be detected. Traffic levels tested (94 to 204 vehicles per hour) were in excess of normal usage expected on the trail. The noise affected zone (area in which ambient noise level was increased) caused by the range of jeep operations was found to be 250 to 500 feet on either side of the test track. (For instance, ambient noise levels increased by an average of 3 dBA at 100 feet from the track.) For motorcycles, the noise affected zone was approximately twice as wide. This is due to the fact the motorcycles are louder than jeeps when operated at their maximum level of power, and motorcycles are normally operated closer to their maximum. Doubling traffic led to an average increase of two to three dBAs.

Detectability measurements were taken under average and quiet forest conditions. As would be expected, at any given distance, a higher percentage of vehicles on the track could be detected under quiet conditions than average conditions. Detection was also affected by whether the test track was level or hilly (causing the vehicles to be operated at higher power levels). At an average listener location no more than five percent of vehicles on an ORV track were detected at distances greater than or equal to 1/2 mile from the track. The maximum distance that a vehicle could be heard ranges from 4,500 feet for jeeps run on level ground to 7,500 feet for hill climbing jeeps and motorcycles.

The impact of ORV noise on humans is a factor of setting and health. In urban and suburban areas, detection of noise is sufficient to cause significant annoyance. In a wilderness setting a much lower noise level is likely to cause considerable annoyance in any given person, even for those who accept this noise in the city. (Conflicts arise because motorized recreationists enjoy the same wilderness feeling as non-motorized recreationists.) In recreational areas noise levels are more of a factor than detection. Forest Service technicians at Oregon Dunes National Recreation Area reported that a dune buggy noise level of 85 dBA at 50 feet was considered acceptable (Harrison, 1974, "Off-Road Vehicle Noise - Effects on Operators and Bystanders".)

Health effects caused by ORV noise are divided into non-auditory and auditory effects. Non-auditory effects, which have been ascribed to noise levels lower than that necessary to cause hearing damage, include: cardiovascular, digestive, and neurohumeral disturbance. It is unclear as to whether these physical symptoms are caused by the noise itself or annoyance and distress due to noise (as in the case of sleep interference reported in urban areas). Literature indicates the latter to be true, with the exception of the startle response which is confined to spectators (often times unwilling spectators) and is most likely to occur in a wilderness setting. Non-auditory health hazards are probably limited to spectators and bystanders and

can be significant under certain circumstances. It is difficult to determine what level of noise will cause non-auditory impacts since the level of annoyance associated with noise differs with each individual (Hanson 1974).

Auditory effects can be discussed in terms of spectators and bystanders, and operators and passengers. In most cases noise reaching the former will not be great enough to cause hearing damage, with the exception of organized track meets. Measurements taken at Ascot Park, California indicated that spectators at the finish line would be subjected to noise levels of 90 to 120 dBA (Harrison, 1974).

There is no question that ORV noise can cause permanent hearing damage to both operators and passengers. Permissible exposure times calculated based on Occupational Health and Safety Administration Regulations are shown on the following table.

Permissible Exposure (Hours/Day) Vehicle Type	Vehicle Sound Level		
	Quiet	Average	Loud
ATV's	3.2	1.9	0.5
Snowmobiles	1.2	1.1	0.9
Motorcycles	4.5	2.6	0.4
Dune Buggies	6.0*	3.0*	0.0*

*estimated

As indicated here, exposure varies depending on how noisy the individual vehicle is. Riders which alter their vehicles such that they become noisier are at higher risk to noise hazards. Motorcycle helmets are not effective as hearing protection (Harrison, 1974).

Studies carried out to determine the impacts of ORV noise on wildlife have thus far been inconclusive. There have been no serious proposals concerning adverse effects of ORV noise on plants.

Methods for minimizing the impacts of ORV noise suggested in the literature include selection of track location, buffers and vehicle inspection. ORV tracks on public lands should be carefully located to minimize potential impacts to adjacent residential areas or other sensitive land uses such as schools and hospitals. Sound buffer strips are recommended to mitigate this type of disturbance.

In addition, Nicholes recommends an inspection program to enforce specific noise standards within a park. Using MIC/E-76 test equipment, an enforcement officer would measure vehicle noise levels at the tailpipe. If the noise level recorded fell above that allowed for park use, the operator would not be permitted to use the trails. A suggested standard for this test would be 105 dBA by MIC/E-76, equivalent to the California standard for ORV noise of 85 dBA at 50 feet (Nicholes, date unknown).

II. Impact of Use on Public Lands

A. Social Implications

Although relatively little has been written regarding the biological and physical impacts of off-road vehicles on the environment, even less attention has been given to the social implications of ORV use. The studies that have been conducted show that significant conflicts exist between traditional, non-mechanized outdoor recreational activities (hiking, backpacking, camping, bicycling, canoeing, ski touring, horseback riding, fishing, swimming) and mechanized activities. Oftentimes these conflicts lead to the displacement of the traditional activities by ORVs'.

Within the past 15 years ORV use has grown explosively. Simultaneously, the conflicts they arouse have increased and introduced new problems. Badaracco (1976) examines the breadth and the depth of the conflict and displacement issues and offers some suggestions to help reduce the problems between ORV and non-ORV users. His literature review indicates negative feelings, often intense, toward ORV activities by other outdoor recreationists. None of the studies show positive reactions. Those who object to ORV's view them as "undesirable and unnecessary from both a societal and from an environmental point of view." In addition to disturbing soil, vegetation and wildlife, the non-ORV's fault the mechanized users for the increase in theft, property damage and vandalism found in association with ORV's. However, noise is one of the most often cited sources of discontent and emotion. Most of the studies note adverse psychological effects of ORV noise upon the other recreationists who seek quietude and solitude in the outdoors. Badaracco suggests that noise "strikes at the deep concerns of many modern day individuals whose expectations continue to focus more on the quality of life."

Mechanized recreationists, on the other hand, see ORV's as fun and desirable with beneficial aspects such as prompting social interaction, providing opportunities for people of all ages to utilize the outdoors, and encouraging a positive economic impact through vehicular sales and use. Noise tolerance by ORV's is high -- "the high pitched, sputtering, two-stroke staccato evokes positive satisfactions." ORV's advocate that public recreation agencies have a responsibility to provide opportunities for off-road vehicle use.

These two directly contrasting points of view thus can and often do result in intense emotional conflict - "someone who has spent time, money, effort to get away from the hubbub of the city in order to hike is not going to be very tolerant of trail bikes." Similarly, the studies in the Boundary Waters Canoe Area in Minnesota found that even though motor use was slight, motorboaters substantially detracted from wilderness satisfaction and perceptions of non-motorized boaters -- "even nearby logging activities were looked upon less negatively than motorboats."

Throughout his literature review Badaracco found documentation of hostility on the part of non-mechanized users toward mechanized recreationists; however, the reverse is not true. He labels this as the "one-way effect." While non-ORVer's contend that their satisfactions are directly impaired by the presence of mechanized uses, ORVer's expressed little or no inherent impacts by other recreationists upon their activities. Thus, "it is a one-way conflict; the mechanized users do not dislike the non-mechanized users," quite often they are even oblivious of the person on foot. It is suggested that "the one-way nature of the conflict probably helps to explain the lack of understanding between conflicting groups."

Since ORVer's and non-users both require space to conduct their activities most studies found that much of the hostility between the groups stems from spatial conflicts. Traditional recreationists, who seek solitude, freedom and serenity often require vast amounts of space to satisfy these values. It is these values, however, which are most vulnerable to crowding. Mechanized users require area to simply carry on their activity and to provide varied terrain in which to enjoy their machines. In addition, evidence shows that ORVer's value the sense of freedom gained from their vehicles and the ability to unhamperedly explore large remote areas. One study concludes that "groups causing the greatest amount of conflict seem to be those that require fairly large land or water area for their activity, make use of private land, and do not have designated areas for their sport."

Badaracco suggests that that outdoor recreational conflict is spatial (physical or attitudinal space is violated) and extensional, in that another has extended himself into that space. Extension is either direct (a person on a trailbike) or indirect (litter, tread marks, lingering smell of fumes, distant sounds, dust plumes). Thus, he concludes that "the magnitude of the off-road recreational vehicle problem lies in the fact that the off-road vehicle user can extend himself so pervasively into the physical and attitudinal space of virtually all other out-door recreationists [by his mobility, conspicuous sights and sounds, and physical impacts and traces left behind] ... the off-road vehicle is, in effect, a multiplier of man."

Another concept Badaracco points out is the Impairment-Suppression-Displacement (ISD) Syndrome. Impairment of non-ORVer's satisfactions by mechanized uses can lead to suppression or reduction in participation by an annoyed recreationist at a given site which in turn may prompt displacement or total abandonment of a site once the annoyed user determines that his frustrations outweigh his satisfactions. Badaracco believes this process is quite common at both the specific site level and in terms of the broader, national outdoor recreational trend. The ISD Syndrome, however, is ironic in that administrators and managers tend to measure recreational demand on the basis of current participation rates. In failing to talk with users who have been displaced, officials often misinterpret public recreational demand and may plan additional sites or programs for the prevailing activity. The administrator, thereby, perhaps unwittingly, assists in the suppression and displacement of additional traditional uses. "Enough managers following the same

course could well set into motion recreational evolutionary processes which change the character of outdoor recreation despite the intense feelings of a broader public."

If the ISD process is indeed a reality, Badaracco advocates that planners and managers must cope with problem situations in light of this reality and with an understanding of the spatial-extensional dilemma. Although the long-term consequences of the conflicts are not apparent or understood they are "significant in terms of future trends in use and management of outdoor recreation." The use of further resources should be allocated "on the basis of a true understanding of public recreational demand, not just participation rates." The "general public" must be sought out honestly, objectively and routinely through polls and surveys to determine its views and needs. Such information must be incorporated into the resource decision-making process.

Most of the studies reviewed by Badaracco conclude that "management controls involving some form of segregation or zoning are necessary to minimize conflicts and maintain satisfactions of all outdoor recreationists." Spacing -- separate trails, separate areas -- is needed. Public acceptance of such actions is evident given the overwhelming support of the President's Executive Order of 1972 which set forth guidelines for ORV use on Federal lands by prescribing that trails and areas be located so as to minimize conflicts between ORV use and other existing or proposed recreational use. Similarly, citizen pressure convinced San Bernadino and Riverside Counties in California to pass ordinances forbidding ORV use on private land without permission from the owner. Likewise, protests from citizens about dust, noise, trespassing, damage, etc. due to ORV's in San Mateo, and Ventura Counties (California) and the city of San Diego prompted the passage of ordinances limiting the use of ORV's in the respective jurisdictions.

In 1974, 405 professionals and experts used the Delphi Study Technique to predict future leisure environments in America. By 1980 they predicted that all ORV use would be restricted to designated areas, by 1985 maximum noise levels would be established, and by 2000 "only travel systems that have a minimal physical and visual impact will be allowed in wild and recreation environments."

The reactions of campers and motorcycle riders to separate areas for ORV use were studied by Fillmore and Bury (1978) at Land Between the Lakes National Recreation Area in Kentucky/Tennessee. Two motorcycle riding areas were developed near two of the three major campgrounds such that no audible disturbance was created in the campgrounds. The campers' rankings of the disadvantages of having a riding area in or near a campground echo Badaracco's findings: noisy (outnumbered the second ranked disadvantage by 5 to 1), out of place in a natural setting, frightening to animals, dangerous to spectators, dangerous to riders, dusty, harmful to vegetation, visually distracting, and too much smoke and fumes. The campers' ranked advantages of having a riding area include: keeps riders out of other places, safer for campers, safer for riders, fun, good form of recreation, convenient to the camping area, well designed, outdoor setting desirable for

cycling, and cycling is challenging. Fillmore and Bury found that "none of the non-riders found the riding areas undesirable enough to prevent their coming to the campgrounds ... most felt the riding areas desirable because users rode there rather than in the camping areas." Similarly, two thirds of the respondents felt that a regulated riding area would make their stay more enjoyable. Nine-six percent of the campers considered an established motorcycle area a good way to handle the problem of cycles in campgrounds. However, in regard to preferences, 15 percent of the respondents preferred all riding to be prohibited, 75 percent preferred nearby areas with no riding on campground roads allowed, 5 percent preferred that no area be provided but campground riding allowed, and 5 percent were undecided. Fillmore and Bury therefore suggest that "conflicts between campers and cyclists were reduced by providing motorcycle riding areas adjacent to campgrounds. Campers with motorcycles enjoyed the ready access to riding areas and non-riding campers approved the reduction in motorcycle riding on campground roads and trails." The authors present an extensive list of recommendations aimed at strengthening satisfactions and widening the range of recreation opportunities. While most of the 22 recommendations address actual design criteria for ORV areas and trails (width and types of trails, varied terrain, adequate area size for trails and buffer zones [about 30 acres]) some of the recommendations offer strategies that relate more directly to reducing conflict between the two opposing groups: 1) Riding areas should be screened both visually and audibly from adjacent campgrounds, with at least 500 feet between the trails and the nearest campsite (distance may vary according to topography, vegetation and prevailing winds). 2) Exhaust noise should be regulated not only at the factory and the dealership but also in the field. 3) Enforcement will probably be required. Providing riders with easy access to publications explaining rules and regulations could help minimize unacceptable behavior by riders. 4) "Communication should be encouraged between riders and campers to minimize potential conflicts ... a) involve campers as well as riders in the planning of riding areas and the development of operating rules, b) inform campers of reasons for providing cycle areas [less noise and disturbance in the immediate camping area], and c) offer motorcycle lessons to interested non-riding campers."

A book by Helmker (1974) demonstrates the vast increase and breadth in the appeal of newer and more advanced ORVs. Her work provides information on all-terrain vehicles (ATV's), offering tips, rules, and suggestions for "the enjoyable use of these unique motor vehicles." Due to their great diversity, ATVs have recently become one of the more popular ORV's in the United States. As Helmker puts it "they enable one to go further into areas never traveled by any vehicle before. In all kinds of weather and climate they bring the pleasure of a thrilling ride ... they can be used in all parts of the country and in all seasons [adaptable both to land and water]." Helmker suggests that recreation is a basic pursuit guaranteed by the Constitution through the concept of the "individual's free pursuit of life, liberty, and happiness ... Modern man is constantly seeking many forms of escapes from the world he has to work in." ATV's

provide such an escape and help close the gap in the need for new recreational innovations in our rapidly changing society. These vehicles can travel up to 40 mph on flat surfaces, can climb any 45° angle, and can "spin in circles until you're dizzy." The five gallon gas tank "will take you 100 miles into the wilderness or occupy a whole day's adventure." Helmker further stresses her point of the desirability of ATVs by including a quote from Popular Science: "I see an ATV as a kind of floating armchair that wisks you through the roughest country without so much as getting your feet wet. You're in the forest, swamp, lake or whatever, but not part of it unless you step off your protective island. It's like being able to join an adventure picture on TV." Helmker, however, does not address the possible problems or conflicts associated with ATVs.

Note:

Badaracco, Robert J. "ORV's: Often Rough on Visitors" Parks and Recreation 11(9) 1976 is exactly the same as Badaracco, Robert J. Conflicts Between Off-Road Vehicles Enthusiasts and Other Outdoor Recreationists -- the ISD Syndrome May 1976.

Smith, G.S. "Eureka Sand Dune: A Case Study of Frustrated Scientists." 1978. Still on request form the Forestry Library, University of Minnesota, St. Paul Campus.

III. Management Techniques and Alternatives

A. Education

Relatively little has been written on educating off-road vehicle users, non-users, and land managers of the effects of ORV's on the environment and how the impacts can be avoided or minimized. It seems that much of the information is written from the perspective of non-ORVer's for planners and managers. Bennett (1973), however, offers a functional and practical guide strictly for ORV operators. His goal is to explain the potential environmental impact of off-road motorcycles to their users and suggest ways in which it can be reduced or avoided. Bennett believes that "education works ... If you have an understanding of what your impact is on your environment it should be easier to hold them to a minimum." Bennett points out that it is in the rider's best interest to try to understand and minimize negative interaction with nature. Much of the land used for riding is public land. Damage to public land will raise some valid objections to rider's presence and thereby encourage the placement of restrictions on ORV use that would otherwise be unnecessary. Since public lands are open to other recreationists it behooves the ORVer to understand the environmental needs and impacts of the other users so that cooperation can be established and maintained. An optimistic approach towards other users is vital.

Throughout his monograph Bennett stresses the need for developing communication channels and cooperation between ORVer's, non-ORVer's conservationists, resource and recreation planners and managers, and legislators. Nicholes (1978) also advocates better communication, cooperation and coordination between these groups. However, he places the responsibility for initiating lines of communication on non-vehicle users. "The greatest hurdle the non-participant has to overcome in the communication process is to recognize the motorized recreator as pursuing a legitimate form of outdoor recreation." He believes the various groups should work together to put into perspective the needs and desires of ORVer's, to "seek the enactment of responsible legislation and regulations to provide money, programs and competent personnel to carry out positive solution-oriented programs dealing with motorized vehicles," and to develop an education program "to teach users an awareness for the environment, for other users of the resources and for their own safety as they travel within the resource." Bennett provides a listing of conservation organizations and encourages ORVer's to consult with them. He believes that without communication the opposition will only grow stronger and attitudes and policies toward ORV use will only worsen. He encourages riders to organize clubs through which communication channels can be established.

Bennett discusses specific environmental impacts from ORV use. Some impact is inevitable, thus, the question is "not whether the trail bike has an environmental impact, but where and what kind." Impacts can be minimized by either riding in an appropriate place or by riding in an appropriate way. Soil compaction, displacement, erosion, soil vulnerability, and vegetation and wildlife sensitivity are discussed and techniques to minimize such impacts are presented.

Bennett believes that common sense is the best guide for reducing impacts. By sticking to designated trails and avoiding wet soils, loose soils, steep slopes and needless wheel spinning potential impacts can be greatly lessened.

Noise is often cited by non-users as the most annoying of all impacts. Bennett encourages cyclists to reduce noise, and thereby avoid conflicts, by riding the quietest machines possible, making manufacturers aware of the preference for quieter ORVs, and by using peer group enforcement.

Being prepared for riding by wearing appropriate clothing and carrying tools and spares will not only make riding more enjoyable, but more importantly, according to Bennett, will allow the rider to give more thought and effort to preserving the environment.

In determining where to ride trailbikes and other ORV's Bennett suggests that areas such as dirt roads, old logging roads, disused railroad rights of way, unreclaimed strip mines, and power lines - areas that have already been altered by man -- be used for ORVs. Always request permission to ride on private lands. If owners are concerned about liability attempt to make agreements releasing owners from responsibility or encourage the legislature to rewrite the liability laws. All public lands except national parks and wilderness areas are open to ORV use. However, Bennett urges riders to check for regulations for specific areas and to inquire about state lands for ORV use.

A large part of the guidebook is devoted to regional considerations, -- some of the special problems that trail riders will find in their own areas. The section on the Midwest concentrates on the Ohio/Indiana area.

Dorman (1982) discusses another approach toward educating ORV users of the operation of their vehicles on public lands. In 1976 the managers of the White Cloud District of the Huron-Manistee National Forest in Michigan developed guidelines and ORV regulations that defined conditions under which an ORV could be operated. However, much of the off-road activity violated the ORV order. Thus, by 1979 an information and education (I & E) program was initiated to facilitate and enhance public acceptance and compliance with the ORV order. After one year the managers questioned the effectiveness of the program; illegal ORV use continued and awareness of regulations appeared to be minimal. Dorman evaluated the I & E program and offers recommendations for designing and implementing an effective program. An I & E program should strive to promote better public understanding of why regulations exist so that ORV users will gain a more positive attitude towards the regulations. This is best achieved through a communications framework.

Observations suggested that congestion at the White Cloud ORV areas was not a problem yet illegal riding still occurred. "If ORV users avoid legal sites because they are concerned about crowding, such perceptions could be changed [through an I & E program] and possibly reduce noncompliance."

Dorman found that the majority of off-road riders were aware that regulations exist but had limited specific knowledge about the regulations. Seventy-three percent of the riders felt that other riders were complying with regulations and more than 40 percent thought advertisement of ORV areas was poor. Thirty-nine percent of the riders received information about ORV sites and regulations through word of mouth, 27 percent from USDA Forest Service outlets, 15 percent from ORV clubs, 15 percent from mass media, and 4 percent from miscellaneous sources. A major problem with the White Cloud District I & E program was the lack of overlap between the media that the Forest Service used to disseminate information and the media that the target audience usually used. The more popular media used by ORVer's should be used to distribute information and media outlets within a 100 mile radius should be saturated. Even though most ORVer's live within 100 miles of the district, they do patronize large urban media outlets. These outlets should also be used to disseminate information. Public air time on radio and television can be used effectively.

The district managers had little or no personal contact with ORVer's through the I & E program. Dorman, thus, stresses the importance of personal contact with ORV, sportsman and youth clubs and the effectiveness of using local outlets and events for information distribution (endurance races, ORV dealers, fairs, licensing centers, general civic and tourist outlets). Mass media should be used as a compliment to a concentrated effort at the local level with adequate signing, brochure dissemination, and personal contact.

An I & E program for the White Cloud District should appeal to a predominantly young male audience (20s to 30s) that uses various forms of mass media, is educated (12th grade or above) and is employed in a cross section of occupations. Dorman suggests that "appeals connecting the regulations to a perception to which ORV riders can relate may be effective." Message content should thus focus on aspects users find important such as: 1) contact and appreciation of the out-of-doors. Environmental appeals to preserving the area might be a logical approach; 2) alternative convenient, legal ORV sites; 3) sites with good signing and information present; and 4) the costs and conflicts involved with other activities in which users participate in the forest.

Dorman concludes that an expanded I & E program for the White Cloud District is warranted. Such a program that informs the public of ORV areas and motivates them to comply with regulations is appropriate for any area where ORV use is significant.

Nall (1979) and McEwen (1978) both discuss the design, development, implementation, management and monitoring of the 2350 acre Turkey Bay off-road vehicle area at Land Between the Lakes (LBTL) in Tennessee/Kentucky. LBTL is a 170,000 acre national outdoor recreation, environmental education and resource management demonstration area operated by the TVA. Because LBTL is a national demonstration area the Turkey Bay ORV area is viewed as an educational tool, a demonstration model for federal, state, urban and private land planners and managers. Through conferences, training

institutes, the media, publications (such as McEwen's monograph), and tours the LBTL staff has publicized their success at Turkey Bay.

At LBTL conflicting outdoor recreation activities (motorcycle riding, camping, hiking, environmental education) have been carefully zoned such that each group is allowed to enjoy itself without disturbing the other.

LBTL opened in 1964. Off-road motorcycle riding was occurring throughout the park and managers soon realized the need to take a positive attitude towards the off-road riding question and provide riding opportunities that would minimize environmental harm and avoid conflicts with other recreationists. Although the siting process began in 1966, Turkey Bay was not designated until 1972, following President Nixon's Executive Order in 1972 directing federal managers to develop policies to control ORV use on public lands. Establishment of an ORV area had been stalled by some less than enthusiastic managers.

In planning for an ORV area the managers identified three major conditions which were felt must be met if any feasible management action was to be successful: 1) a need to put some limits on the environmental impact caused by motorcyclists; 2) reduce the visibility of riding - separate user groups; and 3) the need to elicit the cooperation of the cyclists. By asking the riders to help design the area it was hoped that they would feel some personal investment in the management solution, and thus would cooperate more readily. From the beginning the managers consulted with the American Motorcyclist Association (AMA) and with local riding clubs. Open, cooperative, working relationships were developed.

A major question arose as to the design of the ORV area - a trail system (dispersment) v.s. a single ORV area (centralization). Three major problems are associated with the trail system: 1) extensive contact with non-riders; 2) tempting opportunities to leave the trail and penetrate the surrounding habitat; and 3) necessary enforcement to make cyclists stay on the trail. It was decided that a single area would be superior in many respects: 1) environmental impacts are easier to monitor; 2) impact on wildlife would be less; 3) "By channeling ORV riding into one area the general extent of impact would always be known without the fear that extensive undiscovered impact was occurring in some remote site." 4) a single entrance point could be used making it easier to control the number entering the area; 5) the high visibility associated with motorcycling would be greatly reduced; 6) cyclists would be allowed to build their own trails which provides more variety and eliminates great capital expenses for trail construction; and 7) riders have the freedom to go anywhere which greatly enhances the riding experience.

A large number of criteria were established by the LBTL managers for the selection of an ORV site. These criteria can be helpful in the development of other ORV areas: 1) a single entrance close to a major LBTL entrance and to the park's administrative complex; 2) a square boundary rather than a long, narrow area with adequate acreage to allow for a variety of riding experiences (2,000 to 5,000 acres

deemed appropriate for the LBTL landscape); 3) develop a campground within the ORV area - many ORVer's come to camp as well as to ride; 4) preference for chert soils (highly resistant to erosion), poorer quality vegetation (a second-generation, cutover forest) and habitats with no special wildlife significance; 5) designate an area with a history of use by ORVer's because they are familiar with the area, have already stated their preference for terrain, and the area is already disturbed. Turkey Bay fit all of the criteria.

A relatively simple set of policies and regulations was established to manage Turkey Bay. Although originally geared towards motorcyclists, Nixon's Executive Order in 1972 prompted the area to be open to all ORV's as well as to all other non-riding recreationists. Normal forestry and wildlife management practices have been continued in the area. Boundaries, marked with inward facing signs, were established such that external noise problems along the highways that run adjacent to the north and west boundaries were avoided. No TVA-sanctioned events are allowed, spark arrestors are required, and riding is allowed only during daylight hours. Although safety considerations were given major ranking "the staff avoided the urge to overly protect the cyclist and, consequently avoided some potential management problems." The regulations have proven to be very effective; there have been few major violators. There has been no campground vandalism, no significant littering of the backwoods, and few reports of game harassment.

In keeping with the 1972 Executive Order an environmental monitoring system was established. Results of the five-year program show an increase in total area receiving direct ORV impact from 0.7 percent in 1973 to 2.1 percent in 1977. The 2.1 percent figure is much lower than anyone had anticipated. Although some hills of 15 percent or greater slope had serious erosion problems, overall erosion was not great. Average trail width increased about 31 percent. While vegetation on trails was heavily impacted, plants not actually being driven on showed no significant deterioration. Although measurement is difficult, impacts on wildlife appears negligible. There is some significance to the fact that 48 species of birds and numerous mammals still inhabit on venture into the area (as of 1977).

As a result of the monitoring system, McEwen states that: The Turkey Bay area has not been turned into a biological desert as some environmentalists predicted, nor at the present rate of off-road riding, is there much fear that any such large scale impacts will occur. The major ecological characteristics of the forest vegetation and soil remain undisturbed. More changes probably occur in the particular forest due to logging and wildlife mowing activities. Of all the monitoring data collected, the figure of 2.1 percent of the total land area receiving direct impact, has been the most surprising and most impressive. That figure provides powerful support for continuing operation of the Turkey Bay area and it counters the myth of off-road vehicles always causing mass impact wherever they operate ... at least one type of ecosystem, an oak-hickory woodland, on a stable soils, can withstand relatively large amounts of off-road vehicle use."

In addition to the monitoring plan, studies were conducted on user preference and riding patterns. The profile of a "typical" ORVer at Turkey Bay conforms to that found by Dorman (1982) in Michigan (see above). Over 70 percent of the riders rode an average of 4 hours a day in all types of weather (except cold weather). Woodland trails were most popular and hillclimbing most enjoyable. Over 40 percent camped overnight and most ORVer's indicated a willingness to ride in the area even if twice the number of cyclists were in the area. Seventy-nine percent of the users were cyclists and 21 percent four-wheel drivers. ORVer's constituted 1 percent of the total visitation to LBTL in 1976. The area attracts approximately 300 riders on a good weekend (spring/fall) and an average of 70 to 80 users per week throughout the year. Very few accidents have been reported and no claims have been filed against LBTL.

The increase in four-wheel drive use at Turkey Bay has caused concern among the managers. Can the area support large numbers of four-wheel drives? "In addition to increased environmental impact, conflict would likely arise between the four-wheelers and the motorcyclists." Several options have been considered for dealing with four-wheel drives: 1) ban them totally; 2) establish quotas; 3) develop temporal zoning (four-wheelers on certain days and motorcycles on others); and 4) create a special four-wheel drive area. As of 1978 no decisions had been made.

McEwen concludes that "the Turkey Bay off-road vehicle area illustrates the possibility of approaching off-road vehicle management in a positive manner."

A manual for local administrators on performance controls for sensitive lands is available from Thurow, et al (1975). The book advocates the protection of environmentally sensitive areas in cities and counties by using the police powers invested in municipal and county governments. Less of an educational tool and more of a regulatory handbook, the manual is geared toward developing land control programs in communities, identifying buildable and unbuildable land. It identifies the key natural processes of five environmentally sensitive areas which provide important public benefits (streams and creeks, aquifers, wetlands, woodlands, and hillsides) and suggests means by which these benefits can be maintained using the basic police power and zoning power of local government. The regulatory programs of 60 communities were analyzed. Much of the book consists of examples of municipal and county ordinances. Although some mention is given in the manual to open space and recreation, off-road vehicle use is not addressed.

B. Enforcement

In response to federal and state orders and policies aimed at controlling ORV use on public lands, respective public land managers have become active in designating and developing areas and trails for ORV use while closing others to such use. At specific ORV recreation sites, park supervisors have adopted management techniques to regulate ORV use and encourage observance of area designations. Although management of ORV areas has become quite sophisticated,

enforcement of adopted regulations is not as clear cut and has been approached differently at individual sites. Authority for designating ORV areas, management practices and enforcement options are discussed below.

At the federal level, Executive Order 11664 specifically directs heads of particular land management agencies to locate ORV trails in areas which minimize damage to soil, watershed, vegetation or other resources; minimize harrassment to wildlife and disruption of wildlife habitat; minimize conflicts between ORV use and other existing or proposed recreational uses on the same or neighboring lands, and ensure compatibility with existing conditions in populated areas. ORV trails are not to be located in designated Wilderness or Primitive areas but can be located in areas of the National Park System, National Areas or National Wildlife Refuges and Game Ranges, only if it is determined that use in such locations will not adversely affect natural, aesthetic or scenic values (Richard Nixon, 1972). In relation to enforcement, 11664 authorizes respective agency heads to develop penalties for violation of regulations adopted pursuant to the order and to establish enforcement procedures. Executive Order 11989 which amends 11664 further directs agency heads to immediately close portions of public lands to ORVs which are causing or will cause considerable adverse affects on natural and cultural resources until such time as the adverse effects are eliminated or measures to prevent future recurrence have been implemented (Jimmy Carter, 1977).

Several states have taken the initiative to designate and develop ORV trails and recreation areas, under similar criteria as above, in an effort to accomodate public demand for such use in suitable areas. In order to regulate ORV use at specific sites, land managers have established operating rules, employed fencing and other barriers to discourage ORVs from entering undesignated areas and instituted permit systems. Operating regulations vary within the Buttgenbach Mine recreation area located in Florida's Withlacoochee State Forest, existing trails have been developed by riders and trailbike operation is permitted anywhere except within designated day use areas. Vehicles may access and egress the recreation area's campground provided the vehicle is confined to first gear and speed is limited to a walking pace. Motorcycle helmets are required during vehicle use, and trailbikes are required to have a muffler which complies with State Highway Patrol regulations. At Louisiana's Cheniere Lake Bicentennial Park, only day use is permitted because of its close proximity to urban areas. ORV use in designated portions of Washington's Capital Forest is restricted to established routes. Cross-county travel is prohibited. Speed limits and time restrictions are used to limit travel and reduce noise in the campground area. In Missouri's Finger Lake Park, motorcyclists are regulated by speed limits. In areas of other activities, cyclists are instructed to ride as if only for transportation purposes, and in all areas, to minimize disturbance to soil and plants. Areas are catagorized by different skill levels necessary and designated as such on maps and signs (Robert Rasor, 1977).

Authority for developing and administering operating regulations in most cases has been given to the park managers or supervising rangers. In the case of Cheniere Bicentennial Park, a committee formed under the direction of the Louisiana Trails Advisory Council and the Quachita Valley Bicentennial Commission is responsible for rules and regulations governing the park.

Design of internal roadways and use of gates and barriers within and around parks aid in establishing compliance with operating rules. In Capitol Forest, ORV trails are designed to intersect campground access roads at an interval of 200 yards rather than connecting directly with campground roads to discourage trailbike use (and reduce noise) through the campground. Fencing around the campground at Buttgenbach Mine Recreation Area separates this area from trail use. A single cable device with a gate which permits people but not vehicles limits access to an outdoor pavillion at the park's largest day use area. Arrests by the Florida Fish and Game service of vehicle riders who ventured beyond designated boundaries led to the installation of a fence around the entire recreation area.

Buffer zones surrounding Finger Lakes Park provide a visual block along country roads. Physical barriers and land contouring are used to discourage entrance to the park other than at designated entrances. Gated entrances at county roads provide control by locking. Buffers along property lines shared by an adjacent recreation area discourages tresspassing and provides noise attenuation.

Permit systems and vehicle registration are commonly used to control access to ORV parks and generate revenues for park maintenance. At Buttgenbach Mine, a permit is required for operation and must be displayed on the left front fork tube in a conspicuous location. An annual permit is based on a fee of \$1/month, at a maximum of \$12/year, or a 6-day pass is available for \$3.00. The state of Missouri uses a special "Service Contract" to enter into agreement with club promoters for use of the ORV facility during competition events. The contract calls for five percent of admission and concession revenues to be paid to the state and releases the state from liability during operation by the contracting organization. The state of Washington requires all ORV's to be registered for a fee of \$5/year.

Although the success of the above management practices has been noted in current literature, enforcement of these regulations has not been as thoroughly documented. In the Buttgenbach Mine case, deputizing forest rangers was considered but rejected since rangers are not traditionally used in this capacity. Instead rangers use their authority to eject violators and in certain cases deny them future use of the park. By making examples of agitators in this way enforcement has proven to be 95 percent successful. At Hollister Hills, a volunteer motorcycle patrol, inherited from the period when the park was privately owned, assists in park maintenance, emergency situations and in keeping tabs on rule violators. The head of the patrol is selected by mutual consent among existing patrol members and park management. The head of the patrol is then responsible for

selecting (with the approval of park personnel) and managing patrol members according to priorities established by the supervisory ranger. Patrol membership requires frequent use of the park and familiarity with existing trails, regulations and hazards. In return patrol members receive an orange safety vest, free entry to the park any time for themselves and their families, and 5 gallons of gas for each day of work. In more general terms, enforcement of Washington's ORV law is delegated to relevant state agencies with existing enforcement authority. The law provides that enforcement of trail bike rules and regulations be uniform, consistent and reasonable.

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APPENDIX II

OFF ROAD VEHICLE USE AND IMPACTS IN STATE RECREATION LANDS
A REPORT OF THREE CASE STUDIES

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Note On Report Format

This report begins with a general introductory section applying to the entire study. Then, an in-depth case study is presented for each of the three cases: 1) Pillsbury State Forest; 2) Whitewater Wildlife Management Area and Trout Valley Unit; and, 3) The Minnesota Valley Wildlife Refuge and State Trail area. Specific recommendations for the individual sites are located at the end of the case study for each site. At the end of this report is a "General Recommendations" section containing the statewide recommendations of this research team on managing off road vehicle use on state recreation lands. This format was followed to allow the reader to extract specific case study information or to address the general recommendations.

I. Introduction

The purpose of this study is to provide an in-depth look at the dynamics of off-road vehicle use on state lands in Minnesota. Special attention is directed at specific site management objectives, use of ORV's on these sites and subsequent impact, and use of the site by other (compatible and potentially incompatible) recreation users. Due to time restraints and seasonal limitations, it was unrealistic and impractical to attempt a comprehensive, all-inclusive study of ORV use on all state land at this time. Therefore, a case study approach was chosen to present a representative sample of ORV use on selected state lands.

While attempting to give representative information on state-wide ORV use, the case study approach is, at the same time, quite site specific. Minnesota is a state characterized by varied environments. To generalize the condition and circumstance of all state resources on the basis of a few resources would be an oversimplification. Each resource varies in tolerance of use, qualitatively and quantitatively. Therefore sites have been chosen with land-type variation in mind. This variety may have a significant effect on the final policy decisions and resulting management plans for individual resource areas. The benefits of the case study method are twofold. First, it allows the opportunity to study state lands and ORV use in general, and second the opportunity to specifically focus on individual state resources.

The information included in this document is a combination of a review of related documents and literature, first hand observations by the researchers, and selected interviews with principle people involved in the issue. The review of literature supplies researchers with a conceptual framework for the study, and assists in avoiding supplying information previously contained in other studies. The observations of both the study site and users present give the researchers a data base from which to form recommendations. The interviews are helpful in selecting observation locations, adding support to observed evidence, and in combatting researcher biases inherent in most descriptive research.

For the purposes of this study, off-road vehicles will follow the definition found in Section 84.90 of the Minnesota Statutes, with the exception of snowmobiles.

Sec. 84.90 "Recreational Motor Vehicle means any self-propelled vehicle and any vehicle propelled or drawn by a self-propelled vehicle used for recreational purposes,... trail bike, or other all terrain vehicle,... or motor vehicle licensed for highway operation which is being used for off-road recreational purposes."

At this time, Minnesota lacks a clear cut policy regarding use of off-road vehicles on state lands. Observable use and subsequent impact of ORV's has been noted in several state resource areas. Increased commercial sales of ORV's reflects the growing popularity of ORV's use, resulting in higher demand for public lands and trails to legally accommodate this use. In response to these factors, the Minnesota State Legislature in 1983 gave to the DNR the responsibility to study ORV use and impact on state lands. The results of this study will be presented to the legislature and the governor for the purpose of establishing policy.

Rationale For Selection of Sites

- A. Pillsbury State Forest was chosen for its northerly location. It is situated near a major resort and recreation region. The area has a high recreational tourist orientation. The site itself is state forest land and also has a history of ORV and other trail use. Annually, there is an ORV race which uses a designated trail.
- B. Minnesota Valley National Wildlife Refuge is located near the Minneapolis St. Paul Metro Area and provides easy access for day/evening/weekend use. It has received heavy ORV use in the past and extensive visible impact. Many areas have been closed to any vehicle use as a result. Land ownership and boundaries are complex and the area is managed cooperatively by the U.S. Fish and Wildlife Service and the Minnesota DNR.
- C. Whitewater Wildlife Management Area and the Trout Valley Area within the Richard J. Dorer State Forest were chosen for their location in the southern part of the state. As well, they serve a variety of recreationists. Portions have received heavy ORV use, reported heavy impact, and adverse effects of this use. In addition, the Wildlife Management Area has specific management objectives which are different than those of State Forests, and it was important to include an area in the study that was managed by the Wildlife Section of the DNR.

General Recommendations

Background

The three case studies presented here indicate that off-road vehicles are being used on state recreation lands. This use is causing some adverse impacts on the environment of the resources, on other users of the areas, and on some adjacent landowners. However, at these three sites, the impacts are either slight (as in the case of the Pillsbury site) or they are usually confined to specific locations within these sites. This study did not find widespread impacts on the cases studies.

In these three cases, the major adverse impacts are being caused by 4-wheel drive vehicles and not by 2 or 3-wheel drive vehicles. The physical characteristics of the 4-wheel drive vehicles (weight, power, narrow wheel tread) combined with the use intention of the drivers seeking challenging terrain give these vehicles the potential for extensive environmental damage. However, in this study these impacts are confined to specific locations and are not pervasive across the entire sites studied.

This study found that a major contributor to the management problem of ORV use on state lands is a lack of clear land jurisdiction boundary delineation. In two of the sites studied (Whitewater and Minnesota Valley) the trouble spots are virtual no-man's land areas, where the users and the managers are unclear as to the jurisdiction and use policies. These boundary disputes must be solved before effective management can be implemented.

Management Alternatives

Based on the results of this study, the following are recommended management alternatives that should be considered:

1. Enact legislation which will prohibit off-road vehicle use on all state recreation lands except on improved roads and on designated off-road vehicle trails and use sites.

Rationale: Uncontrolled off-road vehicle use is currently causing adverse impacts on some sites, and there is potential for increased impacts in the future. The current lack of a clear policy has caused confusion and frustration on the part of both managers and users. Without a legal prohibition of use, ORV use will continue to occur on state lands, and will require that all sensitive areas be signed as off-limits. If no general policy is formulated - and each state area managed on a case by case basis - the current confusion on the part of managers and users will continue.

2. The Department of Natural Resources will inventory all recreation lands (except State Parks) to identify sensitive areas where off-road vehicle use will be excluded, and to identify areas and/or trails where off-road vehicle use may be allowed.

Rationale: The potential for adverse impacts varies greatly from one site to another. Factors such as soil composition, vegetation, wildlife sensitivity, potential impacts on other area users, and management goals all determine a site's appropriateness for use by off-road recreation vehicle. A set of inventory criteria must be developed to assist in the decision of which areas are appropriate for off-road vehicle use.

3. The Department of Natural Resources will identify areas where off-road vehicle trails could be developed and/or designated. These trails will be separated from trails used by non-motorized users and will be designated as either a 4-wheel drive trail, 3-wheel drive trail, or 2-wheel drive trail.

Rationale: This study found that the sales of off-road vehicles is increasing. It is impractical to presume that the DNR can close all state recreation lands to all off-road vehicle use. Current and potential users will ignore the law and use the state land illegally, or this use will spill over to private land and land owned by local units of government. The provision of designated off-road vehicle use sites and trails will serve to concentrate use and relieve use pressure from more sensitive areas. A precedent for designated ORV trails has been made in both snowmobile trails and in summer use ORV trails such as the one in Trout Valley.

It is important to manage the three major types of ORV's separately and to provide use sites specific to each type of vehicle. The use sites provided for 4-wheel drive vehicles must be hardened sites virtually sacrificed to sustain severe surface soil and vegetation damage. This use can be in a concentrated, highly controlled area. The sites or trails for 2-wheel drive vehicles can be like those for 4-wheel drive, i.e. hardened, concentrated in a small area, and controlled. The use areas for the 3-wheel drive vehicle can be more dispersed and less hardened because these vehicles appear to cause less environmental damage. In some circumstances the 3-wheel drive trails could be the same trails used by snowmobiles in winter. Perhaps some of these trails and sites would be on county, city, or private land rather than state owned land.

4. Enact legislation which will require licensing of all off-road vehicles and will require that all operators of off-road vehicles on state recreation lands must have a vehicle operator's license.

Rationale: The licensing of the off-road vehicles will accomplish two goals. First, it will generate funds to be used by the DNR for providing and maintaining ORV use sites and trails either on state lands or on a grant-in-aid basis for sites on private or local government lands. Second, the license on each vehicle will make enforcement of regulations more effective because vehicles can be identified. Requiring ORV operators to have license in order to use state lands would ensure that the operators have received at least a minimum amount of education concerning safe operation of the vehicle, user ethics, and the potential environmental damage ORV use can cause. Licensing the operators would also make enforcement efforts more effective because the licenses of rules violators could be revoked.

5. The Department of Natural Resources will encourage and solicit the assistance of individual and organized off-road vehicle users in the designation, development, maintenance, and policing of sites and trails that are planned for ORV use.

Rationale: This study indicated a willingness on the part of organized ORV users to assist the DNR management in the provision of ORV use opportunities on state lands. This assistance in finances, volunteer labor, and peer enforcement of use regulations could help off-set the cost of providing use sites and trails of state lands.

6. The Department of Natural Resources will research the off-road vehicle users of Minnesota to determine demographic data, use patterns, and user demand for off-road vehicle facilities on state, local, and private lands.

Rationale: Little is known about this group of recreational users of state resources. The potential for environmental and aesthetic impact by this user group makes it important that land managers know more about their needs.

Summary

Off-road vehicle use of state recreation lands is a fact of life in Minnesota. The Department of Natural Resources has a number of options regarding the use. The Department can ignore the issue and leave the decision up to individual area supervisors. These supervisors can attempt to close off sensitive areas and let other use go unchecked. This is the current stance of the Department. This study found that the lack of a clear general policy for managing off-road vehicle use on state lands has caused confusion and frustration on the part of both the managers and the off-road vehicle users. Also, if all sensitive areas had to be signed against use, the cost of signing could be significant and prohibitive. These researchers do not recommend this management option.

Another option the Department has is to ban all off-road vehicle use on all state recreation lands. These researchers feel this is a poor management choice because it would not be enforceable. Also, this ban would cause ORV

use to spill over onto other recreation land owned by local governments or private landowners. This option would also create an adverse public reaction against the Department. It may also result in legal challenges for the Department to prove why snowmobiles are allowed on state lands and not other off-road vehicles.

A third option is to manage for the use of off-road vehicles in selected sites around the state. These sites would be selected using established criteria developed by the Department. The use would be concentrated, separated from other users as much as possible, and controlled. This is the option recommended by this research team. All of the recommended management alternatives listed above reflect this favored option.

MINNESOTA RIVER VALLEY

MINNESOTA RIVER VALLEY

II. Methodology

A. Data Gathering Techniques

The research team used the Final Environmental Impact Statement (EIS) of 1982, prepared by the U.S. Fish and Wildlife Service. The management goal proposed, as a result of this document's conclusions is "to protect important fish and wildlife habitat while also providing the opportunity for wildlife oriented recreation and environmental education in the metropolitan area."

The research team also referred to the study Urban Impacts on the Minnesota River Valley National Wildlife Refuge, a publication prepared by the Resource and Community Development interdisciplinary seminar at the University of Minnesota in 1981.

The initial contact for the project was made with a Natural Resource Specialist (3) at the Minnesota Department of Natural Resources (MN-DNR). Background information of the area and a suggested course of action for the study were provided.

Because much of the study area falls within National Wildlife Refuge property, which is owned and managed by the U.S. Fish and Wildlife Service (USFWS), this agency was also contacted. The manager of the Minnesota Valley National Wildlife Refuge (MVNWR) provided maps and indicated areas most affected by off-road vehicle (ORV) use. The Refuge's assistant manager gave the research team his prospective relative to ORV use on wildlife and waterfowl habitat.

Local officials contacted for information relative to the Long Meadow Lake unit in Bloomington (see figure 1) included the Assistant to the City Manager, the Police Captain, and the Assistant Traffic and Transportations Engineer. Local residents including two farmers and neighboring service personnel were also consulted.

Local officials helpful with information regarding the Upgrala unit (see figure 1), included the Community Service Director, City Planner, Zoning Administrator, and Public Safety Captain, all from the City of Eden Prairie. Residents, including a farmer, the Upgrala Hunting Club caretakers, and the Farm Market owners were spoken with, as too were Flying Cloud Airport personnel and the Lion's Tap personnel and patrons. Also important was information obtained from a manager of the Minnesota Valley Trail, an Environmental Engineer, and a Landscape Architect at the Regional Office for the USFWS.

ORV users were not interviewed for this study because they were not directly observed. However, evidence of use and impacts was observed and is documented later in this report.

III. Description of the Case

A. Description of Management Units Physical Characteristics

1. Purpose

Study areas in this report have a dual purpose as a result of influences from managing agencies: the USFWS and MN-DNR. The MVNWR purpose states that:

"Sensitive lands identified will be protected with the overall objective to allow for a higher degree of wildlife oriented recreation and wildlife management while providing basic protection of this valuable ecological resource. Trail use in the Refuge is for hiking, biking, and skiing as well as providing an opportunity for general wildlife observation."

The purpose of the MN Valley Trail which is managed by the MN-DNR is: To establish a recreational travel route which provides access to or passage through areas which have significant scenic, historic, scientific, or recreational qualities.

2. History

The idea of establishing a refuge began with a group of local residents who formed the Lower Minnesota Valley Citizens Committee. This group fought against the authorization of a controlled flood plain and subsequent industrialization of the river valley. Their efforts were supported by Senator Mondale.

In 1976, the U.S. Congress officially recognized the lower MN River Valley's unique value as an environmental, recreational, and educational resource when it passed the MN Valley National Wildlife Refuge Act, Public Law 94-466. The legislation designated that three types of units be included in the project area. These include federal refuge units, adjacent lands to be used as state and local governmental recreation areas, and the MN Valley State Trail which was authorized by MN Statute in 1969 to provide a recreational travel route along the MN River from Fort Snelling State Park to the City of Le Seuer.

Historically, the MN River was known as "river of cloud-tinted water." When French fur traders arrived in the 1600's they renamed it River St. Pierre. It provided resources to Shakopee, a Dakota Sioux Chief, and his tribe; Carver, a British explorer; Le Seuer, a French commendant; and Lt. Zebulen Pike, an American explorer commissioned by President Jefferson. The Dakota found the valley rich in game and fish and fertile flood plain soils. Explorers used the river predominantly for transportation before the Civil War. After that time, the railroad was the major means of mass transportation and the river was forgotten for many years until the 1930's.

In 1934 the valley area was proposed to become a state park but the confusion of war prohibited this from happening. Ocean going ships were constructed in Savage during World War II. To accommodate their size the river channel was dredged to a 9 foot depth. The 1960's brought increased interest in the area's recreation potential. Fort Snelling State Park was established in 1961 and 1969 legislation occurred for the MN Valley Trail. Establishment of the MVNWR was proclaimed in 1976.

3. Regional Description

The MN River Valley area studied is comprised of two units: Long Meadow Lake and Upgala. Both are within the proposed MN Valley National Wildlife Refuge (MVNWR) and include segments of the MN Valley Trail (see figure 1). Presently, the majority of land in these study units is still privately owned.

Both the Long Meadow Lake and Upgala units are located within 30 miles of approximately 1,692,000 metro area residents (see figure 2). The 1980 preliminary census data also reveals a significant increase (20-30%) of population in counties surrounding Hennepin and Ramsey. The Long Meadow Lake Unit is located within one-half mile of a densely populated residential area in Bloomington (see figure 4). It resembles a rural community despite the proximity to the city. This area is being farmed for soybeans and corn by two separate landowners. The south side of the river is Fort Snelling State Park and located further west is the Black Dog Power plant owned and operated by Northern States Power Company. Coal supplies surround the plant. The river serves as a transportation route for barge traffic carrying the coal.

Old Cedar Road comes to a dead end at the MN River, but provides parking for those who use the area. The new Cedar Avenue bridge crosses the river and wetlands area to the east of Old Cedar. It does not provide direct motor vehicle access to this area. However, pedestrians and bicyclists may use the ramp adjoining this bridge in order to cross the river.

The Upgala unit (see figures 1 and 5), is located south of Hwy 169 near Flying Cloud Airport. Unlike Long Meadow Lake, Upgala is within a predominantly rural community. It also is comprised of private in-holdings. Few parcels near the east end of this site have been purchased by the USFWS. The majority of land is owned and managed by Upgala Corporation, a private hunting club. Fertile farmland in this valley is used for grain and vegetable production by a local farmer. This unit is characterized by high prairie grass bluffs which overlook two lakes (both Grass Lake), and is surrounded by prime farm land. The flood plain area separates the river from the lakes and provides optimal habitat for migratory birds and other waterfowl.

4. Site Inventory

The soils subject to most of the impact in the Meadow Lake area are mixed alluvial (MX). The Soil Conservation Survey of Hennepin County states that MX "... consists of moderately well drained to very poorly drained mixed alluvial soils that vary greatly in color, texture, and reaction. They occupy small tracts on stream bottom lands that are frequently flooded. The water table is generally high and run-off is slow". This indicates frequent flooding and soils which are sensitive to impact. Compaction from heavy vehicle (4-wheel drive) use is common in several areas and has caused serious depressions along the road running west of Old Cedar. The SCS recommends "severe" limitations for recreational uses due to frequent flooding. A severe degree of limitation generally requires major soil reclamation, special design, or intensive maintenance.

Soils on areas of the Upgrala unit studied were chiefly of two types, Salida and Hubbard. According to the Soil Conservation Service (SCS) the following are characteristic of each type: The Salida series consists of deep, excessively drained, sandy and gravelly soils. These soils in Upgrala are on knolls, hills in stream terraces and outwashed plains. In a representative profile, the surface layer is black coarse sandy loam about 10 inches thick. The subsoil is very dark grayish-brown gravelly loamy sand about 4 inches thick. The underlying material is dark grayish-brown to brown gravelly loamy sand. These soils also have very low available moisture capacity. Permeability and internal drainage are very rapid. The water table is deep in all seasons and the root zone is shallow and limited to the surface layer and then subsoil. These sandy soils are low in natural fertility and organic-matter content.

Compaction of this soil varies depending on type of recreational use and the percent of slope on the area in which they're found. The SCS notes that Salida type soils found on hills ranging in slope from 18 to 35 percent will sustain severe damage under intensive play conditions such as ORV use. In deed, the SCS points out that even under more sedate recreational circumstances such as trail hiking, moderate damage is likely to occur if allowed on these sensitive soils where the slopes are 12 to 18 percent, and severe on slopes more than 18 percent. Damage is characterized chiefly by severe erosion and disturbance of vulnerable and fragile vegetative cover. This steep, very droughty soil is better suited to permanent vegetation than to most other uses. Vegetation on the Upgrala bluffs would not be permanent if ORV use were to continue.

The Hubbard series is closely related to the Salida. This soil consists of small, low mounds intermingled with narrow drainage ways. Some of it has a surface layer of sandy loam and other areas contain a few bands of sandy loam, loamy sand, or gravel in the subsoil and underlying material.

Like the Salida series soils, Hubbard soils are classified as unsuitable for intensive play areas. Damage sustained is severe where sloping is more than 6 percent and vegetation is very difficult to maintain. In areas where there are hiking trails on these soils, damage is considered moderate where slopes are 12 to 18 percent and severe where slopes are more than 18 percent. It is concluded that due to the fragile and shallow soil types and severity of slope on the Upgrala bluffs ORV use would not allow a permanent vegetative cover and therefore increases the severity of naturally occurring erosion.

The Refuge and State Trail areas of Upgrala lie within the Minnesota River Valley floodplain. The bluffs lining the valley on the north side of the river provide the only significant change in elevation within the area. Changes in elevation from the floodplain to the bluffs average about 100 feet with the bluffs reaching an elevation of about 800 feet above mean sea level (SL). The glacial marine up-lands in Eden Prairie are the highest elevations in the study area measuring 930 feet above MSL. The lowest elevations are found at Long Meadow Lake and at other lakes adjacent to the river.

From 1976 to 1978, the Minnesota Pollution Control Agency (MPCA) collected fish and sediment in the Minnesota River and performed analyses for polychlorinated biphenyls (PCB's). Results revealed there were no great concentration of PCB's in the sediment but the fish did have some unacceptable levels of this substance suggesting the PCB's had made their way into the food chain. Signs posted for those fishing in the river clearly warn that ingestion of fish caught in the river more than once a week could be hazardous to one's health.

Wildlife is abundant in the river valley because a suitable habitat is present. Inventory data of area wildlife was completed by FWS field workers and the University of Minnesota for the Environmental Impact Statement. Amphibians and reptiles were noted but no attempt was made to estimate population size. Mammals were studied to determine general size of population, but more importantly to determine species present and what vegetative types they were using. It is estimated that the entire refuge and recreation areas have over 30,000 breeding pairs of birds. Of these the EIS lists 54 found in the Long Meadow Lake unit.

The EIS noted the importance of the Upgrala bluffs from a statement of Dr. Darwin Warner (University of Minnesota) who also completed a wildlife inventory. He said that the Upgrala site is the habitat of the rare harvest mouse, and the only site where he found the deer mouse. This area is being used for breeding by such birds as pheasants, mourning doves, and mallards.

Vegetation in the MN River Valley is extremely varied due to differences in topography, soil types, and flooding levels. The total area is classified in seven vegetation communities based on the vegetations similiar biological requirements.

The Long Meadow Lake unit has two evident communities, floodplain forest and emergent. Floodplain forest is characterized by cottonwood, willow, elm, and maple trees bordering the river. They are partially submerged in spring due to their proximity to the river. The understory consists of dogwood alder, nettles, and riverbank grape. The floodplain forest community borders 20-30 feet of both sides of the Minnesota River Road. North of this forest community is land presently being farmed. The farmland is then bordered on the north side by an emergent community. During the growing season soils are often covered with a few inches of water. Its vegetation consists of arrowhead, cattail, bullrush, wild rice, etc.

The Upgrala study area is dry grassland characterized by small shrubs such as sumac and hazel and perennial grasses. Several sources noted that this area contains some of the last native prairie grasses in the valley region. The bluffs of the Upgrala unit are owned in part by the Upgrala Corporation, a private hunting club, and the FWS. The area is maintained in its natural state as wildlife habitat.

Much of the ORV damage noted at the Long Meadow Lake unit was on privately owned and maintained farmland. Crops grown are soybeans and corn, which after harvest provide a food source to migrating birds. Property surrounding the farmland is owned by the FWS and maintained in its natural state as wildlife habitat. A land parcel northeast of the new Cedar Ave. bridge is under the ownership of Bituminous Roadways and is used for gravel extraction. However, there did not appear to be any recent use for this purpose. According to the EIS's master plan, these private inholdings are planned for FWS acquisition.

Both sites are devoid of developed recreational facilities, basically because most of the land is under private ownership. However, future development of the master plan includes the following for the Long Meadow Lake unit:

- 1) The Minnesota River Road would become part of the MN Valley State Trail. Uses include hiking, biking and skiing.
- 2) A wayside for information would be located at the base of Old Cedar Ave. and the Minnesota River Road.
- 3) Lands north of the State Trail would be owned and maintained by the FWS.

- 4) The south side of the MN River, east of the Cedar Ave. Bridge, is part of Fort Snelling State Park. It contains a boat access and trailhead, as well as a parking lot. The bridge provides a bicycle and pedestrian access across the river.

Future plans for the Upgrala unit include:

- 1) A refuge boundary adjustment to include the steep sloped prairie grasslands that are presently designated as a recreation area.
- 2) A loop trail extending northeast from Old Riverview Road to the scenic overlook at the top of the bluffs and then back to Old Riverview Road.
- 3) The scenic overlook atop the bluffs was previously a wayside rest, but it has been closed.

B. Use of Management Unit

1. Users

The evidence of ORV use at both study sites was noticeable, but this research team did not see or speak with any users. The following information is that obtained from local residents, landowners, and city officials.

ORV users vary with the type of vehicle they operate. Those at the Long Meadow Lake unit are said to be males, ages 16-25. Vehicles sighted range from passenger cars to raised pick-ups and jeeps, with many being the four-wheel drive type. In this area, most agree that ORV use is concentrated on weekends and Friday and Saturday evenings. Sites of ORV use included the Minnesota River Road, adjacent farmland, open space beneath the new Cedar Ave. bridge, and on the property of Bituminous Roadways.

Four-wheel drive use was evident along the MN River Road at its intersection with Old Cedar, and on the sandy hills of Bituminous Roadways property. Extensive tracks of trail bikes were found below the Cedar Ave. bridge and along the MN River Road. Other users of this site include: bikers, hikers, birdwatchers, persons fishing, canoeists, boaters, farmers, and people who simply come down to enjoy quiet moments by the river's edge.

Witnesses of users at the Upgrala unit note that this age group of users is higher than that of Long Meadow Lake. They claim that ORV users are males ranging from 18-40 yrs. Most vehicles sighted have been four-wheel drive jeeps and pick-ups trucks with the exception of a few autos.

Use has also occurred most frequently on weekends and the evenings. Users enter from Hwy. 169 on the Old Riverview Road. A gate is placed about one mile in from this entrance. Prior to the installation of the gate, users had free access to the bluff area. However, users now ascend the private land north of Old Riverview Rd., easily avoiding the gate barrier. Patterns of use on the rolling terrain are horizontal and then vertical up the steep slopes. Other users to the Upgrala unit are horse-back riders (permitted on the eastern part of Old Riverview Rd. beyond the gate), and hunters.

Use at the Upgrala site has declined recently due to the installation of a cement based steel gate-the third gate this summer. An Eden Prairie official stated that in previous years (within the past 5-10), this area was heavily used for large parties of high school aged youths from the Twin Cities region. Youths would come in autos, pick-ups, and trail bikes and attempt to ascend the steep slopes of the bluffs. Increased enforcement has been helpful, but most effective was the addition of the sturdy gate after two others had been destroyed during the summer of 1983.

ORV use in the Long Meadow Lake unit has increased in the past three years mostly as a result of development of the new Cedar Ave. bridge. Old Cedar Ave. now dead ends at the river, but provides access west to the MN River Rd. (see figure 3). This site is well signed with the boundaries of the MVNWR, but not with signs denoting acceptable and non-acceptable use. It is a fairly secluded area not heavily patrolled by local police. This site is also located within one mile of a densely populated residential area. Use was said to be more prevalent in summer than this fall.

C. Administration of the Management Unit

Both sites are presently under multiple management-the FWS and private landowners, although both sites are also designated to be obtained and managed by the FWS and the DNR (part of the Long Meadow Lake unit-MN River Rd. is to become part of the MN Valley Trail).

National Wildlife Refuge Lands owned and managed by the U.S. Fish and Wildlife Service are traditionally for the benefit of wildlife resources, with a primary emphasis on waterfowl. However, the mandate establishing the MNNWR also places emphasis on public use activities, directing the development of this refuge to provide compatible opportunities for observation, wildlife-oriented recreation, and environmental education. All proposed refuge lands within the MVNWR were scheduled for acquisition by 1983 (see figure 1 for these units). However, budget constraints imposed by the current administration have made this goal unattainable. As a result, most of the land proposed for educational and recreational use has not yet been acquired. Refuge parcels within the two study areas are presently being managed for wildlife resources.

Private lands in the Long Meadow Lake unit are managed for farming and gravel extraction. The Upgrala unit is managed for wildlife habitat, especially for the use of members of the Upgrala Hunting Club.

The MN River Road is a public access route, property of the City of Bloomington, and is maintained by its Traffic and Transportation Department. Complaints of misconduct or trespassing are handled by Bloomington Police although this road is also patrolled by the FWS. A sign at its roadhead (the intersection of Old Cedar and the west end of MN River Rd.) reads "No unauthorized vehicles beyond this point." The source of this sign is not known nor the legality of its message, MN River Rd. is a public access road. This road is designated to become part of the MN Valley Trail, so will be owned and maintained by the DNR eventually. Planned uses are hiking, biking, and skiing.

Old Riverview Road is a public access route maintained by the city of Eden Prairie. A loop trail providing hiking, biking and skiing is proposed to make use of this road. It would be under management of the FWS.

IV. Observed Impacts, Public Benefits, and Problems

A. Impacts

Observed ORV impacts are listed in categories according to their effects on: resource, - land and wildlife; property, other users, management, and proposed use. Impacts relevant to Long Meadow Lake are identified by an (L) and those relevant to Upgrala by a (U).

Resource - Land

1. Extensive rutting of MN River Rd. and area along the roadside at the south end of Old Cedar (L).
2. Destruction of open green space (torn up seeded grass). The area below the new Cedar Ave. bridge is essentially devoid of vegetation (L).
3. Over-use of area below north-bound lanes of new Cedar Ave. The bridge area is essentially devoid of vegetation (L).
4. Erosion of slopes in some spots causing formation of gulleys which increase outwash during rains. This is due to the impact on a sandy soil base and shallow vegetation cover (U).
5. Destruction of prairie grasses (U).
6. Bluff collapsed in 1976 due to a break in the dike of the Flying Cloud Landfill. Some people interviewed attributed some of the cause to slope erosion by ORV use (U).
7. Bluffs may be sites of archaeological significance (U).

Resource - Wildlife

1. Destruction of habitat, damage to nesting sites, ruts through seeded wheat grass (wildlife food source), and decrease of overall habitat with over-use causing erosion (L).
2. Destruction of habitat of rare harvest mouse (U).
3. Possible effect to local deer population as it relates to stress and disturbance of movement within the refuge (L).

A Bloomington police officer stated that in winter months they have received complaints from area residents witnessing deer being chased by snowmobiles (in Long Meadow Lake unit marsh area). It is not known whether this occurs with ORV's.

Property

1. Extensive damage to farm crops (soybeans and corn) of private farms (L).
2. Damage to posted sign prohibiting motorized vehicle use (L & U).
3. Costly damage to farm buildings (large doors smashed through and windows broken) (L).
4. Litter at sites along roadside and spots where vehicle tracks end (L).
5. Trespassing on private lands causing ruts and erosion (L & U).
6. Removal of gates built to deter use-the gates were crashed through and pulled out (the third gate erected this summer has remained) (U).
7. Ruts caused damage to mufflers of police vehicles (L).

Other Users

1. Conflicting use with horseback riders (it is not known for certain this occurs, but the uses are incompatible if occurring on the same site simultaneously) (U).
2. Created unaesthetic view of an otherwise unique environmental, educational, and recreational resource (L & U).
3. Noise disturbance to neighbors (L & U).

Management

1. Created need for increased enforcement in areas which otherwise need little patrolling (L & U).

2. Caused placement of gates - one on Old Riverview Road and other at entrance to property of Wayne Pahl at East end of Old Cedar - and increased cost to management (L & U).
3. Limited access in case of emergencies to areas beyond ruts and gates (L & U).
4. Causes increased need to maintain Minnesota River Road to the point where it is no longer advisable to fill ruts which are constantly re-created. This does cause increased expense to the City of Bloomington (L).

Proposed Use

1. ORV use is incompatible with the proposals for these areas as determined by the FWS and the DNR.
 - a. MN River Rd. is intended to become part of the MN Valley Trail uses include hiking, biking, and skiing (L).
 - b. Old Riverview Rd. is intended to become part of a loop trail permitting hiking, biking, and skiing (U).
2. Use is incompatible with goals of a National Wildlife Refuge and MN State Trails (i.e., management of the unit for purpose of protecting wildlife habitat while providing recreational opportunities in this historically significant valley.)

Economic impacts on local businesses are negligible because use of these areas by ORV users is sporadic and unorganized. It should also be noted that damage has occurred extensively on private lands. This is a result of trespassing in order to get to the public lands. Complaints and observed data have coincided. Although the citizens most concerned about ORV use are those who own or manage property which is being damaged other neighbors who are affected only by noise haven't complained to authorities.

V. Conclusions

Conclusions of ORV use at the Long Meadow Lake and Upgrala units of the MVNWR are as follows:

1. Most of the impacts, and the majority of severe impacts, in these areas are a result of four-wheel drive vehicles.
2. Property boundaries in both areas are unclearly marked as are the accepted and unaccepted uses of public property.
3. ORV use is incompatible with the goals and management objectives of a National Wildlife Refuge
4. ORV use is incompatible with the sensitive soils in both areas and the severity of slope in the Upgrala unit.
5. Enforcement has been difficult due to the limitations of police vehicles.

As a result of these conclusions this research team presents the following recommendations.

1. In recognition of current multiple ownership of these sites, create enhanced cooperation between owners regarding specific ownership.
 - a. Increase signage to clearly delineate boundaries.
 - b. Provide signage which clearly states accepted and unaccepted uses on public lands.
2. On public lands place interpretive signs or materials explaining the unique values and character of the region in order to create a sense of worth and awareness of the property and respect to its unique qualities.
3. Erect gates and fences in areas most damaged by uncontrolled or unpermitted use:
 - a. At eastern entrance of Upgrala bluffs-gate and fencing.
 - b. Fence the northern edge of Old Riverview Rd. to prevent trespassing and illegal access.
4. Provide education to ORV users regarding the environmental effects of ORV vehicles on land. Require this as an obligation for ORV dealers.
5. If use is to occur in these areas provide the following:
 - a. Maps indicating trails and regulations
 - b. Persons enforcing these regulations
 - c. Required licensing of vehicles using these sites
 - d. Different trails for each vehicle type four-wheel, three wheel, and two wheel vehicle trails. The four-wheel vehicles cause greater erosion and compaction as a result of their appreciable size and power difference.
6. On a broader basis, encourage private enterprise, to design, construct, maintain and manage ORV parks for commercial use.

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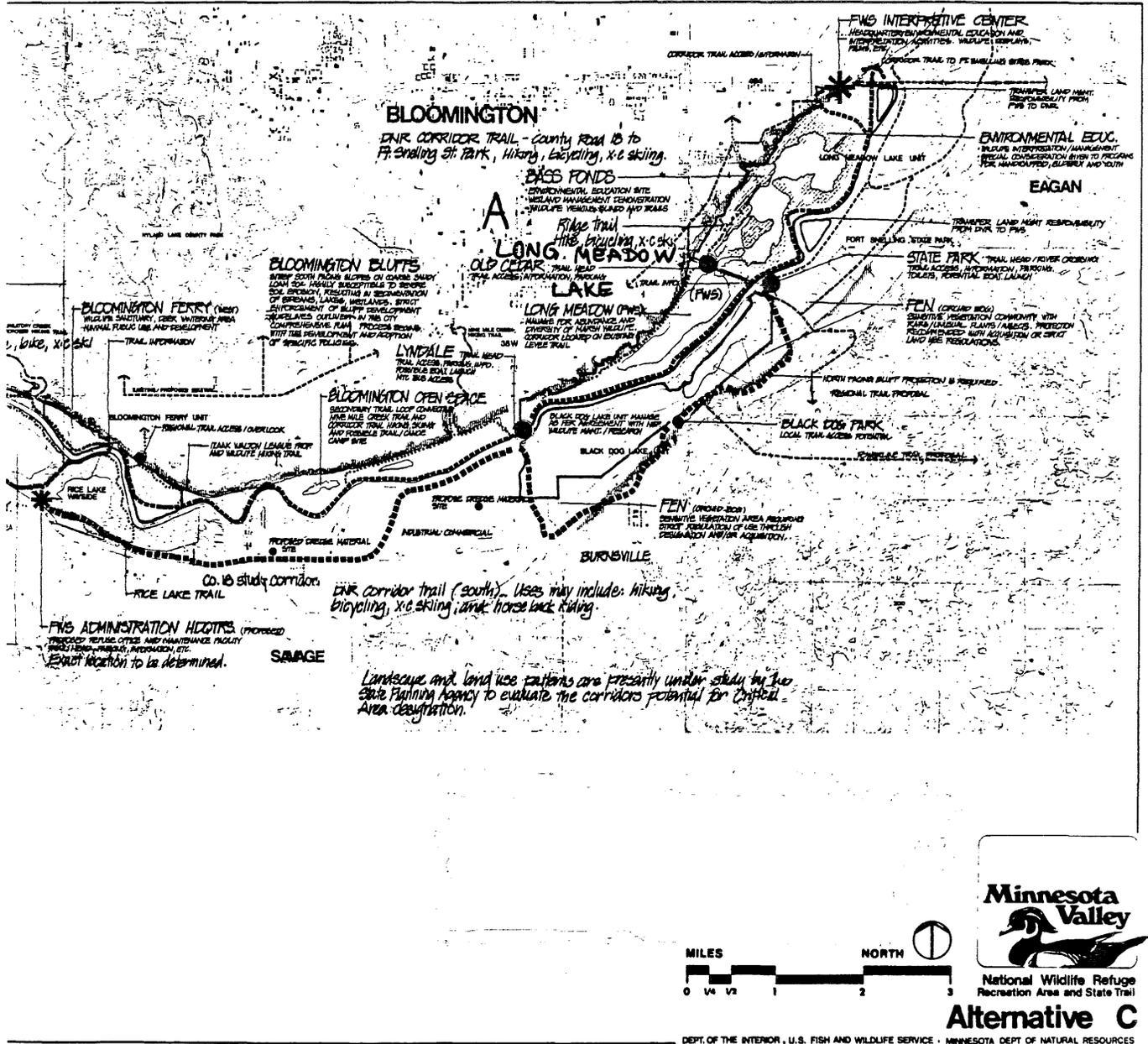
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INDEX TO VISUAL DOCUMENTATION - SLIDES MN. RIVER VALLEY

- #1 Mn Valley Refuge Map. Two Units Studied: Upgrala and Long Meadow
- #2 Grasses
- #3 Grasses
- #4 Overlook-Upgrala (U)
- #5 " "
- #6 Natural Erosion-Upgrala-Sandy Soils
- #7 4-Wheel Drive Evidence-along Old Cedar-Long Meadow Lake unit (LML)
- #8 Minnesota River
- #9 Rutting, trash - "No unauthorized Vehicles." L.M.L.
- #10 Dead Snake-L.M.L.
- #11 Deer Track- L.M.L.
- #12 Dead Raccoon- L.M.L.
- #13 Upgrala-Well Traveled 4-Wheel Drive Trail
- #14 " Overlook
- #15 Black Dog Power Plant L.M.L.
- #16 Entrance into well traveled ORV area-owned by Bituminous Roadways-L.M.L.
- #17 Bituminous Roadways (BR) property damage by ORV's (LML)
- #18 B.R. Rut measurement
- #19 B.R. -ORV evidence
- #20 Part of Loop at B.R.
- #21 Tracks under new Cedar
- #22 " " " "
- #23 Road an Proposed State Trail along MN. River-LML-Rutting
- #24 Rutting-Old Cedar-L.M.L.
- #25 Rut measurement -L.M.L.
- #26 " " "
- #27 Seeded area under new Cedar damaged by ORV - 4-Wheel Drive
- #28 Same as above
- #29 Well traveled 4-Wheel Drive Route LML
- #30 ORV damage adjacent to parking area
- #31 Upgrala (U) damaged bluff (center)
- #32 Well travelled route-Upgrala
- #33 Erosion evidence U
- #34 Dirt bike trail U
- #35 4-Wheel Drive-recent evidence (24 hours) Upgrala
- #36 4-Wheel Drive-up the bluffs U
- #37 ORV evidence " " " "
- #38 More rutting-U
- #39 Well traveled 4-Wheel Drive-route U
- #40 ORV (4-WD) use-across bluffs (Darklines)
- #41 Fencing-enforcement at L.M.L.
- #42 Overlook closed due to bluff collapse
- #43 Enforcement fence U-enough room for dirt bike to get through
- #44 Enforcement fence U - 4th one this summer-others crashed or uprooted
- #45 Upgrala Overlook
- #46 " "

FIGURE 1

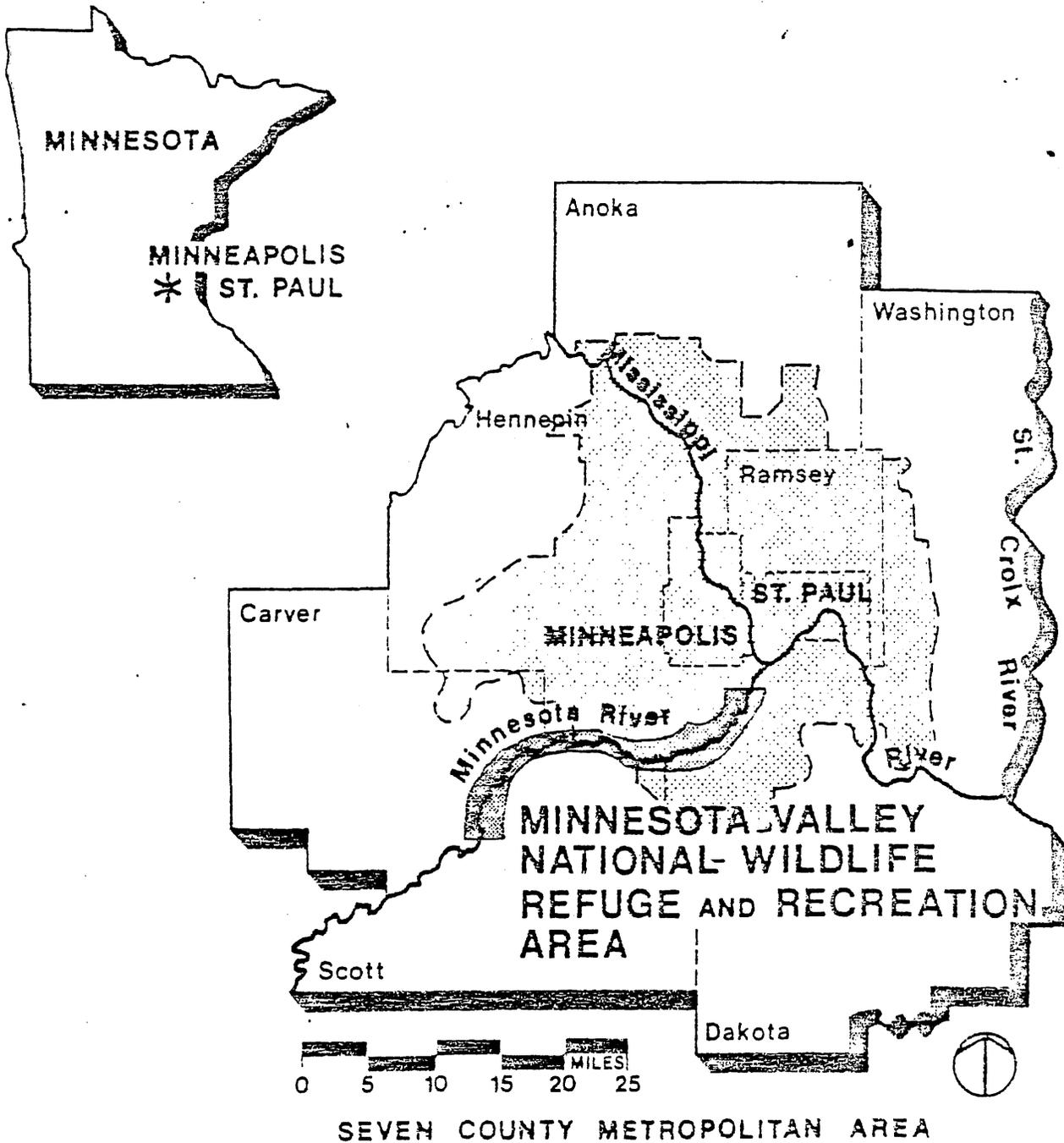


FROM: MINNESOTA VALLEY
NATIONAL WILDLIFE REFUGE
ENVIRONMENTAL IMPACT STATEMENT,
MAY, 1982

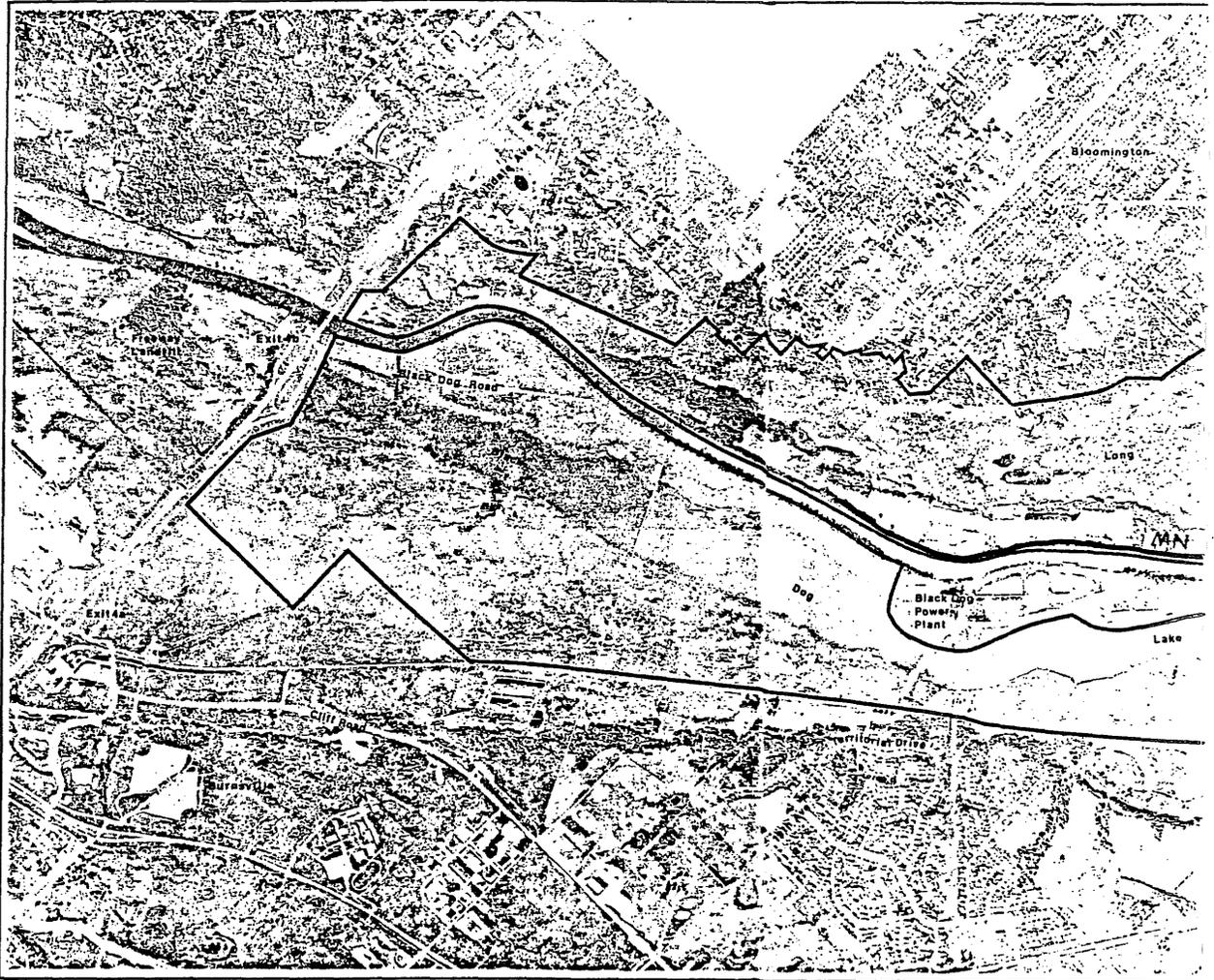
FIGURE 2



Location



FROM: MINNESOTA VALLEY NATIONAL WILDLIFE REFUGE
ENVIRONMENTAL IMPACT STATEMENT
MAY, 1982



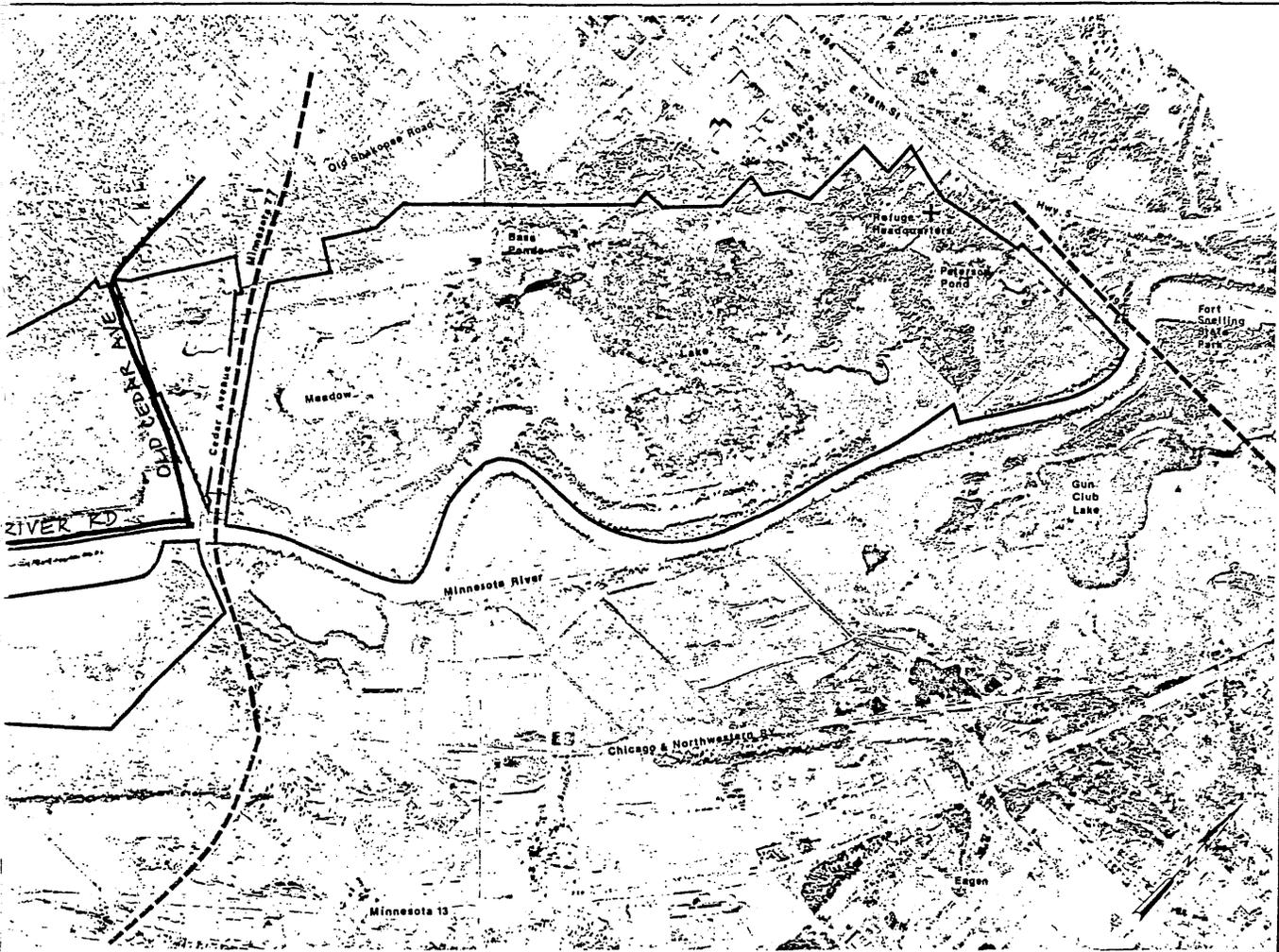
MINNESOTA VALLEY

NATIONAL WILDLIFE REFUGE

U.S. FISH AND WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR



FIGURE 3

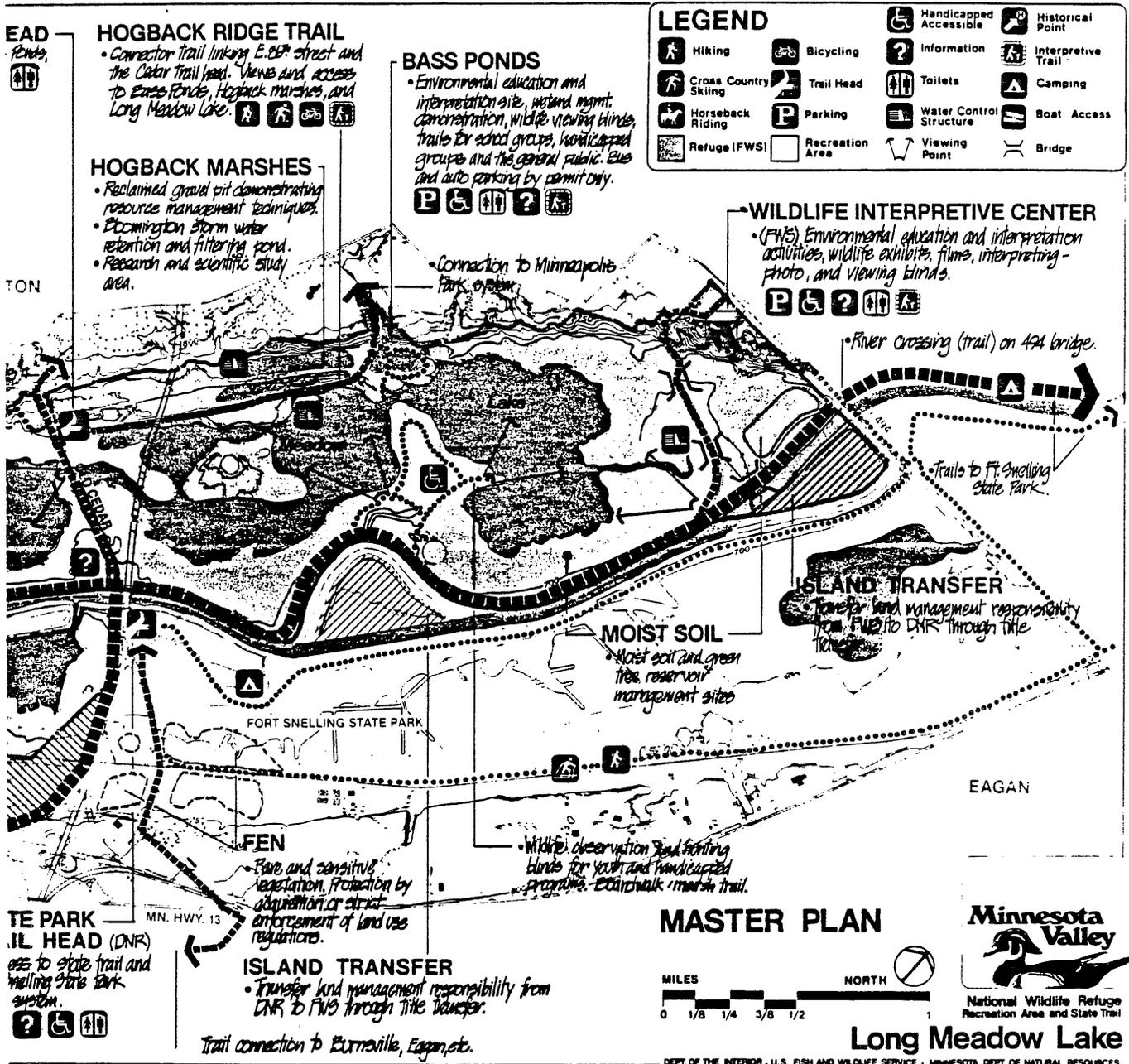


SCALE
1/2 3/4 1 MILE
0.8 1.6 KILOMETERS



LONG MEADOW LAKE UNIT
BLACK DOG LAKE UNIT

FIGURE 4



LONG MEADOW LAKE UNIT (FWS)

(West)

- Wildlife sanctuary emphasis
- No internal marsh trails
- Manage resources for diversity and abundance of wildlife.
- Ecological food production for wildlife

(East)

- Environmental education and wildlife interpretation
- Special consideration given to programs and facilities for handicapped, elderly and youth.
- Ecological food production for wildlife.
- Pasture wetlands.

OLD CEDAR TRAIL H

- (FWS) Access to state trail, Easement and secondary trails. **P ?**

MINNESOTA VALLEY STATE TRAIL

- (DNR) Multi-use trail using existing dirt road located on the natural levee adjacent to the river. Fort Snelling to County Road 16.

LYNDALE MARINA TRAIL HEAD (FWS)

- Access to state trail and secondary trails



BLOOMINGTON BLUFFS

- Steep south facing slopes on coarse sandy loam soils, highly susceptible to erosion resulting in sedimentation of lakes streams and wetlands. Strict enforcement of bluff development guidelines outlined in the Bloomington comprehensive plan. The process begins with the development and adoption of specific policies.

BLOOMING

connection with Bloomington trail

Bloomington Bluff Trail (FWS) connecting to trail

Long

Lake

BLACK DOG LAKE UNIT

- Limited public use
- Managed in-kind lands with agreement with Northern States Power Co.
- Wildlife management and research

MINNESOTA VALLEY STATE TRAIL south

- (DNR) Multi-use trail following top of bluff and river levee Ft. Snelling State Park to Rice Lake Wetlands



BURNSVILLE

FEN (orchard bog/wet prairie)

- Recommend FWS acquisition
- Rare and sensitive for plant community requiring protection.
- Research and scientific study area.

BLACK DOG PARK TRAIL HEAD

- Burnsville access to the state trail.

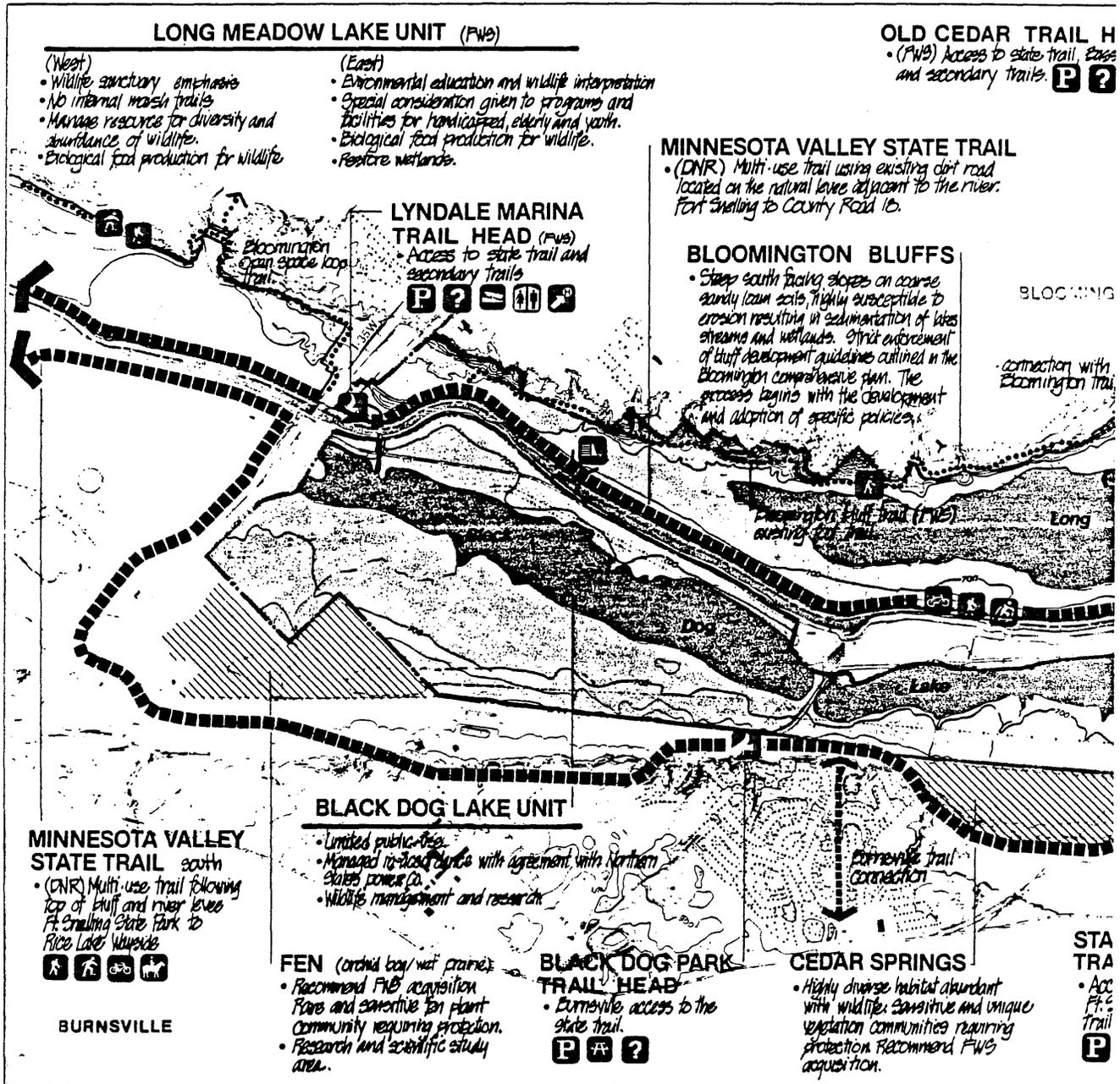


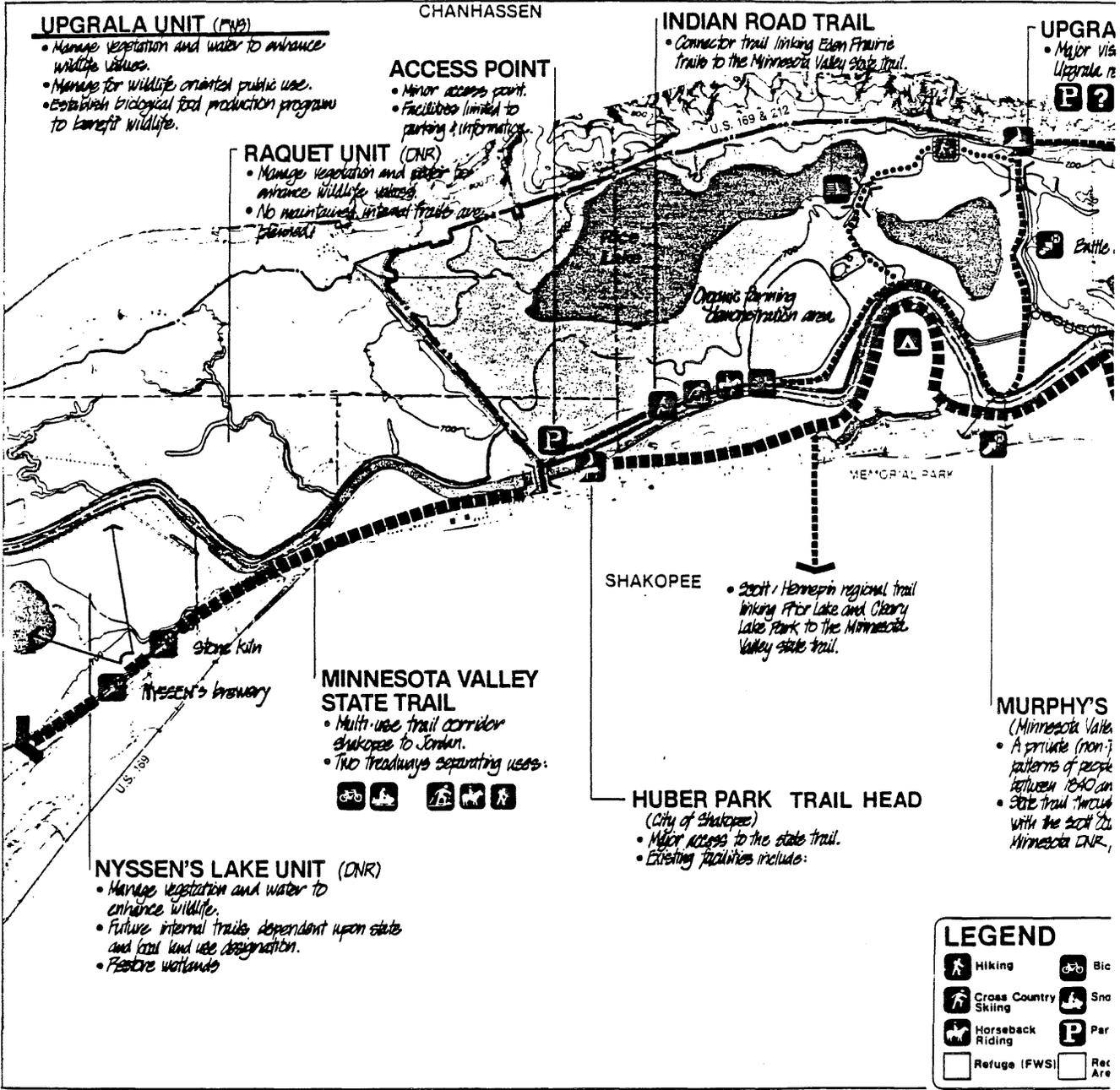
CEDAR SPRINGS

- Highly diverse habitat abundant with wildlife. Sensitive and unique vegetation communities requiring protection. Recommend FWS acquisition.

STA TRA

- Access to State Trail





UPGRALA UNIT (FWS)

- Manage vegetation and water to enhance wildlife values.
- Manage for wildlife oriented public use.
- Establish biological food production program to benefit wildlife.

ACCESS POINT

- Minor access point.
- Facilities limited to parking & information.

INDIAN ROAD TRAIL

- Connector trail linking Eden Prairie trails to the Minnesota Valley state trail.

UPGRA

- Major vis Upgrala re

RAQUET UNIT (DNR)

- Manage vegetation and water to enhance wildlife values.
- No maintained internal trails are planned.

Organic Farming Demonstration Area

MINNESOTA VALLEY STATE TRAIL

- Multi-use trail corridor Shakopee to Jordan.
- Two treadways separating users.



NYSSSEN'S LAKE UNIT (DNR)

- Manage vegetation and water to enhance wildlife.
- Future internal trails dependent upon state and local land use designation.
- Restore wetlands

SHAKOPEE

- Scott / Hennepin regional trail linking Prior Lake and Cleary Lake Park to the Minnesota Valley state trail.

HUBER PARK TRAIL HEAD

- Major access to the state trail.
- Existing facilities include:

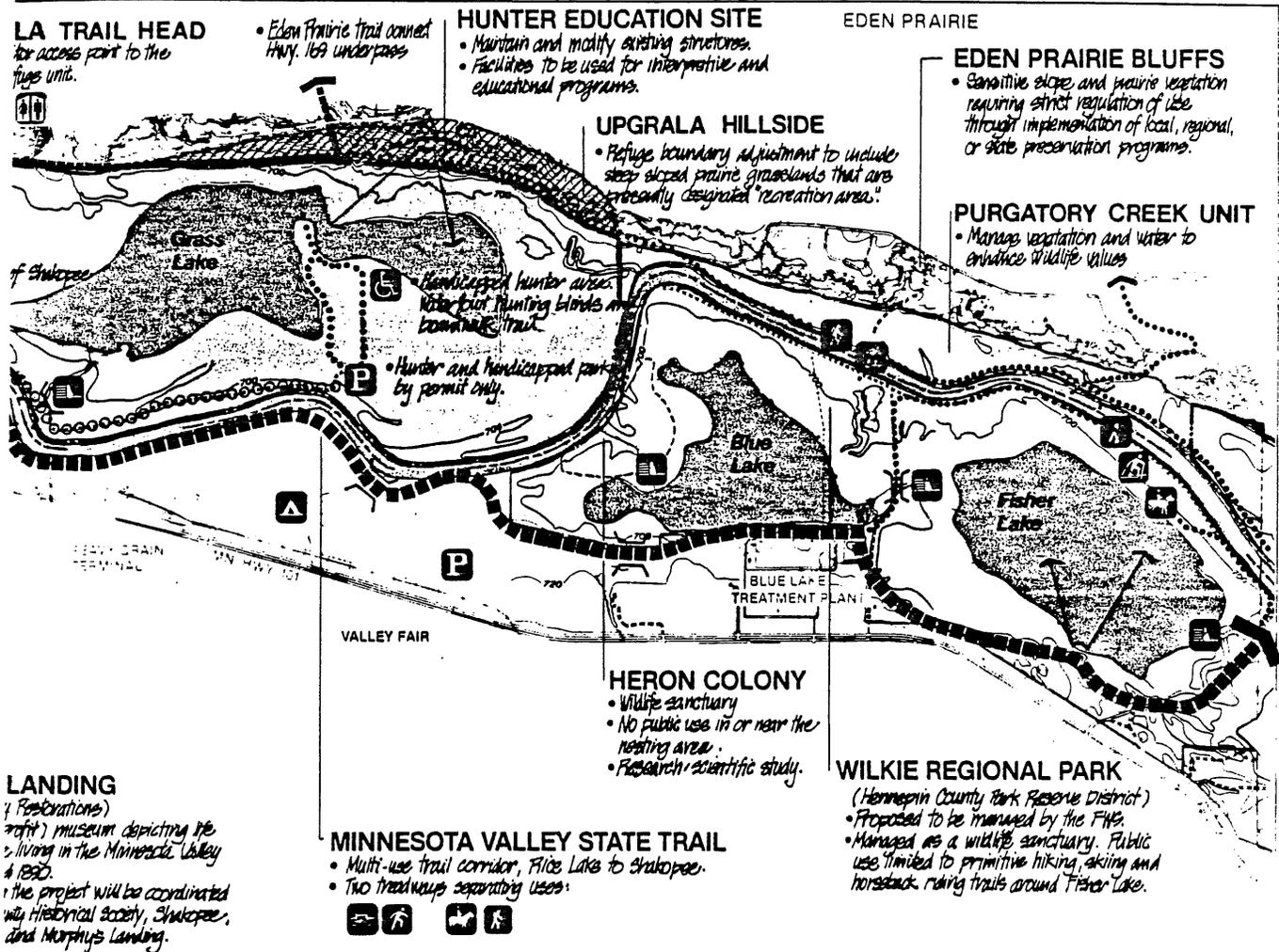
MURPHY'S

- (Minnesota Valley)
- A private (non-) pattern of people between 1840 and
- State trail through with the Scott Co Minnesota DNR.

LEGEND

	Hiking		Bic
	Cross Country Skiing		Sno
	Horseback Riding		Par
	Refuge (FWS)		Rec Area

FIGURE 5



	Handicapped Accessible		Historical Point		Picnicking
	Information		Interpretive Trail		Bridge
	Toilets		Camping		Viewing Point
	Water Control Structure		Boat Access		
	Boundary Adjustment		Trail Head		

MASTER PLAN



National Wildlife Refuge Recreation Area and State Trail

Uprala

WHITEWATER WILDLIFE MANAGEMENT AREA
THE TROUT VALLEY UNIT

WHITEWATER WILDLIFE MANAGEMENT AREA
THE TROUT VALLEY UNIT

II. Methodology

Data collected for this case study came from various sources. Literature reviewed included the Whitewater Wildlife Management Area Master Plan, 1977-1986, and various area and trail maps of both the Whitewater Wildlife Management Area and Trout Valley Management Area. Individuals contacted included both the Area and Site Manager of the Whitewater WMA, the first area manager of the management area, DNR Specialists of the area from the Departments of Fisheries and Wildlife, the Area Forester in charge of Trout Valley Management Area, the Area Conservation Officer, and local county sheriffs. These individuals helped to provide both the historical and current perspectives of ORV use in both areas. They also provided information on the impact of ORV use on each of their areas of specialization, and suggested solutions to help alleviate the problem.

ORV users of the area were interviewed to obtain their opinions and use patterns. These people were interviewed either on site or by telephone. Approximately 6 hours were spent in observation at the Trout Valley site and 6 hours at the North Branch Whitewater site. Neighbors of the North Branch site were interviewed, as were local residents. An ORV dealer in Rochester was interviewed to determine sales and use patterns from an economic viewpoint. All on-site interviews and observations were made on October 7-8 and October 17-18, 1983.

III. Description of the Case

This particular case study in the southeastern part of the State of Minnesota involves two distinct sites. One is the north branch of the Whitewater River within the boundaries of the Whitewater Wildlife Management Area. The other is the Trout Valley Trail within the Trout Valley Unit of the Richard J. Dorer Memorial Hardwood State Forest.

The Two sites and their circumstances are different from each other and have been lumped together largely because of their geographical proximity to each other. For comparison, this report frequently moves back and forth between the two sites. Hopefully the transitions are defined, as it is important to keep the distinctions clear.

A. Description of Management Unit's Physical Characteristics

1. Purpose of Minnesota Wildlife Management Areas and State Forests. Minnesota's Wildlife Management Areas are administered by the Commissioner of Natural Resources to perpetuate, and if necessary reestablish quality wildlife habitat for the maximum production of a variety of wildlife species. These areas are land and water habitats having a high potential for wildlife production and with the purpose of producing opportunities for public hunting, fishing, trapping, and other compatible outdoor recreational uses.

Somewhat similarly, Minnesota's state forests were established to produce timber and other forest crops, provide outdoor recreation, protect watersheds, and perpetuate rare and distinctive species of native flora and fauna. Multiple use management is practiced on all state forests. Land suitability and the demand for various products and services are considered when deciding which uses will receive emphasis on a given unit.

2. History of Establishment

Before the 1850's, few people visited the Whitewater River Valley other than fur trappers. However, the fertile soils and ample water power in the valley led to its rapid settlement and cultivation in the mid-1850's.

The major crop was wheat to meet the growing demand which resulted from increasing populations regionally as well as in New England and Europe. Because of various factors in the 1870's, agriculture shifted from wheat to hog and cattle farming and associated corn production. By 1900, excessive land clearing, over-pasturing, and unwise cultivation practices began causing serious hillside erosion and valley flooding. Farming became impossible in the Whitewater Valley, causing people to leave. By the 1930's emigration from the valley was almost complete.

In 1932, the State of Minnesota began acquiring land in the valley for the Whitewater Wildlife Management Area. The Minnesota Conservation Commission authorized a 10,000 acre project. By 1938, approximately 3,000 acres were acquired. Acquisition efforts increased in 1940 with funds from a federal excise tax on sporting arms and ammunition. By 1942, 8,000 acres had been acquired. To protect state-owned lands from severe soil erosion problems, additional land was needed. In 1942, the County Commissioners and Governor of Minnesota approved a project expansion. Acquisition was limited to approximately 39,180 acre in 1951. In 1971, the project was modified by deleting 660 acres containing substantial cropland and adding 1,074 acres of mostly forest and marsh land. As of 1977, land holdings totaled 25,224 acres.

Between 1934 and 1936, Public Works Act laborers built ponds and fish raceways for a fish rearing station on the first parcel of land purchased for the management area. In 1938, the rearing station was transferred to the Section of Fisheries. Trout for stocking throughout Minnesota are raised at the station.

Following the creation of the Whitewater WMA, the desire for additional conservation practices caused the Minnesota legislature to establish the Richard J. Dorer Memorial Hardwood State Forest in 1961. The Trout Valley Management Unit comprises 2,375 acres of the Memorial Hardwood Forest.

3. Regional description

The Richard J. Dorer Memorial Hardwood State Forest lies along the Mississippi River within Dakota, Dodge, Fillmore, Goodhue, Houston, Olmsted, Wabasha, and Winona counties. The cities of Austin, Mankato, Minneapolis, St. Paul, Rochester, Winona, and La Crosse are located within 100 miles. The study areas are in Wabasha, Olmsted and Winona counties.

The three counties are basically agricultural. Many aspects of farming in the counties have changed throughout its history. In particular, the number of farms and acres farmed have declined, while the average farm size has increased slightly. Forested areas range from a low 8% in Olmsted to 32.9% in Winona County. Because the pulpwood market and softwood growing stock are limited in southeastern Minnesota, hardwood sawtimber is the most important forest product in the region.

A variety of recreational opportunities are available on public land in the three county area (Table 2). In addition to the Whitewater WMA and Trout Valley MU, there are approximately 7,300 acres in three state parks and a state wayside, about 6,600 acres in eight additional wildlife management areas, and 11,400 acres of forest land. Twenty camping areas furnish 721 campsites.

4. Site Inventory--Climate

Certain climatic aspects of the Whitewater WMA and Trout Valley MU vary markedly depending on the slope and directional exposure of the land. South and west facing slopes generally are warmer, drier, and have less snow cover than north and east-facing slopes and bottomlands. January is normally the coldest month, averaging 15.7 F while July is the warmest month and averages 73.4 F (Table 3). Temperatures below -20 F and above 90 F are common. Approximately 150 days during the year are frost free. Yearly precipitation averages 31.33 inches, higher than almost all other regions in Minnesota. Most of the precipitation falls in May through September. Approximately 42.5 inches of snow falls yearly with the greatest amounts in March. The ground is covered an average of 85 days per year. Prevailing winds are from the northwest during the fall and winter and south and southwest in the spring and summer.

a. Topography

The Whitewater WMA and Trout Valley MU border a region in southeastern Wisconsin and northwestern Illinois, the "driftless area," that was never glaciated. Although the management areas were not covered with ice during the last Wisconsin glaciation, they were during earlier glaciations.

Both regions are characterized by comparatively level uplands with elevations of 1,000 to 1,200 feet above sea level and deeply eroded bedrock valleys descending to about 650 feet in elevation. All major bedrock formations in the region are highest in the northeast and descend at approximately 15 feet per mile to the southwest. Bedrock in the valleys originated in the Cambrian period and belongs to five major formations of groups.

b. Soils

Soil descriptions for the study areas were compiled from a Winona, Wabasha, and Olmsted County soil survey. A thin layer of unconsolidated deposits covers the bedrock of the area. The upland benches are covered with fine silt and sand from 0-50 feet deep. This material, dating from the main Wisconsin glaciation, was derived from Mississippi River or tributary outwash plains and carried by wind to the Whitewater area. These deposits extend onto the valley slopes but often leave bedrock behind. The valley floors are mantled with a layer of alluvium and valley fill 50-100 feet thick and are composed of clay, silt, sand and gravel. The soils of both the North Branch and Trout Valley are predominately very fertile. Both areas also have a high soil erosion and flooding potential (Figure 2).

c. Water

The study areas are located in the Whitewater River Watershed. This system drains about 300 square miles of land before emptying into the Mississippi River near Weaver, Minnesota. A total of 49 miles of streams is found in the area. There are about 45 small impounded upland pools and 7 impounded bottomland wetlands within the watershed. Much of the area is floodplain. Portions of the flood plain are inundated almost annually during spring melt and runoff. Because of the steepness of the watershed, the floodplain may also flood after heavy rains.

The North Branch Whitewater is a designated trout stream in Winona County, T.107N, R10W, S. 5,6,7,8,9; Wabasha County T.108N, R.11W, S.32,33,34; and Olmsted County, T.107N, R.11W, S.1,2,3 (Figure 3). The portion of the stream that is managed for trout is the lower 8.3 miles. The stream flows for 6.2 miles from the source through rolling, lightly wooded farmland before entering a narrow, deep valley. The gradient along this part of the stream is about 8 feet per mile. The remainder of the stream flows through a wooded valley until reaching the old Fairwater settlement, after which much of the valley is open land. Stream gradients through the lower 14 miles of the stream are more than 22 feet per mile in the upper portion, decreasing to about 13 feet per mile approaching the river mouth.

Trout Creek begins in Winona County (Section 29, T.108N, R.9W; Fig. 4). The stream flows 7.2 miles north before joining the Whitewater River. The upper stretches of the stream flow through open pasture and wooded pasture; the lower portion flows through heavily wooded land. The stream gradient decreases from approximately 25 feet per mile near the headwaters to about 8 feet per mile near the confluence with the Whitewater River.

d. Vegetation

The irregular topography and different slope aspects found in the Whitewater WMA and Trout Valley MU support a variety of vegetation. More than 400 species of plants have been identified. Presettlement vegetation was probably tall grass prairie and forests of hardwood trees. Other historical accounts show prairies on uplands bordering the management areas to the southwest, bottomland forests along the river floodplains, and upland forests in the remainder of the area. Presently (Figure 5), oaks are the predominate trees on most of the drier soils, but forests of sugar maple and basswood grow on some north and east-facing slopes. In contrast, short-grass prairies occur on the steepest and driest south and west-facing slopes. Forests of elm, ash, cottonwood, and black walnut grow along the streams and are interspersed with small, scattered wetlands.

The vegetation of the North Branch Whitewater is predominately white and bur oaks along the slopes; elm, ash, and mixed hardwood along the floodplain; and old fields along the bench. In the Trout Valley MU, the flat ridge tops are open agricultural land while the slopes are covered by oak-hickory forests. Aspen, birch and black walnut are also found growing on the slopes. The valley bottom is a mixture of cropland, pasture, and woods.

e. Wildlife

A total of 237 species of birds is regularly found in the vicinity, and 108 are either year-round or summer residents and probably nest in the area. Seven species occur only as winter visitors, and 122 nonresident species are regular spring and fall migrants. The peregrine falcon, an endangered species, occurs rarely. Thirty-three species of game birds are hunted. Wood ducks, mallards, and blue-winged teal are the most common resident waterfowl; ruffed grouse, turkey, and ring-necked phasant are abundant upland game birds. A wide variety of shorebirds live in the wetlands, while wood warblers, vireos, and thrushes inhabit the forest. Several species of grassland songbirds are common in open areas. Bald and golden eagles are often seen in the fall and winter, while several species of hawks and the turkey vulture are common during warmer months.

As many as 49 different species of mammals (Table 4) occur on the area. The white-tailed deer is the most common game animal followed by fox, grey squirrels, and the raccoon. Raccoon, red and grey fox, muskrat, and beaver are also trapped. No mammal considered endangered or threatened by the Minnesota DNR or the U.S. Department of the Interior inhabit the area.

Thirty-seven species of fish occur in the Whitewater River (Table 5). Nine species of game fish occur, the most important being the brown trout. Substantial populations of wild brown trout are present through much of the streams but are supplemented with hatchery raised fish. Nine non-game species are found in Trout Creek. Brown trout is the only game fish found there.

f. Land use

Wildlife Management Areas in Minnesota are available for a broad spectrum of public uses. Outdoor recreation has always accounted for the largest share of public use, but areas are also used for timber harvest, cooperative farming, and environmental education. Hunting has been a dominant recreational use of both management areas. Most use is by small game hunters, followed closely by deer hunters, and lastly by waterfowl hunters. Because of high participation and a relatively short season, deer hunting is the most intensive use. Trapping in the area is regulated through permits issued by the resident manager. Muskrats have been the most important species trapped for both number and fur value.

Fishing pressure on the North Branch Whitewater is high at about 1000 fisherman hours per mile. This is due to ease of access and traditionally "heavy" stocking. Fishing pressure is limited mostly to pedestrian access. Trout fishing occurs from mid-April through September with the highest numbers of anglers present from April through June. Angling pressure is high in the lower 2.1 miles, at about 2,000 hours per mile. The current annual stocking quota is: 3,500 brown trout yearlings, 8,000 brown trout fingerlings, and 5,000 rainbow trout fingerlings.

Additional recreational activities in the area include bird watching, walking, cross-country skiing, and nature study. In addition, snowmobiles, horses, and various types of off-road vehicles are common.

g. Summary of Forest Products - Recreation, Timber Harvest Plan

District foresters from Olmsted, Wabasha, and Winona counties are responsible for conducting timber sales with the approval of the resident manager. Forest products harvested include hard and softwood pulp, hardwood sawtimber, black walnut logs, and some fulewood. Black walnut is economically the most important timber product.

Agricultural land is leased for farming on a share-crop or cash-rent basis. Crops include hay, oats, soybeans, and corn.

h. Ownership

As of June 1, 1977, 25,224 acres of land had been purchased as part of the Whitewater WMA. Ninety-nine percent of the land was purchased from private land owners, while the balance was tax-forfeit or Minnesota Trust Fund land. Acquisition funds have come from four sources: hunting license and hunting license surcharge monies, "Resource 2000" funds from general revenue, Minnesota Resource Commission funds from a cigarette excise tax, and federal matching funds from Pittman-Robertson excise tax on sporting arms and ammunition (Table 6). Almost 99% of the acreage has been acquired with hunting license, surcharges, and federal matching funds. Of the acquisition totals, 13,362 acres remain to be purchased. Individual tracts were classified as to their immediate need by the resident manager in 1975. Basically, acquisition priorities were determined by the location, topography, and vegetation of the tract (Figure 6).

i. Features of Development

The North Branch Whitewater is paralleled by a Quincy Township road which has not been maintained since 1936 (Figure 3). Portions of this road are now impassable except to 4-wheel drive vehicles. The Section of Wildlife requested abandonment of the upper 6.2 miles of the North Branch road by the town of Quincy in 1972. At a public hearing, the Quincy Town Board decided not to vacate this road. This road is the main road used by the Divisions of Fisheries and Wildlife for maintenance of the North Branch. A small parking lot is present near the start of the road, before it makes a steep descent to the river bed. The TWSP of Elba did vacate a road which paralleled the lower 2.1 miles of the river. Two entrances to this road are available, both are closed off by gates designed to prohibit ORV use. Small parking lots are adjacent to each entrance.

Trout Valley Management Unit has seven miles of looping trails. The multi-use trail provides hiking and horseback riding opportunities during the summer and is marked and groomed for snowmobiling in the winter. The Trout Valley Trail connects the valley bottom with the ridge top and provides scenic overlooks of Trout Valley. The trail begins at the Trout Valley Demonstration Woodland, an area used to show various forest management practices (Figure 4)...

j. Summary

The main purpose of the Whitewater WMA is the production of a variety of wildlife and fish species from the forest, agricultural, marsh, and river habitats. As most of the unit is best suited for forests, management will encourage the production of forest wildlife. Optimum use of the Whitewater's fish and wildlife resources is a second management goal. Since sport hunting and fishing monies have paid for most of the acquisition, development, and operation of the Whitewater WMA, a primary concern of the unit will be providing high quality public hunting and fishing. This utilization of the area's resources will not endanger the perpetuation of any fish, wildlife, or plant species and will provide an aesthetically pleasing experience for outdoor enthusiasts.

The goals of the Trout Valley MU of the Richard J. Dorer Memorial Hardwood Forest are to foster timber production, wildlife management and soil and water conservation. Facility development will be kept minimal with emphasis on keeping the area as natural as possible while providing for the different uses.

B. Use of the Management Unit

ORV use in the Whitewater/Trout Valley area is predominately of a recreational nature. The North Branch Whitewater is heavily used by 4-wheel drive vehicles. These vehicles do not come from the local area, but rather come from larger, neighboring towns such as Rochester, Winona, and even the Twin Cities area. Organized 4W groups are seen more than single vehicles, with groups usually consisting of 6-10 vehicles. Use is not restricted to any particular age or socio-economic group, and family use is common. While the North Branch is used year-round, except when inaccessible due to snow, an increase in use is seen following heavy rains. The most heavily used days are holidays such as Memorial Day, the Fourth of July, and Labor Day. On these days, as many as 100 vehicles have been observed on the site by local residents.

The North Branch is used heavily because it is virtually the only site available for 4W use in the general area and it is easily accessible from the larger neighboring towns. The numerous river crossings by the trail add a dimension of challenge not found in other areas.

ORV use in the Trout Valley MU is totally different. Four wheel use is prohibited and gates have been erected to keep such vehicles out. However, 2W and 3W use is allowed and suitable trails are available. These same trails are also used for hiking and horseback riding. Two wheel and 3W use is mainly by local youth who live within several miles of the area. In addition to trail riding, ORV recreators also use their vehicles in Trout Valley for hunting, fishing, and nature study. As on the North Branch, use is year round, except when

inaccessible due to snow. It also increases following heavy rains. ORV's, 3W vehicles in particular, are also used locally for non-recreational purposes. Many farmers in the area own 3W vehicles for farming and maintenance. The versatility of such vehicles allows greater flexibility in daily routine and allows greater access to areas otherwise unavailable to other farm vehicles.

A Honda dealer in Rochester interviewed for this study has noted a tremendous increase in 3W sales in the past several years. Sales for 1979 were 26 vehicles, 1980 about 28, and then in 1981, jumped to 165. She attributed this jump in sales to the introduction of a new, larger 185-200cc vehicle. Sales for 1982 were also large, with approximately 175-176 sold. Predictions for 1983 are similar. The majority of the 3W vehicles sold were to farmers. The dealer expects a similar trend under current legal conditions. However, if legislation were available to legalize some sort of trail use, she predicted another large jump in sales due to a much wider user market.

C. Administration of the Management Unit

-See Description of the Management Unit's Physical Characteristics for:

- Forest management-products
- Recreation and forest use plan
- Historic practices
- Policies

Current practices--North Branch Whitewater

Trout management on the North Branch Whitewater consists of monitoring trout standing crops, stocking, limiting access, and habitat protection. The effectiveness of the current stocking program has been limited the last several years because the access needed for stocking of the upper 6.2 miles of managed water has been made impassable by off-road vehicle use (Figure 7). In order to stock the stream and to carry out trout standing crop assessments, it has been necessary to secure access across private land. DNR Section of Fisheries has always favored limiting vehicle access on the state owned land above Fairwater to authorized (DNR) vehicles for fish and wildlife management purposes. It is their opinion that fishing access to the upper 6.2 miles of managed trout water should only be available via pedestrian access. This would create an angling opportunity in a pristine setting for those wanting to get away from crowds and the noise of vehicles. This type of recreation is increasingly sought and is the hardest to provide, according to DNR Fisheries personnel.

Generally, it can be said that the North Branch is improving as a trout stream. This can be attributed to the conversion from private to public ownership of land in the watershed as it is acquired for inclusion within the Management Area. The most dramatic positive changes come from the conversion of crop and pasture land to wildland. The benefits to the stream are recognized as improved stream-bank stability, less siltation, and reduced runoff.

IV. Observed Impact, Public Benefits and Problems

The dual aspect of this particular case study provides an opportunity to compare the impacts of 3-wheelers and 2-wheelers with those of 4-wheel drive vehicles. Although only 15 miles separate the two sites, Trout Valley's non-winter motorized vehicle use is largely 2 and 3-wheelers, while the North Branch of the Whitewater River is used mostly by 4-wheelers.

To make this comparison, this study will look at the impacts on the following areas; 1) resource impacts; 2) site management; 3) other recreational use; 4) neighbors to the area; 5) other observed considerations.

A. Impacts

1. The resource impacts:

Whitewater Wildlife Management Area

Physical damage to the area about the North Branch of the Whitewater River is undeniable. In certain areas the ruts are five vehicles wide and over three feet below normal ground level (Photo no. 36). The 4-wheel drive enthusiasts admit that the pleasure in driving the area is to challenge their vehicles in difficult terrain, sometimes to the point where they need to be wrenched out by a second 4-wheeler. Those that go in alone (members of clubs such as the Winona 4-Wheelers use the area in vehicle groups of 6-10 vehicles) either dig themselves out by shovel or seek assistance from the nearby farmer.

The 4-wheelers' defense of the destruction upon the hillside and river's edge is four-fold. First of all, they claim that because Quincy Township has never vacated the road, it is their right to travel this section. They are correct in this assertion. Although the road has not been maintained since 1936, 4-wheel drive enthusiasts did, in 1972, convince Quincy Township to keep the road open. The damage inflicted, in some areas, is wider than the roadbed. Furthermore, the Wildlife Management Area (WMA) officials claim that correct location of the Township right-of-way can no longer be discerned. At the present, no vehicle other than a 4-wheeler can successfully traverse the road.

Secondly, 4-wheelers claim that the organized 4-wheel groups are careful to stay within the Quincy Township Road and not abuse any other area. This may be the case now, but was not so in the summer of 1974 when a member of the Winona 4-Wheelers was charged with 1) driving on the section of road vacated by Elba Township, and 2) disorderly conduct towards a DNR official. The member of the 4-wheeler club was fined for disorderly conduct, but was acquitted of illegal vehicle use because the procedure used to vacate the road was in question.

Thirdly, the 4-wheelers claim that their recreation is as worthy a form of recreation as any other, and the Whitewater River is the only state property available in the entire southeastern section of Minnesota. Their only other option is Camp McCoy in Wisconsin. Finally, the 4-wheelers claim that the Whitewater River floods so devastatingly each year that any damage done by the vehicles is insignificant compared to the power of nature.

DNR officials respond that the 4-wheelers have no business in the Wildlife Management Area because wildlife habitat within the utilized area is disrupted. However, if surrounding natural areas remain undamaged, most wildlife should not be heavily affected. The one exception may be the fish population, as river crossings and driving in the river damage its banks and cause excessive siltation. The crossing points have trout spawning nests, and any siltation threatens successful trout reproduction. Also the straight descent from the north ridge into the river valley encourages unnecessary erosion.

The largest impact as far as physical damage in the area may be aesthetic. Deep ruts mar the 4-mile stretch of river (Photos nos. 29-38). The extent of the impact is most evident when compared to the eastern section of the same road. This part of the road has been vacated by Elba Township and is now closed to public vehicle traffic (see figure 3). The two entrances to the eastern vacated end of the road have been gated. As a result, one entrance has become a single-lane footpath (Photo no. 21). The other entrance has completely grown over, although it is occasionally used by fish stocking vehicles. (Photo no. 18). By contrast, the western entrance, which is still open to 4-wheel drive use, is clearly identifiable, with deep ruts and holes occurring on much of what is thought to be the original roadbed.

It is not only WMA employees that criticize the 4-wheel use. Both the Sierra Club and the Izaak Walton League spoke in support of vacating the road during the 1972 Quincy Township debate on the matter. The director of a Rochester nature center sent a letter in 1977 to the then acting DNR Commissioner Mike O'Donnell stating that "the ban on motorized vehicles is a necessary part of wildlife management." The nature center director, in his letter, made it clear that he was referring specifically to the North Branch of the Whitewater River. (Figure 8).

Trout Valley

Conversely, the visible impacts upon the Trout Valley Trail by 2 and 3-wheel vehicles are negligible. The Lewiston District Forester pointed out that at current levels of use, motorized 2 and 3-wheel vehicles do about as much damage as horseback riders using the same trail.

Trout Valley Trail has both an eastern and western entrance. The latter has a locked gate which limits access to only 2 and 3-wheel vehicles, in addition to horse and hiking traffic. The gate at the eastern entrance has been kept unlocked to allow those with fuelwood permits access into the area. Yet 4-wheelers need not pass through the gate, as a steep undesignated access approximately 30 yards south of the gate allows them to drive around the gate (Photo no. 11). The trail on the eastern end clearly has more rutting and erosion than does the western portion. However, the source of the rutting is not known. Impacts could be from 4-wheel drive vehicles, but could just as well be caused by vehicles holding fuelwood permits or even by vehicles involved in a timber harvest that occurred in the area during the summer of 1983. In its current condition, the road can still be negotiated by vehicles other than 4-wheel drive ones.

2. Impacts on sites management

Whitewater Wildlife Management Area

In the WWMA, off-the-road use affects management in two ways. One involves law enforcement along the North Branch of the Whitewater River. The other involves trout stocking operations.

The conservation officer in Plainview states that ORV users did not present an enforcement problem. He has yet to encounter large groups of 4-wheelers, but has found solitary 4-wheelers cooperative each time he has had reason to talk to them. If he was called upon to deal with a problem on the North Branch, the conservation officer admits that he would not know what to do, as the location of the Quincy Township Road is unclear. He states that his only grounds for citation might be to cite a person driving up and down the river during spawning season, basing the citation on habitat destruction.

Managers of the WWMA, as well as staff from DNR Fisheries, state that their confrontations with 4-wheelers have not been as cordial as those of the conservation officer. As an example, these staff referred to the 1974 incident between the Winona 4-wheelers and a DNR official. This is the same incident mentioned earlier in this report, in which a member of the 4-wheelers was cited for disorderly conduct and driving on the vacated road.

Concerning management of the North Branch as a trout stream, a 1979 office memorandum from the Regional Fisheries Supervisor suggested that expensive management of the trout population could not be justified so long as 4-wheelers continued to tear up access roads and to destroy trout habitat. This memo was the result of an incident on July 23, 1979 in which a DNR vehicle carrying a load of fish became stuck in a rut caused by 4-wheelers (Figure 1). Some of the load died, and those fish that did survive had to be dumped into the river at the point

where the truck became stuck. Fisheries staff note that maintenance of the road is pointless as they are able to complete only one stocking operation before the 4-wheelers destroy the road beyond use by anyone other than the 4-wheelers. The road condition also precludes fish population assessment.

Trout Valley

Ironically, management concerning off-the-road vehicles within the Trout Valley Unit may be less difficult on the Trout Valley Trail than in other parts of the unit. According to the Lewiston District Forester, this is because he has more authority to regulate vehicle use on the trail than he does off the trail.

To prevent the tearing out of water bars on the trail and to appease crop leasees that complained of vehicles driving through their fields, gates were constructed at the entrances to the Trout Valley Trail. The gate at the west entrance is approximately four years old, while the gate at the east entrance is only two years old. When first put in, the gate at the east end was destroyed twice, but there have been no problems recently. The gates are effective in keeping out most 4-wheel traffic, especially during the critical shotgun deer season. Vehicles used for timber and fuelwood sales do use the Trout Valley Trail, but their use can be limited to times of the season when resource impact and interference with other users can be minimized.

3. Impacts on Other Recreational Use:

Whitewater Wildlife Management Area

The WWMA Manager feels that his first priorities are to those recreators who hunt and fish the area. In his opinion, game management and ORV use are not compatible. In 1974, the then Regional Wildlife Supervisor considered ORV impact to be "more severe than most poaching losses."

Both area managers and staff from Fisheries cite noise pollution, excessive alcohol consumption, and site deterioration as example of how 4-wheelers have destroyed one of the few opportunities in the southeastern section of the state for a solitary trout fishing experience. Local residents support such sentiments. Two local farmers and an area businessman note that the off-the-road vehicles disrupt anyone that has taken the hour or more to hike to a place along the river where they might escape the noise of vehicles. One farmer made the observation that because of 4-wheelers digging into the access road, most vehicles cannot even reach the area that the DNR had intended to be used as a parking lot. Therefore, potential hikers and walk-in fisherman may not be using the area because they have no access.

Trout Valley

The Lewiston District Forester observed that noise pollution was the biggest problem as far as motorized conflicting with non-motorized recreational use. Actual complaints have been few, which the Forester credits to the current light use by the 2-wheelers and 3-wheelers.

The two major non-motorized recreators are hunters and horseback riders. No horseback riders were encountered in the area during visits for the study. Hunters interviewed expressed either no opposition or mild opposition to 2 and 3-wheelers on the trail. Noise and a personal desire that forest lands be open only to non-motorized recreation were the reasons hunters voiced opposition. One hunter had seen 3-wheelers hauling deer from the forest and was angry that people may be hunting or driving deer with vehicles.

4. Impacts on neighbors:

Whitewater Wildlife Management Area

Two families directly feel the effects of users on the North Branch of the Whitewater River. One is a mink rancher whose home and mink pens are at the intersection of the maintained road and the unvacated Quincy Township Road (Figure 3). The other is the farmer who owns the roadbed of the Quincy Township Road prior to the road's descent into the river valley.

Both the mink rancher and the farmer voiced the opinion that 4-wheelers should not be allowed on the North Branch of the Whitewater. Both felt that the 4-wheel groups consumed excessive alcohol. The mink rancher complained of occasional noise well into the night. He observed that in 1983, the group sizes of 4-wheel vehicles was usually about 6 and not more than 9. This is quite different from the 104 4-wheel vehicles he observed in a single day a few years ago.

The farmer complained that the 4-wheelers drive into field adjacent to the Township Road. They continue to do this even after the farmer leveled the road to encourage them to stay on the roadbed. The farmer is asked to pull vehicles out of deep ruts. This is inconvenient and often is late at night, but it serves as a source of a small amount of income for the farmer. Although the 4-wheelers annoy the farmer and the mink rancher, their personal recreation has not been affected. Both the farmer and the mink rancher rarely go to the Whitewater River for reasons other than to pull out vehicles which are stuck.

The owner of a local tavern stated that the residents of the nearby town of Elba strongly dislike the 4-wheelers. The reasons that he gave were that the 4-wheelers abuse private land and tear up the local fishing and hunting grounds. The tavern owner also felt that roads on public land that at one time would have been kept open have now been closed to keep out 4-wheelers. (No DNR official suggested that this was actually the case.)

Trout Valley

No residents were contacted during the study. The Trout Valley Trail is mostly surrounded by state land, with the west end being the exception. According to the Lewiston District Forester, one local farmer makes money by charging for access to the trail from across private property. As mentioned earlier, a major reason for installing gates at the trail accesses was to appease farmers that hold crop leases along the trail. With the gates, destruction of crop fields has been greatly reduced, but not totally eliminated.

5. Other considerations:

Whitewater Wildlife Management Area

Liability along the Quincy Township Road is unclear in the minds of management area officials. If serious injury occurred along the proximate road location, would liability rest on the state, the township, or the individual injured?

Public relations suffers because of the off-the-road controversy. Four-wheeler clubs claim that the DNR is against their form of recreation because they are the only group to vocally oppose DNR plans within the WWMA.

B. Summary of Problems/Benefits:

Whitewater Wildlife Management Area

Observations support DNR claims that ORV use has disturbed the resource beyond the confines of the original roadbed. Also the road is destroyed beyond use by any vehicle other than a 4-wheel drive vehicle.

The area the WWMA map shows as a parking lot is difficult to reach in vehicles other than those that are 4-wheel drive. Also the parking lot is difficult to find when it is reached.

The north branch of the Whitewater River is the only public land in the southeastern part of the state known to 4-wheeler groups to be open to 4-wheel use.

Trout Valley

With 4-wheel drive vehicles excluded, and at current levels of use by 2 and 3-wheeled vehicles, physical impacts upon the Trout Valley Trail are negligible. Interviews of hunters on the area substantiate the district forester's claim that objections have been mild and few.

V. Recommendations

1. A clear distinction must be made between 4-wheel drive vehicles and vehicles with only 2 and 3-wheels. The destructive power of the heavy 4-wheelers dwarfs that of the 2 and 3-wheelers, and this power is magnified when the object of the 4-wheel driver is to challenge the machine in difficult terrain.

2. The Whitewater Wildlife Management Area should do whatever is possible to close vehicular traffic on the Quincy Township Road. This longstanding landownership dispute will continue to cause problems. The river area cannot be effectively managed as a WMA unless vehicular traffic is prohibited on the road.
3. If closure of Quincy Township Road is not possible, steps should be taken to confine the ORV use and impacts. This means determining the route of the original township road and signing or fencing the right-of-way. This would have to be backed up by increased enforcement, but only at times of heavy use; e.g. holidays and following heavy rains.
4. Whether or not the Quincy Township Road is closed, provide, somewhere in the southeastern part of the state, an alternate site for 4-wheelers to drive their vehicles. By the 4-wheelers own admission, it is the challenge of an area, not its aesthetic attributes, that appeal to them. This alternate 4-wheel use area could relieve use pressure on the North Branch of the Whitewater River. It may even lessen the strong opposition to the vacation of the Quincy Township Road.

If such an alternate site was provided, it should be accompanied by a major public information effort to notify 4-wheeler users of its availability and location.

5. Adequately sign the parking lot along the Quincy Township Road, so that recreators not seeking to challenge their vehicles will be encouraged to park on the ridge.
6. Allow 2-wheeled and 3-wheeled vehicles to continue their use of the Trout Valley Trail. Observe for signs of increased impacts and increased traffic to determine if future 2-wheel and 3-wheel use is appropriate.

TABLE 1

Cemeteries and stonehouses within the Whitewater WMA.

Site	Location					
Fairwater Cemetery	SE¼	NW¼	S. 9	T. 107N	R. 10W.	
Whitewater Cemetery	SW¼	SE¼	S. 22	T. 108N	R. 10W.	
Beaver Cemetery	SW¼	SW¼	S. 15	T. 108N	R. 10W.	
Young Cemetery	SW¼	SW¼	S. 1	T. 108N	R. 10W.	
Marnach House	NE¼	NW¼	S. 33	T. 108N	R. 10W.	
Kieffer-Hemmelberg House	N ½	NE¼	S. 11	T. 107N	R. 10W.	

FIGURE 1

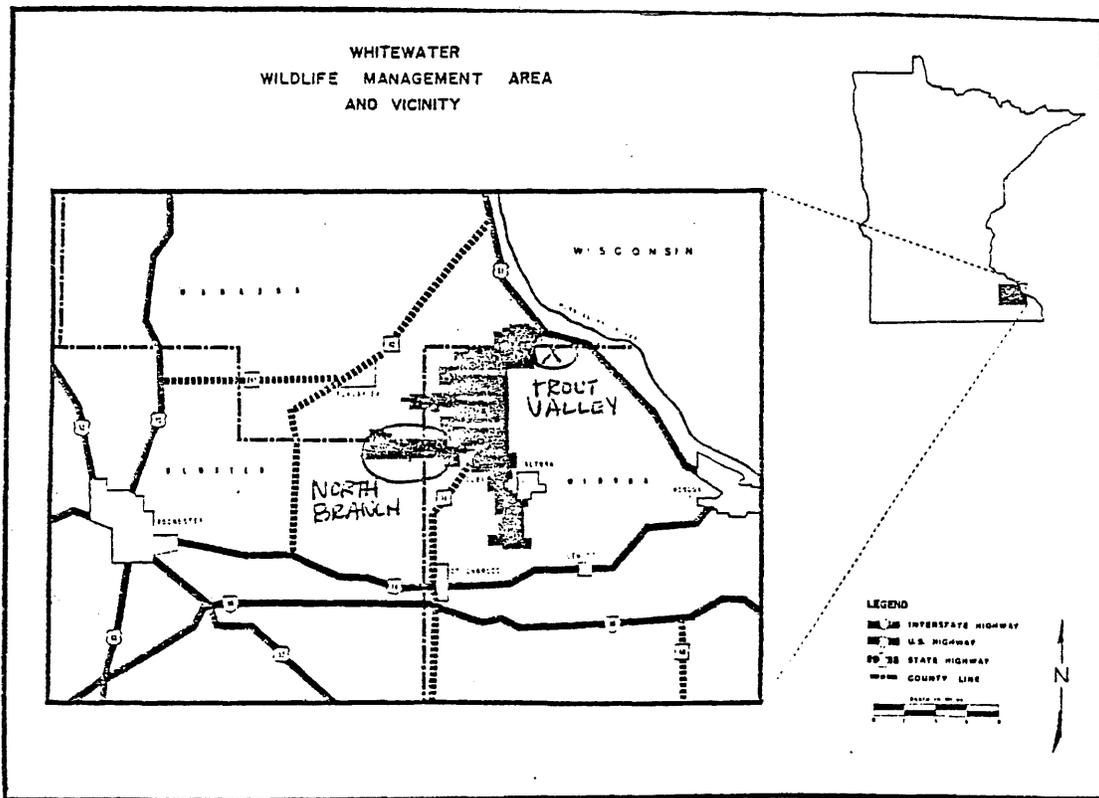


TABLE 2

Selected public recreation areas in Olmsted, Wabasha, and Winona counties.

Area	Name	Olmsted	Wabasha	Winona
State Parks (acres)	Carley		211	
	O.L. Kipp			2,835
	Whitewater			2,862
State Waysides (acres)	John Latsch			1,534
Wildlife Management Areas (acres)	Whitewater	2,924	3,775	32,481
	Keller	66		
	Rochester	550		
	Schumann	73		
	Suess	55		
	Mazeppa		3	
	I. W. L.		80	
	McCarthy		3,521	
Zumbro		1,337		
State Forest (acres)	Minnesota Memorial Hardwood	269	5,255	6,025
Public Access Sites	Sites		3	8
	Acres		3	8.7
Trails (miles)	Snowmobile	4	6	
	Hiking	7	9	31
	Horseback	4		5
	Bicycle	7		
	Motor	7	6	
Camping Areas	Tent Ar.			2
	Vehicle Area		6	6
	Total Sites	173	194	354
Picnic Areas	Areas	24	12	12
	Tables	109	229	214
Water Facilities	Swimming Beaches	1	3	1
	Marinas		6	3
	Marina Capacity (boats)		354	44

TABLE 3

Average normal temperature, precipitation, and snowfall for the Whitewater WMA vicinity, 1941-1970.

Month ¹	Average Normal Temperature (° F)	Average Normal Precipitation (inches)	Average Normal Snowfall (inches)
January	15.7	1.02	9.0
February	19.3	0.82	8.0
March	27.8	2.02	11.0
April	47.1	2.60	2.0
May	53.9	4.15	T. ²
June	63.7	4.87	0.0
July	73.4	3.98	0.0
August	71.5	3.72	0.0
September	71.9	3.23	T
October	51.8	2.07	T
November	35.5	1.72	3.5
December	21.4	1.13	9.0
Total		31.33	42.5

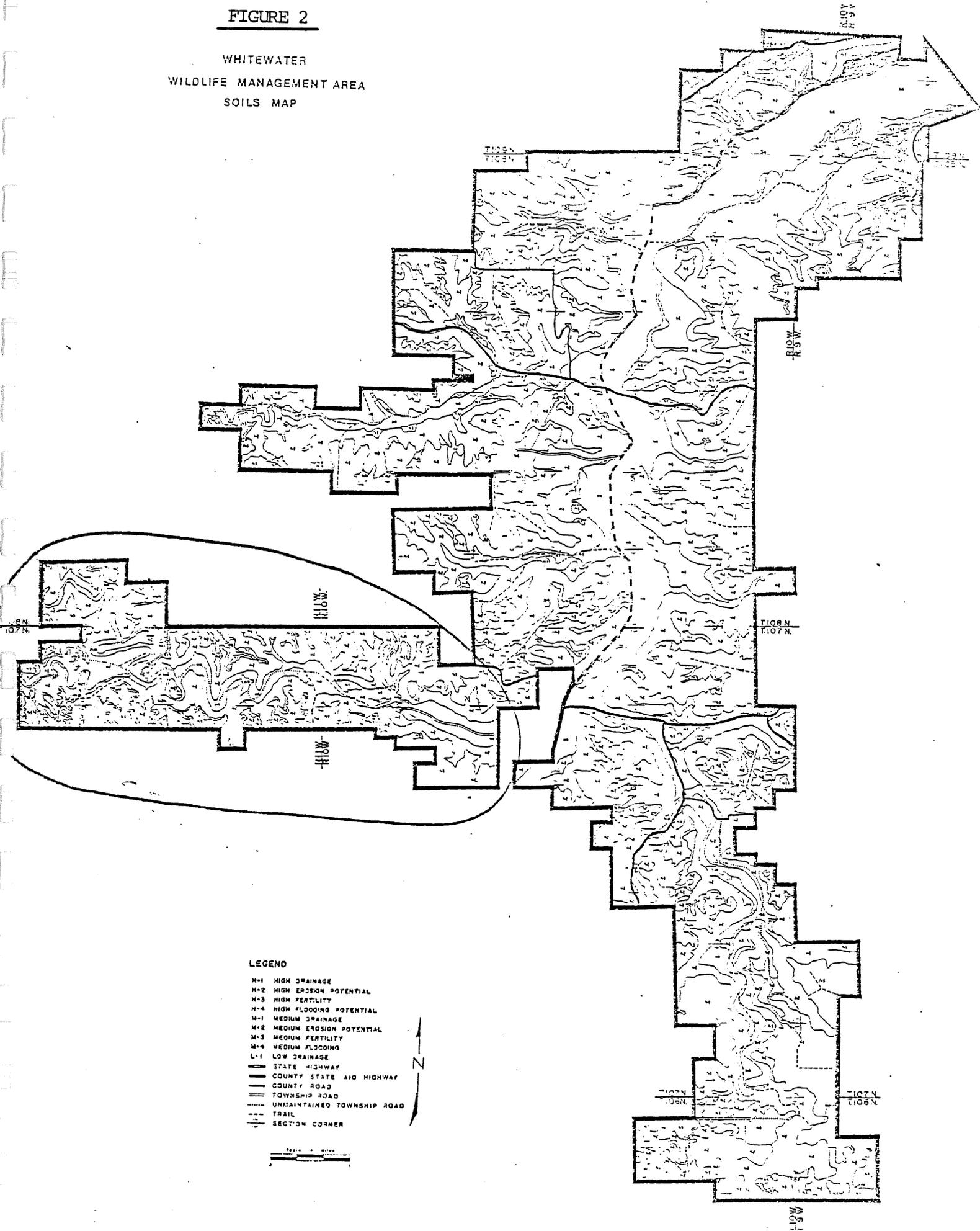
¹. Data from weather station at Winona, Minnesota.

². Trace.

Source: Forecast Office, National Weather Service. U.S. Department of Commerce. Minneapolis, Minnesota.

FIGURE 2

WHITWATER
WILDLIFE MANAGEMENT AREA
SOILS MAP



LEGEND

- M-1 HIGH DRAINAGE
- M-2 HIGH EROSION POTENTIAL
- M-3 HIGH FERTILITY
- M-4 HIGH FLOODING POTENTIAL
- M-1 MEDIUM DRAINAGE
- M-2 MEDIUM EROSION POTENTIAL
- M-3 MEDIUM FERTILITY
- M-4 MEDIUM FLOODING
- L-1 LOW DRAINAGE
- STATE HIGHWAY
- COUNTY STATE AID HIGHWAY
- COUNTY ROAD
- TOWNSHIP ROAD
- UNMAINTAINED TOWNSHIP ROAD
- TRAIL
- SECTION CORNER

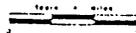
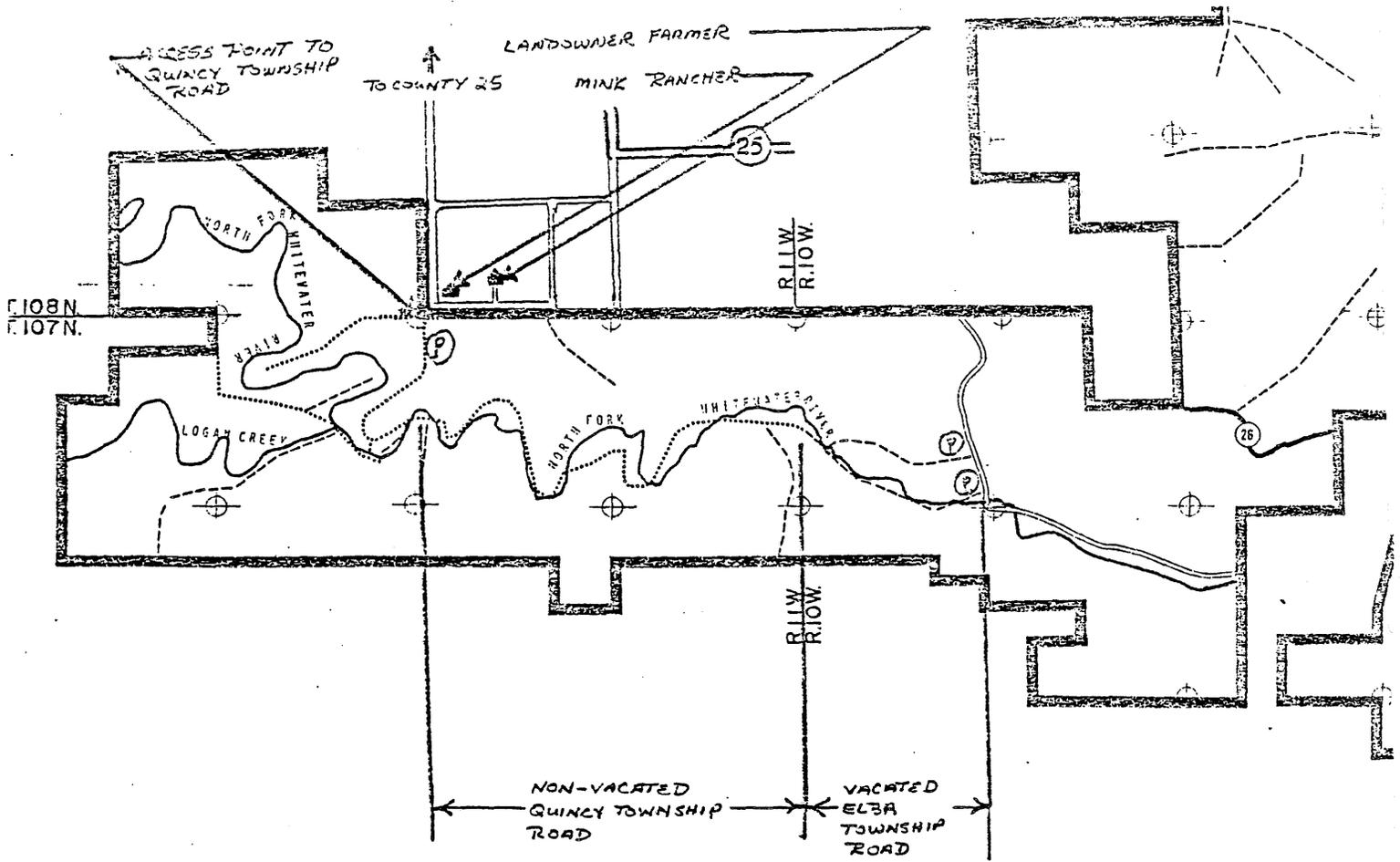


FIGURE 3



LEGEND

- STATE HIGHWAY
- COUNTY STATE AID HIGHWAY
- COUNTY ROAD
- TOWNSHIP ROAD
- UNMAINTAINED TOWNSHIP ROAD
- TRAIL
- SANCTUARY
- PARKING AREA
- HEADQUARTERS
- FISH HATCHERY
- SECTION CORNER

Scale in Miles

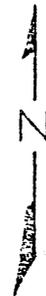
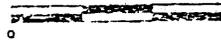
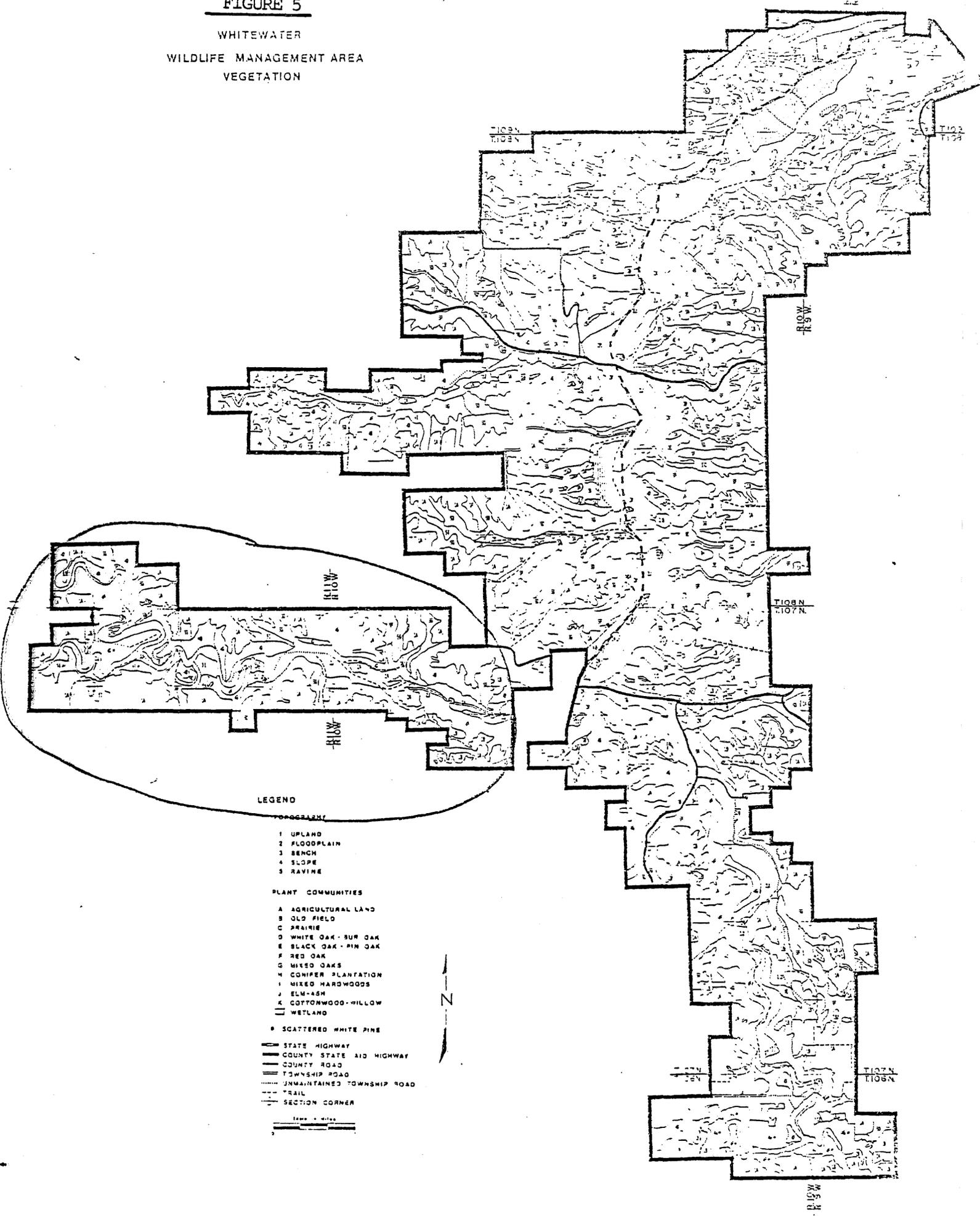


FIGURE 5

**WHITEWATER
WILDLIFE MANAGEMENT AREA
VEGETATION**



LEGEND

- TOPOGRAPHY**
- 1 UPLAND
 - 2 FLOODPLAIN
 - 3 BENCH
 - 4 SLOPE
 - 5 RAVINE
- PLANT COMMUNITIES**
- A AGRICULTURAL LAND
 - B OLD FIELD
 - C PRAIRIE
 - D WHITE OAK - BUR OAK
 - E BLACK OAK - PIN OAK
 - F RED OAK
 - G MIXED OAKS
 - H CONIFER PLANTATION
 - I MIXED HARDWOODS
 - J ELM-ASH
 - K COTTONWOOD-WILLOW
 - W WETLAND
 - SCATTERED WHITE PINE
- ROADS**
- STATE HIGHWAY
 - COUNTY STATE AID HIGHWAY
 - COUNTY ROAD
 - TOWNSHIP ROAD
 - UNMAINTAINED TOWNSHIP ROAD
 - TRAIL
 - SECTION CORNER
- Scale = 1:50,000

TABLE 4

Mammals occurring in the Whitewater WMA vicinity.

Game	Nongame
White-tailed deer	Masked shrew
Eastern cottontail	Least shrew
Fox squirrel	Eastern mole
Gray squirrel	Little brown myotis
Muskrat	Keen's myotis
Beaver	Silver-haired bat
Mink	Eastern pipistrelle
Raccoon	Big brown bat
Virginia opossum	Red bat
Coyote	Hoary bat
Red fox	Eastern chipmunk
Gray fox	Woodchuck
Badger	Thirteen-lined ground squirrel
Spotted skunk ¹	Franklin's ground squirrel
Striped skunk	Red squirrel
Bobcat ²	
Short-tailed weasel	
Long-tailed weasel	

1. Possible occurrence.
2. Probable occurrence.

TABLE 5

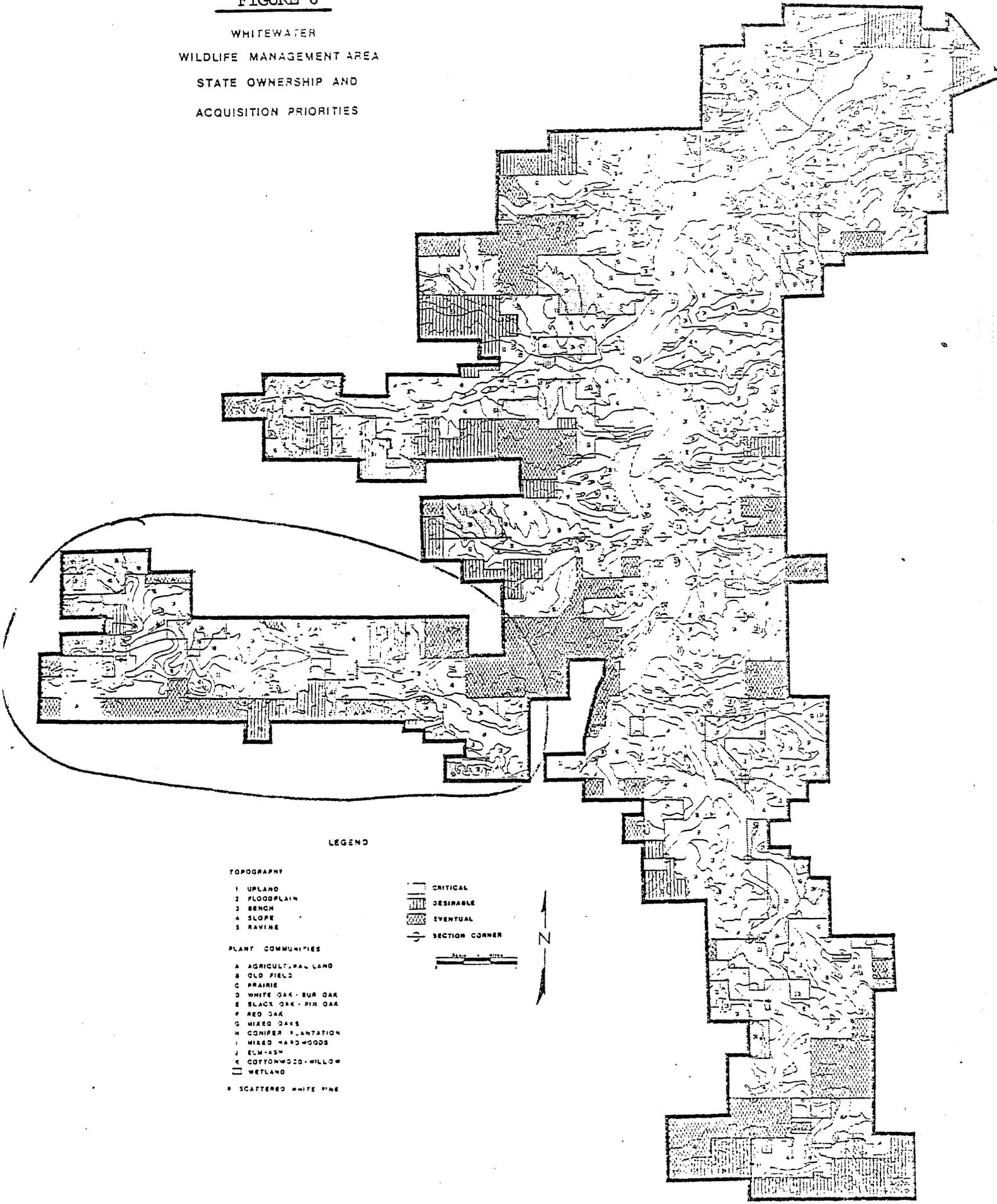
Fish occurring in the streams on the Whitewater WMA.

Game	Streams ¹					Nongame	Streams				
	A	B	C	D	E		A	B	C	D	E
Sauger	X					Freshwater drum	X				
Channel catfish	X					Burbot	X				
Brown trout	X	X	X	X	X	White sucker	X	X	X	X	X
Rainbow trout	X	X	X			Slimy sculpin	X	X	X	X	
Brook trout	X	X				Great Lakes long-nosed dace	X	X	X	X	X
Northern pike						Western black-nosed dace	X	X		X	X
Walleye	X					Central stoneroller	X	X	X	X	X
Largemouth bass	X					Northern creek chub	X	X	X	X	X
Smallmouth bass	X			X		Silver lamprey	X				
						Brook stickleback	X	X		X	X
						Fathead minnow	X	X	X	X	X
						Brassy minnow	X		X	X	
						Golden shiner	X			X	
						Central bigmouth shiner	X	X	X		
						Johnny darter	X	X	X	X	X
						Fantail darter	X		X	X	
						Black bullhead	X		X	X	
						Mudminnow	X		X	X	X
						Central common shiner	X	X			
						Brownnose minnow	X	X			

1. Streams
A. Whitewater River
B. South Fork of the Whitewater River
C. North Fork of the Whitewater River
D. Beaver Creek
E. Trout Creek

FIGURE 6

WHITEWATER
WILDLIFE MANAGEMENT AREA
STATE OWNERSHIP AND
ACQUISITION PRIORITIES



LEGEND

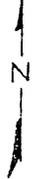
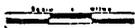
TOPOGRAPHY

- 1 UPLAND
- 2 FLOODPLAIN
- 3 BENCH
- 4 SLOPE
- 5 RAVINE

PLANT COMMUNITIES

- A AGRICULTURAL LAND
- B OLD FIELD
- C PRAIRIE
- D WHITE OAK - BUR OAK
- E BLACK OAK - PIN OAK
- F RED OAK
- G MIXED OAKS
- H CONIFER PLANTATION
- I MIXED HARDWOODS
- J ELM-ASH
- K COTTONWOOD-WILLOW
- L WETLAND
- M SCATTERED WHITE PINE

- CRITICAL
- DESIRABLE
- EVENTUAL
- SECTION CORNER



DEPARTMENT Natural Resources - Fisheries V

Office Memorandum

File No. 4670-1

TO : Bruce Hawkinson ✓
Area Fisheries Manager

DATE: July 23, 1979

FROM : James A. Schneider
Regional Fisheries Supervisor



PHONE: (507) 285-7427

SUBJECT: Trout stocking in the North Branch (Whitewater)

John Huber nearly lost a load of fish this a.m. due to getting stuck in the after-effects of a 4-wheeler party in the North Branch bottoms. He finally had to stock the load on-site to avoid losing them all (quite a few bellied up before that could be done).

There is no way we can manage even a subquality fishery in the face of these overgrown delinquents. The banks are torn to hell, the stream bed is in constant movement, the water is stirred up, and solitude is out of the question.

Until and unless this situation is corrected, we can no longer justify expensive management to our clientele. Make plans to switch our priorities over to the waters that are still manageable. Straight put-and-take stocked fish should be used where they will be caught before natural mortality takes its toll anyway. We may be able to carry in some small fish for put-grow-and take, but only if costs are commensurate with results.

sjb

cc Jerry Kuehn
Quincy Township Board
Robert Story
Trout Unlimited, Hiawatha and Winona Chapters

RECEIVED

MAR 26 1977

March 25, 1977

REGION V WILDLIFE OFFICE
2300 SILVER CREEK ROAD N
ROCHESTER, MN 55901

Mr. Mike O'Donnell
Acting Commissioner
Department of Natural Resources
Third Floor Centennial Building
St. Paul, MN 55155

Dear Mr. O'Donnell:

I'm writing this letter to you as testimony to the Comprehensive Management Plan for The Whitewater Wildlife Management Area. Because I will be unable to be present at the meeting on Tuesday, March 29, at St. Charles, I'm using this method to express my opinions.

I have an Ed Specialist degree in teaching biology and ecology and have been in education for 24 years. Currently and for the past five years, I have been director of Quarry Hill Nature Center in Rochester. Our mission here is outdoor-environmental education. I feel that I am reasonably well qualified to speak for the plans for Whitewater Management Area.

* It is obvious from a historical standpoint that the Whitewater Valley is not conducive to farming. Its present use as a wildlife management area is probably the best use. The ban on motorized vehicles is a necessary part of wildlife management. It has been proven time and again that motorized traffic produces stress conditions in animals which are not acceptable in a management area.

My understanding is that numerous four-wheel drive groups are asking that the Management Area be available to them. To allow this to happen would be deplorable and unthinkable. I strongly urge that the Management Plan be developed as proposed with no provisions for motorized traffic.

I would further recommend that the Quincy Township Road which remains open in the Whitewater's North Branch be closed as soon as possible.

Since my main goal in life is to provide people with an understanding of their environment, I appreciate the need for a large natural area where this understanding can be developed. The Management Area serves this purpose as well as serving as a "nursery" for animals which spread to surrounding private lands.

Mr. Mike O'Donnel

-2-

March 25, 1977

Again, I urge you to maintain the wildlife management status for the Whitewater with no provisions for motorized vehicles.

Thanks for your attention.

Sincerely,

QUARRY HILL NATURE CENTER

Harry L. Buck
Director

HLB:iem

cc: Governor Rudy Perpich

Howard Sheppard ✓

DNR - Region V - Wildlife

Bureau of Information
ATTENTION: Clark Anderson

Nov 22, 1974

Howard E Shepperd
Regional Wildlife Supervisor

Illegal Use of Jeeps
Whitewater W.M.A.

Last summer 17 jeeps went through barricades on the Whitewater W.M.A. and traveled along and across the North Branch of the Whitewater River following an old township road.

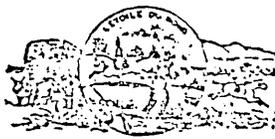
They were stopped by our men and advised that they were in violation of DNR regulations. Tempers got quite hot and Bud Gerrish, Assistant Manager, was relieved of his summons book and Bernard Ellinger, a worker on the area, was roughed up a bit. None of the jeepsters would produce identification so they all got away with it except John Heaser who was known by our men. Heaser was taken into court but got off quite easily as you can see from the attached memorandum handed down by the judge.

We occasionally read news releases that report arrests and convictions for gross game and fish violations. This is a case that does not involve killing of game but jeeps have done irreparable damage to wildlife habitat, trout stream habitat and the ecology of the North Branch in general by tearing up and down this valley. The impact on wildlife is more severe than most poaching losses.

I think it would be good if you could put together a news release on this.

HS:jp

cc: R Holmes
G Meyer



*Staff
Send reports out
7 Dec 1969*

STATE OF MINNESOTA
DEPARTMENT OF CONSERVATION
ST. PAUL, MINNESOTA 55101

December 11, 1969

Mr. David Hanson, Secretary
St. Paul Fly Tier's & Fisherman's Club
1141 Rice Street
St. Paul, Minnesota

Dear Mr. Hanson:

Commissioner Leirfallom has asked me to respond to your December 1 letter pertaining to the use of four-wheel-drive vehicles, particularly in the Whitewater area.

All of us in the Conservation Department share your concern and apprehension over the rapid development and use of off-the-road all-terrain vehicles. Our concern is not only four-wheel-drive vehicles but the multitude of other mechanical devices coming on the market now that will have the same impact.

We have gotten a number of complaints in the Whitewater area of four-wheel-drive vehicles tearing around causing erosion, siltation, etc. We've checked out the photographs that appeared in a recent Sunday supplement of the Minneapolis newspaper. In each of these cases the vehicles were operating wholly on private property or on undeveloped but nonetheless official township roads over which we have no authority.

We have reviewed this at several staff meetings and hopefully we will be able to have corrective legislation ready for the next legislative session. It appears that well-thought-out legislation will be required to regulate the use of such machinery.

In the meantime, we would like to get all specific information possible. Therefore, if your members observe destruction of trout habitat or public lands, we would like to hear about it as soon as possible. We can, of course, take legal action if such vehicles are operating without authority on State property.

Thank you again for your letter, and please keep in touch with us on this problem.

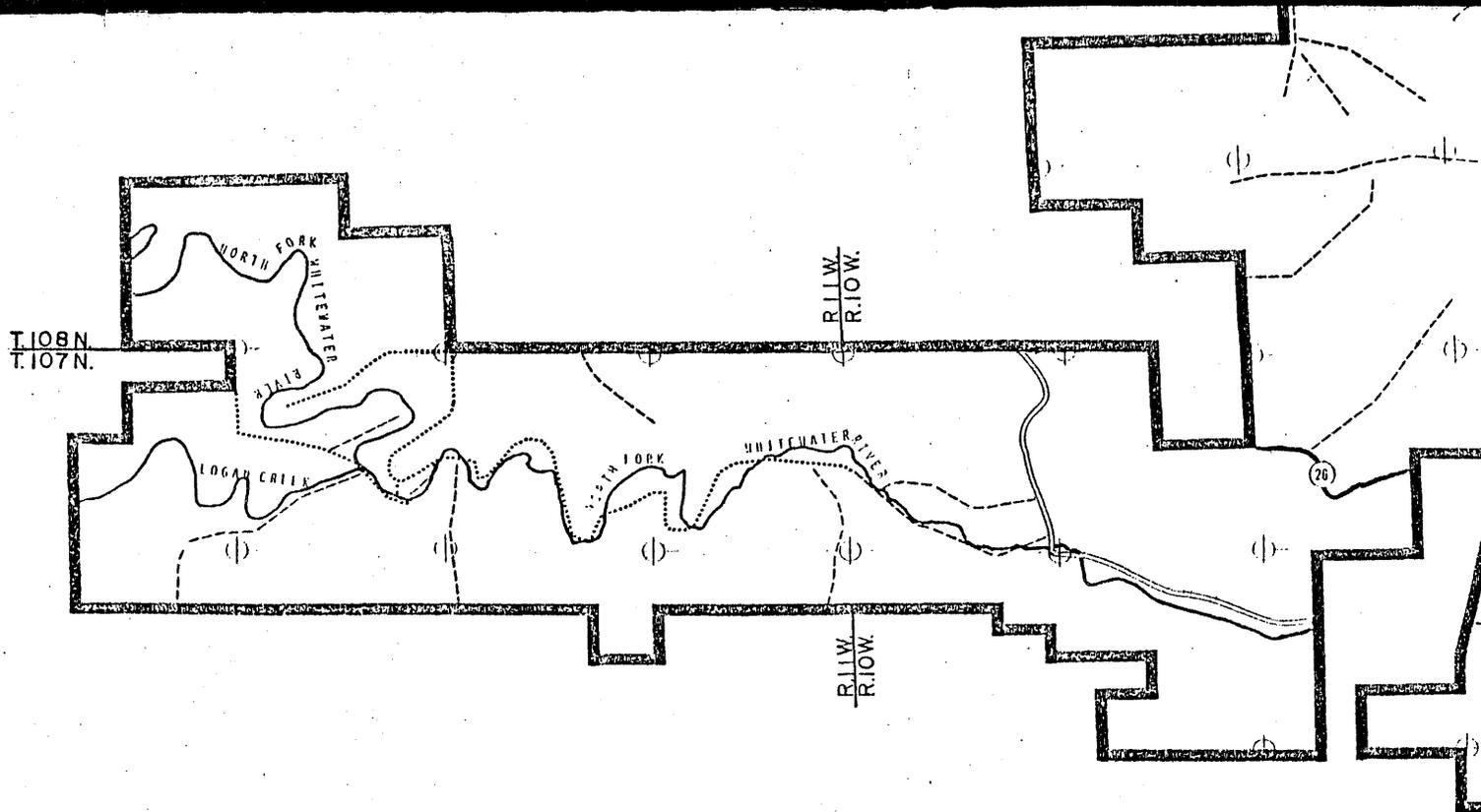
Yours very truly,

Richard D. Wettersten, Director
Division of Game and Fish

RDW:mr

cc: Commissioner Leirfallom

✓ David E. Vesall
Hjalmar Swenson

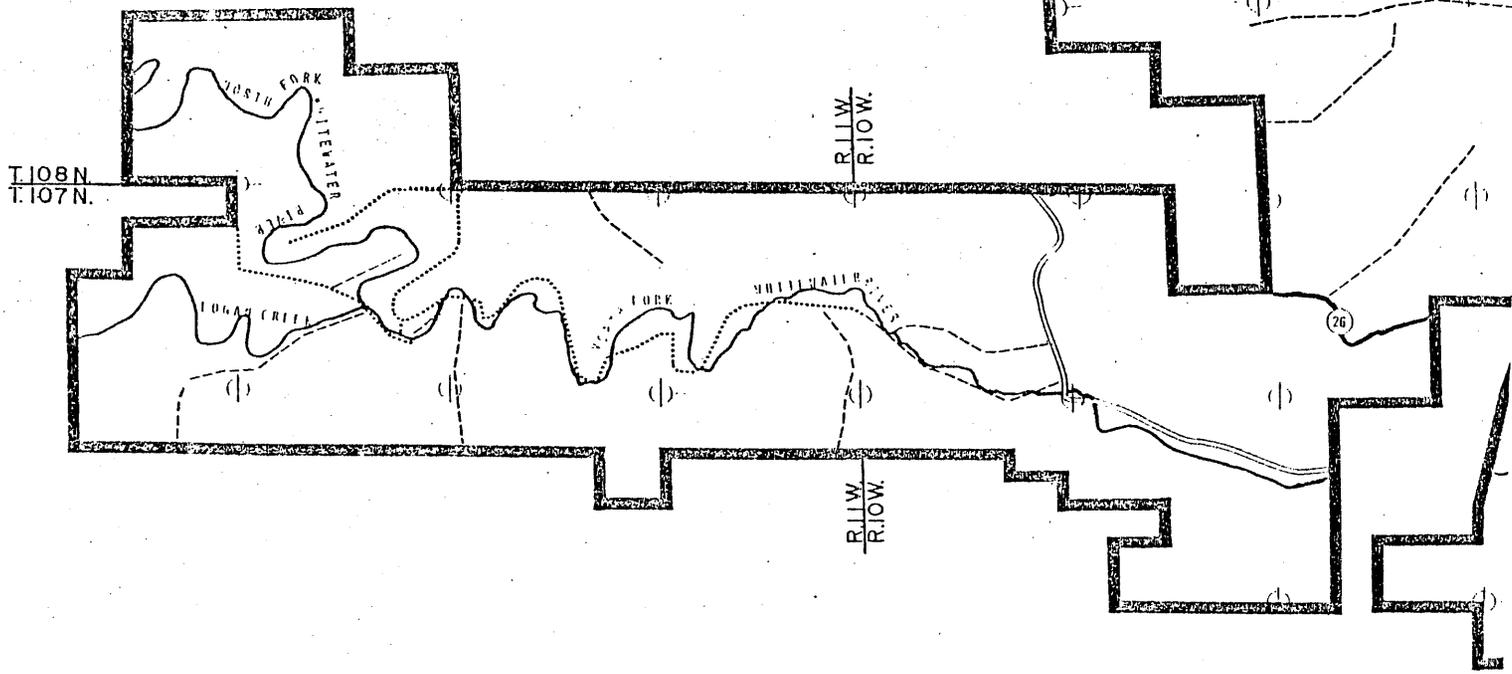


LEGEND

-  STATE HIGHWAY
-  COUNTY STATE AID HIGHWAY
-  COUNTY ROAD
-  TOWNSHIP ROAD
-  UNMAINTAINED TOWNSHIP ROAD
-  TRAIL
-  SANCTUARY
-  PARKING AREA
-  HEADQUARTERS
-  FISH HATCHERY
-  SECTION CORNER

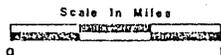
Scale in Miles





LEGEND

- STATE HIGHWAY
- COUNTY STATE AID HIGHWAY
- COUNTY ROAD
- TOWNSHIP ROAD
- UNMAINTAINED TOWNSHIP ROAD
- TRAIL
- SANCTUARY
- PARKING AREA
- HEADQUARTERS
- FISH HATCHERY
- SECTION CORNER



PERSONS INTERVIEWED FOR CASE STUDY

DNR

Forestry

1. David Svien
Lewiston District Forester
Box 278
Lewiston, MN 55952
(507) 523-2183

Fisheries

1. Larry Gates
Area Fisheries Manager
P.O. Box
Lake City, MN 55041
(612) 345-4219
2. John Huber
Box 261
Altura, MN 55910
(507) 796-6504

Whitewater WMA

1. Nick Gulden
305 Exchange Building
Winona, MN 55987
(507) 457-5486
2. Bob Tangen
R.1, Box 183
Plainview, MN
(507) 932-4133
3. George Meyer (Retired)
R.R. 1, Box 19
Kellogg, MN 55945

Area Residents

1. Name ??
Mink Rancher residing at access of Quincy Township Road (see figure 3)
2. Name ??
Local Farmer that owns land upon which access at Quincy Township Road rests (see figure 3)
3. Mr. Mauer, owner of Mauer Bros., local bar in Elba, MN

4-Wheel Users

1. John Heaser, former organizer for Winona 4-Wheelers Club
Rollingwood Resident
(507) 689-2070
2. Mr. Tyce, current organizer for Winona 4-Wheelers, proprietor of
Kotter Bike Shop
Mankato Ave., Winona
(507) 452-5665

Proprietor of Rochester Honda dealership
2 and 3 Wheelers using Trout Valley Trail
Hunters camping at west access to Trout Valley Trail

EXPLANATION OF SLIDES

Whitewater and Trout Valley Wildlife Management Area

Slides 1-16 Trout Valley
17-39 Whitewater WMA

1. View of area adjacent to west end of Trout Valley Trail.
2. West entrance to Trout Valley Trail with 2 and 3-wheeler in the background.
3. Parking lot at west entrance doubles as unofficial campground for hunters.
4. Gate at west entrance to discourage 4-wheel drive vehicles.
5. (Difficult to see) water bars on Trout Valley Trail. Forester fears 4-wheel use would tear out these bars.
6. Representative view of trail
7. Near west end of trail is small ridge created by a sand deposit. Here is example of wear on area where users left designated trail.
8. Fence to encourage users to stay on designated trail rather than side route created by users. Forester believes fence is effective, but recovery is slow. (Fence has been up 3 or 4 years).
9. Only damage by motorized vehicle noted on west section of trail. Spinning tire of dirt bike scrapes plant material from trail.
10. Gate at east entrance to Trout Valley Trail.
11. Tree skid from summer '83 timber harvest now used a route for 4-wheel drive vehicles to drive around gate. Skid is at parking lot immediately south of gate.
12. Rutting and erosion on trail near east entrance.
13. Road in foreground is farm road. Just in front of hay bales is where Trout Valley Trail intersects farm road.
14. Example of rutting on trail between east gate and farm road.
15. Example of trail beyond point where trail intersects farm road.
16. Dirt bike track on farm road.
17. View of North Branch of Whitewater River.
18. The road along the North Branch of Whitewater has the east end vacated by Elba Township. The east end of road has two access points. This photo shows the eastmost of the two entrances and the plant regrowth following the closing of the road.

19. Gate at the second eastern access point.
20. The sign at the closed access points.
21. The trail at the second eastern access point has narrowed to a footpath.
22. At the western access of the road, this is the suggested parking lot. It is atop the ridge just prior to the road descending to the floodplain.
23. Flat, fairly dry section of road away from river but still in floodplain.
24. First river crossing of Quincy Township Road.
25. Vehicular access to river immediately upstream from first river crossing.
26. Second river crossing of Quincy Township Road.
27. River crossing approximately 50 yards downstream of more widely used 2nd river crossing.
28. Rutting along road near river.
29. Area downstream of 2nd crossing receives the greatest amount of damage. This is example of rutting on this section of road.

#Note: All remaining slides are of this heavy impact area.

30. Rutting along road.
31. Low spot along main road to test power of vehicle.
32. Road widens to 4 separate routes, each of varied difficulty.
33. Area where use widens to 4 lanes.
34. Area where use widens to 4 lanes
35. 4 lanes narrow to 2, and finally to one lane again.
36. Area of deepest observed rutting. Pool on left is 3 1/2 feet below normal ground level.
37. Area of deepest observed rutting.
38. Area of deepest observed rutting.
39. View of river adjacent to 4-wheel drive use area.

PILLSBURY STATE FOREST



PILLSBURY STATE FOREST

II. Methodology

In the process of formulating a data base for the Pillsbury State Forest Off-Road Vehicle Study many existing documents and publications were used. These include: A Management Plan for the Rock Lake Solitude Area (1978) published by the Minnesota DNR, the Forest Management Plan for the Pillsbury Ranger District-Area 4 (1962) unpublished; a brochure on the Pillsbury State Forest, published in 1970; two files kept by the Pillsbury Ranger District, titled "The River Valley Enduro Riders Club" and "Pillsbury State Forest", the Minnesota Soil Atlas (Brainerd Sheet) (1969) published by the University of Minnesota Agricultural Experiment Station; and topographic maps supplied by the U.S. Geological Survey (1972).

Both the Area Forestry Supervisor, and the Area Staff Forester, were contacted and interviewed. They both were solicited for professional opinions the physical nature of the forest, the present recreational use patterns, whom to contact for further information on specific cases, and on how access to the State Forest by off-road vehicle users could be managed and/or controlled. Other employees of the DNR were also solicited for their opinions, or for any factual information they possessed which could supplement case findings. These employees included the Regional Conservation Supervisor, the Area Conservation Officer, a staff person from the Wildlife Branch of the DNR, and staff from DNR's St. Paul Office of Planning.

Visitations to the site were made on two occasions, both for two day periods, but on neither occasion were off-road vehicle users contacted. The general lack of sightings are probably a function of the DNR regulation forbidding the use of any motorized vehicles on the State Forest trails.

Interviews were conducted with other recreationists on State Forest land, i.e. horseback riders. On both visitations riders were solicited for information on sightings of off-road vehicle users on trails, any conflicts as a result, their own trail use patterns, the condition of the trails, and opinions on multiple use of state trails by horseback riders, vehicles and hikers.

An interview was conducted with the president of the local Enduro bike riders club. He was asked to outline the nature of the club's membership, its riding patterns and locales, and his knowledge of vehicle use in and around Pillsbury State Forest. His opinion on the nature of state ORV legislation, and options of vehicle management and control were also solicited.

The Cass County and Crow Wing County Sheriff's offices were contacted to obtain any information on documented incidents of user conflicts in or around the State Forest, or of violations against anti-vehicular regulations by local off-road vehicle users or by tourists. These offices, as well as the Area Conservation Office, were also asked to supply records of any formal complaints lodged by local landowners regarding vehicle trespassing.

III. Description of the Case

The DNR, Division of Forestry, strives to protect, develop and administer the renewable resources of Minnesota's 56 state forests so that they are utilized in the combination of uses that will best meet the needs of Minnesota citizens, harmonious and ordinated management of the forest resources to bring about their maximum productivity, as well as providing other public benefit. The primary management objective is to maintain a maximum sustained yield of various forest products while utilizing renewable forest resources to benefit the greatest number of people. Management practices such as timber harvest and production, watershed protection, wildlife habitat maintenance, and recreational development are carried out on lands best suited for each. The legislation has included state forest lands in Minnesota's Outdoor Recreation System (Outdoor Recreation Act, 1975).

History of Pillsbury State Forest

The Pillsbury State Forest was established by legislation in 1935. It is built around a nucleus of cut over pine lands in southern Cass County donated to the state by the late John S. Pillsbury governor of the state from 1879 to 1887. The area was considered a state forest reserve as early as 1902, and in the following year clearing was begun for the state's first forest tree nursery. Most of the area was originally covered with Norway Pine, White Pine, and Jack Pine on the upland soils, with tamarack, black spruce and bottomland hardwoods on the lower soils. Hardwoods have been the resulting growth since the original harvest of early logging. Settlement of the area began in the late 19th century. The land was unsuitable for agriculture though, and farming activity has since steadily declined and few farms still exist in the area.

Regional description (see Figure 1)

The Pillsbury State Forest is located entirely within Cass County, near the town of Brainerd, which is one of the largest population centers in the area. The forest contains 8,105 acres under state ownership. All owned by the Division of Forestry, except for a 300 acre parcel managed by the Division of Wildlife. The area has a typical continental climate with wide temperature extremes from summer to winter. The mean maximum (July) and minimum (January) temperatures are 82 F and -3 F respectively. The annual precipitation rate is near 26 inches. The area normally has more than 100 days of the year with over 3 inches of snow on the ground, and 60 to 80 days with over 6 inches.

The state forest is located almost in the exact center of State Economic Development Region No. 5. The majority of the people within the region are within an hour's drive, and thus are potential "day users" of the unit. The region includes residents of Brainerd, Crosby-Ironton, Little Falls, Wadena, Walker, Motley, Pine River, Staples, Nisswa and other areas. The Brainerd area is the third largest urban residential area in Minnesota, with a population that is steadily increasing.

The Brainerd Area is also a major vacation destination area for people from the Twin Cities area, and to a lesser degree for St. Cloud and Duluth residents. Major resort developments are in the Brainerd area. Other natural recreation areas in the region include Superior National Forest; Crow Wing, Foothills, and Lyons State Forest and miles of ski and snowmobile trails. Tourist/travel expenditures during 1974 totalled \$33,504.423 in Cass County. This figure represents 56.5% of gross sales.

Land use in Cass Count is predominately in forest. Current agricultural land use is not intensive or extensive. Major crops are feed crops, wild rice and small grains. Residential land use and tourism development are increasing, especially around lakes which are scattered throughout the region.

Site Inventory

SOIL - The Pillsbury State Forest lies within an area called the St. Croix Moraine. The materials carried by the advancing glacier were usually till and they have a sandy loam texture. These are small wet depressions in the moraine, many of which are lakes. The predominant soil unit in the forest is a sandy loam top surface and sand and gravel substratum. The low area swamplands and lakes are in poorly drained sandy loam or silt.

WATER - Surface water resources in Pillsbury State Forest consist of many medium to small sized lakes, and sizeable acreage of marshlands. There are 29 smaller lakes within the Forest, and portions of Lake Sylvan and Gull Lake, both major resort lakes in the area. The larger number of lakes makes the area very pleasing aesthically to the recreationist. Water quality is good.

TOPOGRAPHY - (see Fig. 2) The topography of the Forest is rolling to hilly, with a scattering of sandy plains, lakes and marsh areas. Elevation ranges from 1450 feet to 1200 feet above sealevel. There are many hills with elevation over 1350 feet.

VEGETATION - The upland islands and ridges of the forest consist mostly of jack pine, aspen, birch and oaks. The lowland areas consist of willows, black ash, and swamp grasses. Site specific vegetation variations include ash swales, tag alder, and tamarack. In the 1962 Forest Management Plan the breakdown of species listed was as follows: Norway pine, white pine and jack pine (13.4%); northern hardwoods (32.4%); aspen (16.4%); and the remaining 37.8% was comprised of tamarack, oak, bottomland hardwoods, spruce and birch in rank order of numbers.

WILDLIFE - A relative abundance of whitetail deer, grouse, mink and beaver exist in Pillsbury State Forest. Other animals and birds which maybe sighted include squirrels, rabbits, racoon, woodcock, waterfowl and songbirds.

A major winter deer concentration exists in and along the west and southwest edges of the Rock Lake Solitude Area of the Forest. Winter deer populations in this area may average 20-40 deer/sq. mile during average winter and increase to 40-80 deer/sq. mile during severe winters. Hunting and fishing are major recreational pursuits in the Forest and its environs. White-tailed deer and waterfowl are primarily sought, while fishermen find crappie, sunfish, walleye and northern pike. Beauty Lake, in the Forest's center, has been stocked with rainbow trout.

LAND USE - This has been described earlier in the study in detail. The land is predominately forested in Cass County, with limited agriculture and a growing residential component in the form of vacation homes around the lakes.

OWNERSHIP - (see Fig. 3) The 14,402 acres comprising Pillsbury State Forest are divided in ownership with: State of Minnesota owning 8,105 acres and Cass County and private owners the rest.

FEATURES OF DEVELOPMENT - Development within Pillsbury State Forest is at present rather limited. No utilities are presently available in the forest. Paved highways run along the western and eastern edges of the forests, while gravel roads run east and west through three sections of the forest. (ie. Pillager Road, Beauty Lake Road, County No 15). There are numerous spur logging roads running off these. A metal fire tower, erected in 1935, stands near Gull Lake in the northeast corner of the Forest.

A state forest campground is located on Rock Lake. It includes 18 campsites 4 picnic sites, a 20-30 car parking lot, a swimming beach, boat access, fishing opportunities, and a 12.8 mile hiking and cross-country ski trail. A 25 mile long snowmobile and horseback riding trail winds its way through the Forest. An assembly area/group camping area is located at one intersection with the Pillager Forest Road, 4 miles northeast of the village on the eastern shore of Shafer Lake.

SUMMARY OF FOREST PRODUCTS - The products yielded by Pillsbury State Forest can be categorized into timber, recreation and wildlife.

The total timber supply in the Forest is 71,300 cords, but because of the generally low commercial value of the timber only 6,300 cords is recommended for annual harvest. Demand for this timber is low, and seldom is the recommended harvest limit reached. Most wood harvested is used for domestic purposes.

Recreation and wildlife are both vital forest products, with moderate utilization by both area residents and vacationer's from other areas in Minnesota. Recreational use is predominately by snowmobilers in the winter and horseback riders in summer. Some car camping and picnicking is conducted at Rock Lake. Wildlife harvesting is concentrated in the fall, with white-tail deer, ruffed grouse, and waterfowl being the predominate targets.

Use of the Management Unit

It was unfeasible to obtain a verifiably accurate picture of off-road vehicle recreators in the State Forest because of both their unwillingness to be interviewed and their limited presence in the area.

By inference from the visual evidence on most of the forest trails there does seem to be some light traffic on restricted trails. It seems to be strictly of a 4-wheel drive nature, with only occasional tracks visible indicating two wheel or three wheel vehicles.

Conversations with members of the Minnesota Trail Riders Association, a horseback riding group, seems to verify that there is little off-road vehicle use in the State Forest. Members have not encountered any this past season while on organized trail riders, and have seen only limited tire track evidence of use.

The State Forest is used by an Enduro Motorbike Club for one annual rally (in May). This race is conducted by the River Valley Enduro Riders Club, located in St. Cloud, MN.. This was the second year of the event. Club members clear the proposed trail of brush, (see Fig. 2 and 4) post signs along the route, supervise riders and spectators, and repair the trail after the event under the supervision of local Division of Forestry Staff.

To obtain an indication of the local popularity of the use of off-road vehicles the researchers contacted a local retailer of such vehicles. He indicated that off-road vehicles, predominately 3-wheel all-terrain vehicles, made up over 40% of his total annual sales, with over 400 units sold each of the past three years. He indicated as well that 2/3 rd's of his sales were to farmers for agricultural work, with the remainder purchased for recreational use. Both the dealer, and the staff forester, agreed that much of the 3-wheel traffic in the State Forest is from local farmers, or by children of these farmers. No evidence indicates use by recreators travelling any distance with their vehicles in tow.

Other users of the Pillsbury State Forest include horseback riders, hikers car campers, cross-country skiers, snowmobilers, hunters, fishermen and loggers. The horseback rider use is quite heavy on weekends, with organized trail rides occurring frequently from April thru November. Trail rides usually include over fifty riders and horses. These users camp in camper-trailers predominately at the assembly area located on the Pillager Forest Road. Local riders, often from neighboring farms and vacation homes, also use the trails, predominately on weekends.

Snowmobilers are by far the heaviest users of the trails maintained in the State Forest. Few, if any of these users camp, but often they drive from the southern portion of the state staying overnight in local hotels and resorts.

Cross-Country skiers also use the area, and at one time shared the trail with snowmobilers. They have recently acquired (1978) a separate 12.8 mile trail at the Rock Lake Solitude Area. Most users are from the Brainerd area, or are vacationing at winter resorts in the area.

Hunters form a major group of area users, especially throughout the fall deer and waterfowl seasons. Many drive from the southern part of the state, adding to heavy, predominant local use. Many hunters drive the forest roads or logging trails to get to game areas. Some use of the designated riding and hunting trails has been evidenced, probably to access more remote areas for game harvest. To drive these trails a 4-wheel drive vehicle would be needed, as much of the trail is comprised of steep inclines or dips in predominately soft, sandy loam soil.

Logging is not a major use of the forest, as over 90% of the trees are of pole variety, and not of use for commercial timber. Loggers are often local landowners, who harvest wood for personal use or for sale in neighboring towns as firewood.

From conversations with the Area Staff Forester, participants in the October 14, 1983 horseback trail ride, some inference can be made on the spatial and temporal recreation patterns. Recreational use of the forest is predominately of a longitudinal nature, along cut developed trails. The vegetation cover of the area makes any other pattern nearly impossible. The only high impact concentration of recreation would be in the vicinity of Rock Lake, where a picnic area, beach and campground are located.

Use of the area is year-round, with only the nature of the recreator, not the volume of traffic or use level declining. Snowmobilers and cross-country skiers dominate the winter; while horseback riders, hunters, campers, and some hikers use it during the other months. Recreational use of Pillsbury State Forest has increased steadily over the past 30 years, with increases corresponding to a series of facility developments in the area. These developments have included over 26 miles of hiking/riding/snowmobile trail, the Rock Lake campground, the Rock Lake ski trail (1978), the stocking of Beauty Lake with trout, the development of an Enduro bike trail (1982), and improvements to each of these at various times throughout the recent history of the Forest.

Administration of the Management Unit

The management of Pillsbury State Forest is based on the recommendations outlined in the Pillager District Management Plan (1982). This plan is formulated for each forestry district throughout the state, with necessary adjustments made to fit local conditions. The Brainerd Regional Office, Brainerd Area, of the DNR is presently revising and updating the management plan for Pillsbury State Forest.

The management program outlines the production of timber and wildlife, the protection of soils and water, and the provision of recreation opportunities for the forest. Management of these resources requires a coordinated program which insures maximum productivity and protection, as well as providing public benefits such as recreation.

The wildlife management goals outlined call for improved deer and grouse production by providing more food in the initial stages of site preparation and release work, and more protection cover later on. The DNR will also continue intense fire protection and multiple use planning, to give greater economic returns from the forest. Multiple use includes recreation, and these trails and other resource accesses will be opened and maintained as necessary. These trails however, may shift location due to shifts in timber harvesting areas.

Recreation opportunities in Pillsbury State Forest are legislated under the 1975 Outdoor Recreation Act. This allows for development of the state forest for recreational purposes consistent with the purposes for which the unit was authorized, and avoidance of over crowding and/or conflicts between recreational users. The act requires each agency to prepare a master plan for each of its units included in the act. The DNR is presently developing this master plan for Pillsbury State Forest.

The policies of the Department of Natural Resources concerning recreational use of state forests are outlined in the Minnesota Rules for Public Use of State Parks, State Historic Sites, State Recreation Areas, State Waysides, State Forest Campgrounds, State Forest Day Use Area.

According to the Area Forester Supervisor, and the Area Staff Forester, the above mentioned policies are followed with few if any exceptions. They do mention a certain difficulty in enforcement, especially of those sections dealing with unlawful vehicular use of posted trails. As well, though there is some assurance that noise "of a volume tending reasonably to arouse, alarm, anger or resentment" occurs, few complaints are lodged, thus little action is taken.

IV. Observed Impacts, Public Benefits and Problems

A. Impacts of ORV use on the resource

1. Compaction does not seem to be a problem due to the sandy, loamy soil with a base of rocky glacial moraine. No compaction problems were observed.
2. Erosion has the potential to be a problem due to the sandy, loamy soil. This soil on an unprotected or over used slope could be an erosion problem. Erosion was observed on portions of the hiking and riding trail. It appeared to be caused by 4-wheel drive use rather than other ORV's. The portions of the Enduro bike race trail observed, appeared to be no more than game trails except in some areas where obvious rutting could be observed. Some portions of the bike race trail were run over twice during the race and so received more damage and impact.

3. Wildlife impact was unobservable except in the form of hypotheses and interviews. The opinions received varied from detrimental effects to productive effects. One hunter submitted a letter praising the Enduro bike trail as a good way to produce new game trails and access for hunters.

Wildlife management officials are concerned with the aesthetic disturbance of ORV's not only on hunters themselves but also on the animals in general. They are also concerned that greater harvests of waterfowl might be taken, especially from remote areas of the forest, due to easier access with an ORV. Deer and other game could also more easily be hunted and transported out. The potential for harassment of animals is also a possibility.

4. Forest road access impact was not a specifically observable impact that could be directly related to ORV's in the Pillsbury Forest. Access and logging roads showed their share of ruts, but they appear to be a result of 4-wheel drivers in virtually every case rather than 2 or 3-wheel vehicles.
5. Forest management and protection receives some potential impact in terms of being able to actually apprehend an illegal ORV user in the forest. From the other stand point, ORV's could become an excellent management tool for enforcement and protection of the resource. Forest personnel are concerned with the potential added burden of management if a legislative action requires them to provide ORV use areas comparable to those for snowmobiles.
6. Trail systems within Pillsbury State Forest, specifically the Hiking and Riding Trail, have received some noticeable impact from ORV's, predominantly 4-wheel drives. Evidence of some 3-wheel and 2-wheel use is predominantly from local landowners. There is no evidence of recreational ORV users from other areas commuting to Pillsbury Forest to use the resource for that purpose except the annual Enduro bike race. Cost of administration and management for the Hiking and Riding Trail last year was \$1,323.00 for 132 man hours.

The Hiking and Riding Trail shows that most impact and use was from horseback riders, especially during wet weather. As many as 20 horses and riders were seen using the trail at one time in one group. The Hiking and Riding Trail also showed signs of impact at intersections with the Enduro bike race route. This appeared in the form last year's Enduro. Cost of forest service personnel for the race came to a total of \$203.42 for 20 man hours.

- B. Impacts of ORV use on other recreators and neighbors: Interviews gave insight to impacts and potential impacts of ORV's on other users and neighbors. The participants of a horseback trail ride cited the potential conflict of horses and ORV's using the same area. These conflicts could vary anywhere from verbal argument over appropriate use of the trail to a rider being thrown from the back of a spooked horse. These interviewees had not seen or been involved in any

conflict with ORV's in Pillsbury, but cited major conflicts at an area north of there referred to as the Spider Lake area (Foothills State Forest). Their concern also centered around the non-restricted use of ORV's by any age person with no protective gear.

Their suggestions were to license ORV's and require laws and educational programs similar to those for snowmobiles. They also expressed the need for trails restricted for ORV use, totally separate and non-intersecting with non-motorized trail users. They suggested self development and maintenance of their respective use trails, as a volunteer service. This could be and is now being accomplished in some areas by organized clubs of these specific recreational users.

An interview with the president of the local Enduro bike riders club in Brainerd brought forth the same concerns and suggestions. He stated that horses and ORV's do not mix and should not be required to use the same areas or trails. The potential hazards and degraded aesthetics for both users were the prime concerns. He suggested organized clubs establishing and maintaining trails under state supervision.

The Cass County Sheriff's Office, and the Crow Wing County (Brainerd) Sheriff's Office were adamant in condemnation of the no-law supervision of ORV's at the present time. The Crow Wing Sheriff's Office was especially concerned with the number of complaints he has received regarding ORV's, especially 3-wheelers, which have been eroding the drive way right-of-ways of county residents. He too expressed the concern for potential injury and property damage if some legislative action is not taken. He cited examples of 3 children on one 3-wheel vehicle, children as young as 3 years old on 3-wheel vehicles without protective gear, and the potential for land owners to place physical barriers to protect their property. These barriers might not be seen and might cause injury to the first ORV to come through the barrier. Neither sheriff cited any current problems or complaints of ORV's in regard to Pillsbury. One complaint was filed to the Forestry office by an absentee landowner concerning the running of the Enduro bike race in Pillsbury last year (see Appendix Office Memorandum #3500, 10-19-82).

- C. Impacts of management on users: In Pillsbury, there appears to be little if any current problem between management and ORV users. There are so few known illegal users of the Hiking and Riding Trail by ORV's that it is not a problem, although the potential may be there in the future.

Organization of the Enduro bike race has received praise from Forestry management and a willingness to continue the event on a yearly basis.

Not only ORV users, but other user types interviewed seemed to have positive feelings towards the management of Pillsbury State Forest. However, many of the forest users interviewed indicated there was a problem on a statewide level with inadequate supervision of off-road vehicle use.

- D. Is existing development on-site causing/contributing to problems: In Pillsbury, existing development does not seem to be contributing to the ORV use problem. There are virtually no trails for them to use except access and logging roads. The president of the local Enduro riding club expressed that he thought he was not allowed in Pillsbury State Forest except by special use permit, ie. the annual Enduro bike race.
- E. Comparison of recreational use areas to non-used portion: The non-used portions seem virtually like the used portions would be had they not been developed. Non-used portions have potential for use due to the many logging trails which criss-cross the non-used area.
- F. Natural Heritage opinion of problem: The Natural Heritage office was not concerned with any specific resource problem related to ORV's in Pillsbury State Forest.
- G. Perceived economic impact on area business: Perceived economic impact of ORV's on some of the Pillsbury area businesses seems substantial. Local businesses in Pillager were pleased with the income they derived from the annual Enduro bike race at Pillsbury (see Office Memorandum #3500, dated 10-19-82).

In Brainerd, the primary ORV dealer and service shop were concerned with the future of ORV's in the Pillsbury area. Forty percent of their retail business was in the sale of 3-wheel vehicles, approximately \$400,000 per year (see interview section). Out of the 40%, they felt that 66% of these were sold to farmers and ranchers for utility purposes such as: checking cattle, dragging firewood and even pulling hay wagons. The other 33% went for general recreation. The owner of the shop was very supportive of the licensing of ORV's as are snowmobiles, and with the same laws. Many of the people interviewed said the revenue realized by the state through licensing would be substantial, and a justification for providing for ORV use on state land. The local ORV dealers saw the potential for increased sales if ORV use was allowed and encouraged on state lands and if trails and other developments were provided on those lands.

H. Summary of Problems/Benefits

1. Complaints compared to observed data:

Complaints and opinions as compared to observed data seems to be highly correlated. Researchers found only one exception. This was the belief that the annual Enduro route reclaims itself each year to a game trail after the rehabilitation efforts of the sponsoring club. This is basically the case except in some instances where the route crosses the Hiking and Riding trail, and on some slopes where the routes is noticeable rutted and unreclaimed. Five months after the race, route signs were still stapled to some trees where the Enduro route intersects the hiking trail.

We found that most observable damage to the resource appeared to be by 4-wheel drive users as opposed to 2 and 3-wheel users. This damage occurred at some accesses to the hiking and riding trail and or some logging and access roads.

2. Results of past and present management: Researchers found that user figures, or even estimates, are unavailable for Pillsbury State Forest. Areas of study which would be helpful in the management of Pillsbury are number of users of the Hiking and Riding Trail (hikers and horses), number of snowmobilers using the Hiking and Riding Trail in winter, number of cross country skiers using the Rock Lake ski trail, and the potential number of ORV users for the Pillsbury area. Sentiment among Pillsbury users interviewed here were all favorable, especially since there has been virtually no conflict of ORV use in that area. The ORV use is so limited that few problems have developed. The Enduro race appears to be causing little adverse impact, and both users and managers were happy with the event.

V. Conclusions and Recommendations

A. Site Management Alternatives

1. Conclusions

It is the opinion of this research team that ORV policy within Pillsbury State Forest is adequate at the present time. This is due to the relatively few actual ORV users of Pillsbury. Depending on future legislative action and a possible increase in demand for ORV use, these numbers could dramatically change.

In regard to the State of Minnesota, the research team recommends legislation to clarify regulated ORV use on state lands and public highways. Also, legislation is needed to reduce potential dangers of personal injury and damage to physical property.

2. Recommendations

- a. That 2 and 3-wheel ORV's be licensed in a similar fashion as snowmobiles and be managed under similar laws.
- b. That 4-wheel ORV's be managed under more severe scrutiny than 2 and 3-wheel ORV's.
- c. That 2 and 3-wheel ORV use sites be designated on some state land areas, and be totally separate from non-motorized use areas.
- d. That ORV trails be incorporated and managed with snowmobile trails whenever possible.
- e. That organized riding clubs within a reasonable distance of a designated motorized trail on state property be included in the development of such sites.

- f. That ORV use be held to strict limits during hunting seasons except in designated areas.

B. Education and interpretive tools

There is inadequate education of users of ORV's as compared to snowmobilers. Much of the education being conducted on ORV use is by organized riding clubs for members only. Interpretive tools supplied by the state are limited to maps of state areas for recreational use, rules and regulations, and signs.

Recommendation:

An operator license should be a requirement for every individual who operates an ORV. It should be secured only by completing an educational seminar regarding the specific vehicles they wish to use. The educational curriculum should include: safety, laws, environmental impact, general maintenance and user ethics.

C. Physical Management and Enforcement

Recommendations are:

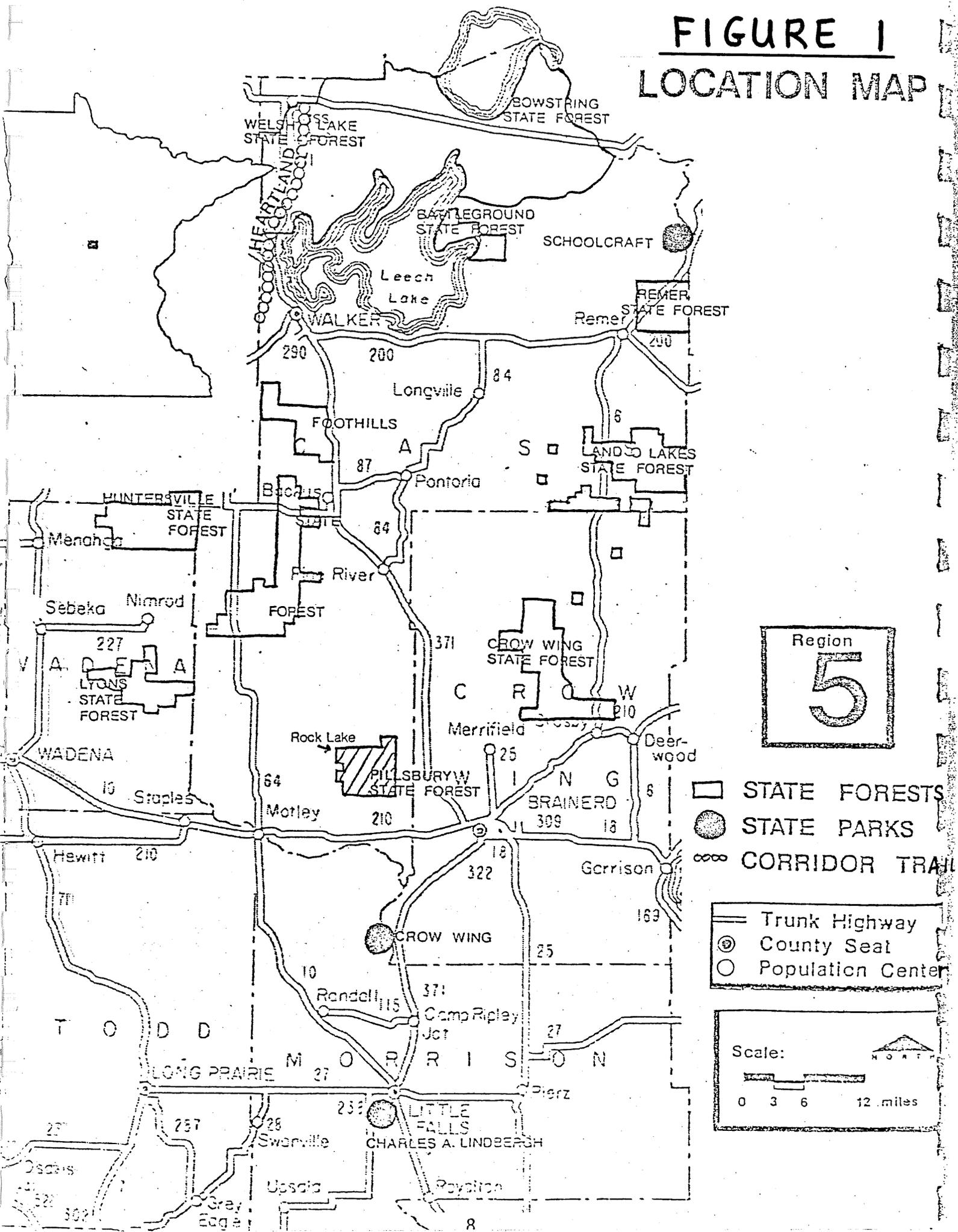
1. That organized ORV riding clubs be included in the planning, development and maintenance of state owned riding areas.
2. That organized and licensed riders be held responsible for policing areas that they have been instrumental in developing.
3. That no designated ORV sites be placed in conflict with existingly important environmental resources such as delicate wildlife management areas.
4. That ORV users of private land, other than their own, be required to acquire written permission from the landowner.

D. Costs

Costs on a statewide basis could be recovered and kept to a minimum by:

1. Using volunteer services and organized clubs in licensing, education, and development of sites.
2. Fee/licensing of all ORV vehicles and drivers
3. Fees collected for use of ORV sites or related services. i.e. camping sites.
4. Encouraging private commerical business in the development of ORV riding sites on private land.

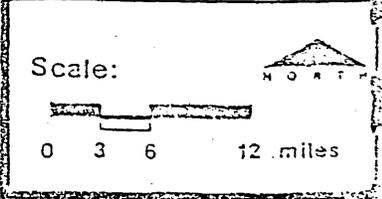
FIGURE 1 LOCATION MAP

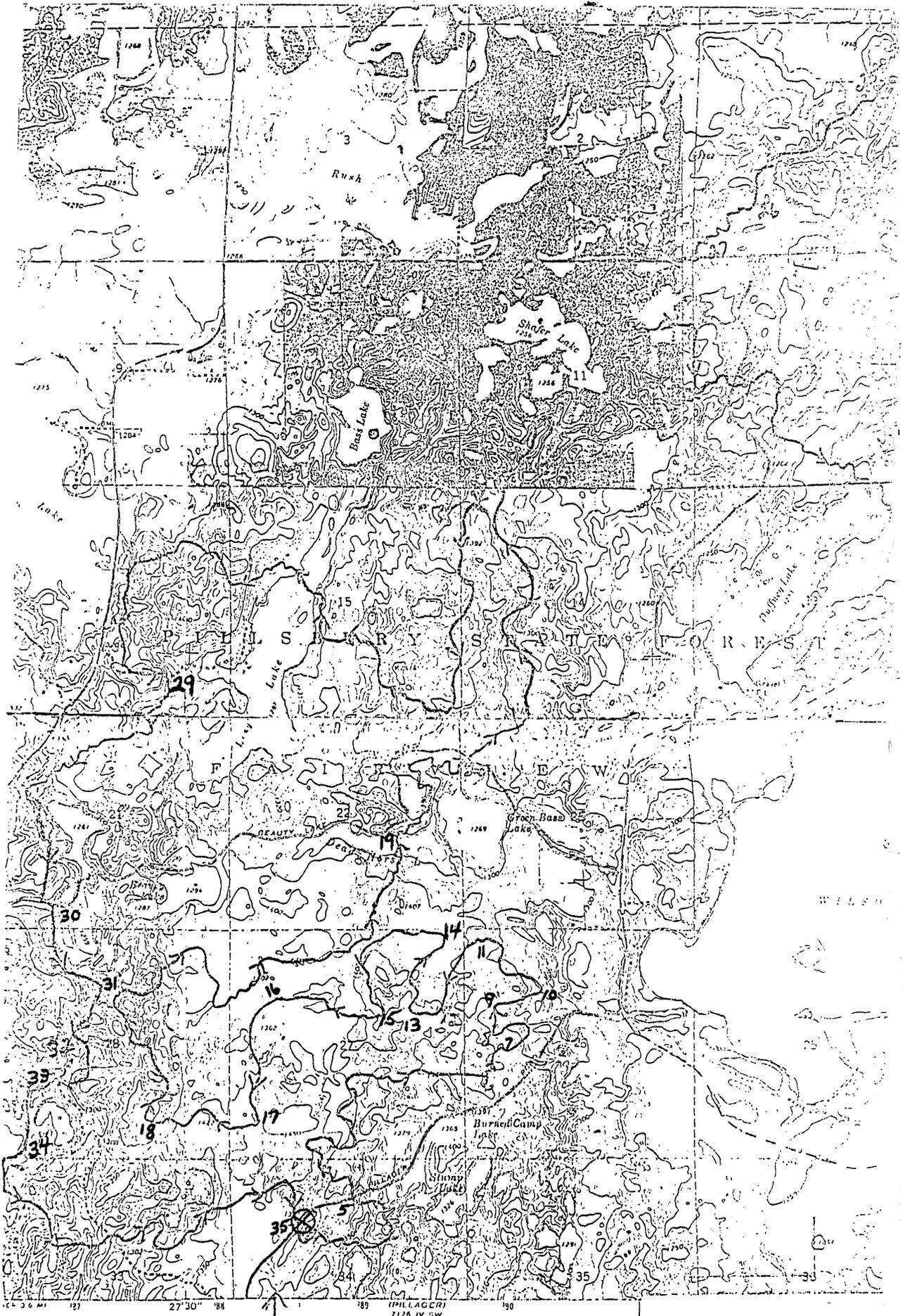


Region
5

-  STATE FORESTS
-  STATE PARKS
-  CORRIDOR TRAIL

-  Trunk Highway
-  County Seat
-  Population Center





Approx. 35 miles from #4 to #35

SCALE 1:24,000

1000 2000 3000 4000 5000 6000 7000 FEET

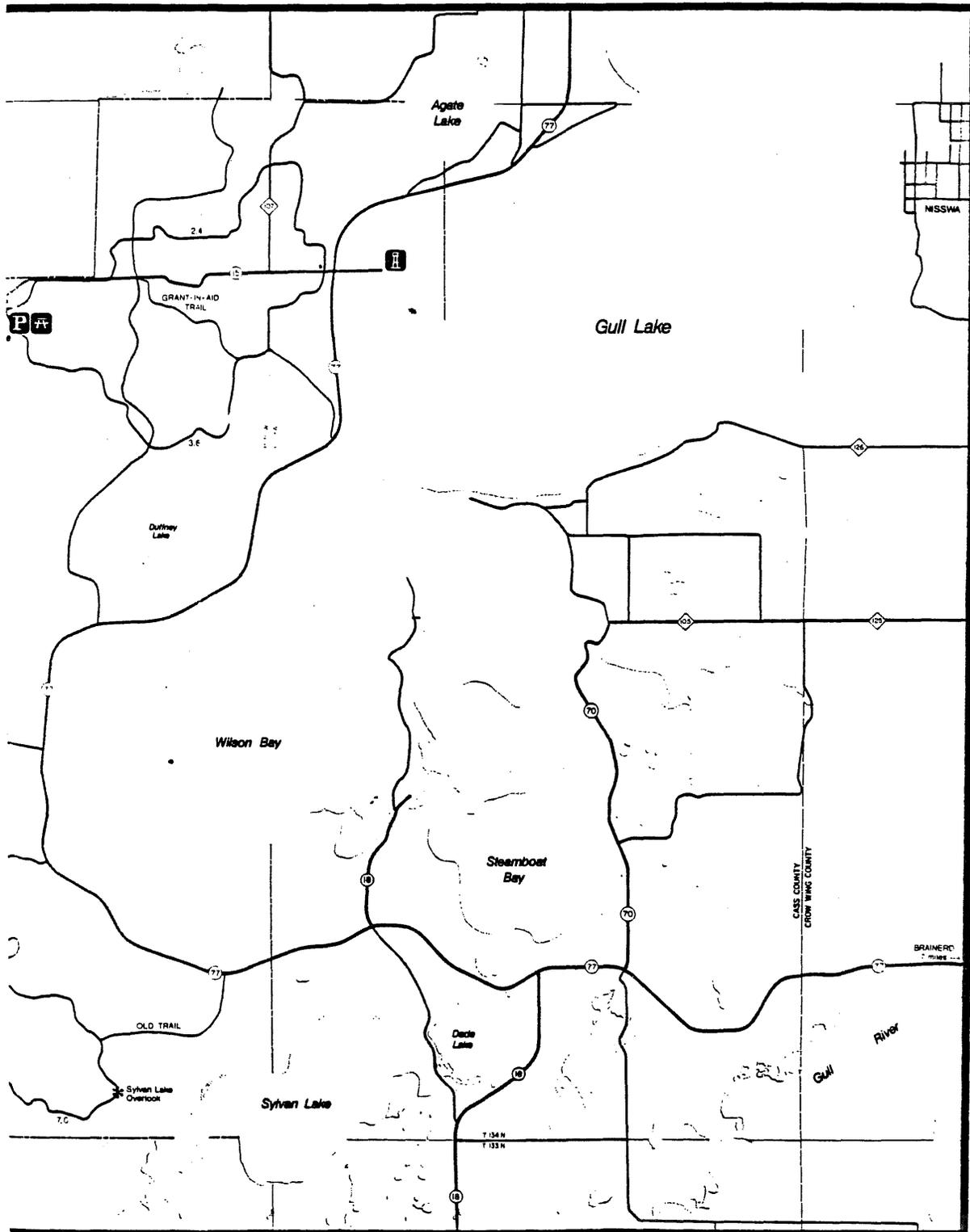
1 KILOMETER

CONTOUR INTERVAL 10 FEET

ASSEMBLY AREA ENDED FACE

FIGURE 2

OF PILLSBURY STATE FOREST



STATE OF MINNESOTA

*Office Memorandum*DEPARTMENT of Natural Resources
DIVISION OF FORESTRY

TO : Darwin Anderson, Regional Forester

3500
DATE: 10/19/82

FROM : Cliff Carlson, Area Forester
Brainerd

PHONE: 828-2565

SUBJECT: Enduro Ride - Pillsbury State Forest

Attached find the following information regarding the Enduro ride that was authorized in the Pillsbury State Forest.

1. Special Use Permit - with restrictions
2. Rules of the Enduro ride (we have a complete copy of A.M.A. Rules)
3. Course layout - (we have a more accurate map in our area file on topo maps.)
4. Pictures of points of interest.

We monitored the race and were impressed with the organization that existed and the people administering the event and the participants.

We received favorable comments from the local businesses at Pillager who of course profited from the race.

Only one adverse comment existed from an absentee lakeshore owner. After I had a chance to visit with the gentleman, most of his fears were dispelled.

The Pillager State Forest afforded a challenge to this type of event and I am sure we will be asked to authorize another race.

In conclusion, I concur in the use of continued Enduro rides in the Pillsbury State Forest.

CHC:sc

Attach.

cc: Ray Hitchcock, Director
Bruce Umbahlen
Al Sharp

STATE OF MINNESOTA

Office Memorandum

SF-00008-02

DEPARTMENT Natural Resources - Forestry

DATE: October 26, 1982

TO : Cliff Carlson
Area Forest Supervisor
Brainerd Area

PHONE: 296-4499

FROM : Bruce ZumBahlen, Supervisor *BZ*
State Forest Management

SUBJECT: REPORT ON ENDURO RACE - PILLSBURY STATE FOREST

Thanks for the information on the Enduro race, along with the pictures. I'm giving the report to John Hellquist for his reference in addressing use of state forests for this purpose. As you requested, I am returning your original photographs. Please get copies made from the negatives and forward to John. If the negatives are not available, let me know so we can make other arrangements for copies.

Your experience and report on this event is appreciated. I'd like to call upon you in the future to help us in setting policies on how, where, and when we can accommodate events such as these.

BZ:pb

Enc.

cc: Darwin Anderson
John Hellquist

STATE OF MINNESOTA

SF-00008-03

OFFICE INFORMATION MEMO

DATE		TIME
11-2		
TO	LOCATION	
Bruce Z.	Forestry	
FROM	LOCATION	
Cliff C.	Brn.	
PHONE NO	MESSAGE TAKEN BY	
()		

- Called
- Urgent
- Please call
- Will call again
- Was here to see you
- Returned your call

ACTION

- As we discussed
- As you requested
- Review and see me
- Review and return
- For your information
- For your approval
- For signature
- Notify staff
- Take appropriate action
- Prepare reply for my sig.
- Reply and send me copy
- File
- Dispose

PHOTOCOPY

- No. of copies
- Date needed
- One side only
- Head to head
- Head to foot
- Collate
- Staple
- Other

TYPING

- Date needed
- Rough draft
- Single space
- Double space
- Run
- Final copy
- Memo
- Letterhead
- Carbons

REMARKS/MESSAGES

*negatives from
Enduro race
in Pillsbury*

Cliff Carlson
Division of Forestry
203 West Washington St.
Brainerd, MN 56401

Dear Cliff;

Sorry about the delay. First I would like to thank you for all of your help with the Peck situation. I haven't been able to reach him yet.

Would it be possible to set up a meeting to discuss a 1983 Pillsbury Enduro on March 11? We've got some changes to make and it looks like we might have an early spring. Everybody is real excited to get started.

I'll get back to You as soon as I hear from John Peck.

My 15th Riva
Monday 14th
3:30 PM

Sincerely,

Joe Opitz
RVER President

612-251-3822 work

612-252-1948 Home

JOE
815 11th Ave NO
ST Cloud MINN
56307

RECEIVED
MAR 2 Rec'd
BRAINERD
FORESTRY

Appendix

Enduro Bike Race Report
Office Memorandum
#3500, 10-91-82

SLIDES

1. Lake, vegetation and topography vista
2. Scenic vista (Pillsbury Peak)
3. Medium sized lake
4. Rolling hill topography and pole class timber
5. The riding and hiking trail (undamaged portion)
6. No motorized vehicle sign at trailhead
7. Trail identification sign
8. Horse/Hiking Trail Assembly area
9. Horseriders camp at Assembly area on Pillager Forest Road
10. Trailhead with evidence of vehicle traffic and sign outlining restrictions
11. Further vehicular evidence (3 wheel ATV) at trailhead
12. Rut from horse use near trailhead
13. Ruts from four wheeled vehicles at trail at trailhead
- 14.
15. Evidence of off-road use on the Riding/Hiking trail
16. Predominately 4 wheel drive use, with little to moderate impact
17. Heavier impact recorded on low spots in trail, where ground is soft and wet.
- 19.
- 20.
- 21.
22. Deepest rut on trail (12 inches approximately)
23. Evidence of erosion on hills
- 24.
25. Further evidence of vehicle use
26. Posted sign (stapled to trees for Enduro Bike race)
27. Enduro Bike Race signs
28. Enduro Bike race trail (looks like game trail)
29. Enduro Bike Race route (once a year use)
30. Deepest rut observed on the Enduro bike route
31. Close up photo of the above rut
32. Rut viewed going up a gradual incline
33. Trail of Enduro route widens climbing hills or traversing inclines
34. Enduro bike rutting
35. Riding and Hiking Trail

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1. River Valley Enduro Riders Club
2. Pillsbury State Forest, Cass County

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1. Bentley, Captain, Crow Wing County Sheriff's Office, Brainerd
2. Bertschi, Bud, District Forester, DNR, Brainerd.
3. Fronom, Dale, Deputy, Cass County Sheriff's Officer, Walker
4. Guck, Dan, President of the local Enduro Bike Club, Brainerd
5. Hanson, Dennis, Wildlife Manager, DNR, Pillsbury State Forest
6. Tingwell, Orv, Owner of Brainerd Honda and Ski-doo, Brainerd
7. Participants of the October 15, 1983 horseback trailride in the Assembly Area for the Hiking and Riding Trail in Pillsbury State Forest.

:ln
2314F

OFF-ROAD VEHICLE USE
IN
SAND DUNES STATE FOREST
A CASE STUDY WITH
RECOMMENDATIONS FOR MANAGEMENT

NOVEMBER 1, 1983

PREPARED BY THE DEPARTMENT OF
NATURAL RESOURCES, OFFICE OF PLANNING

Pursuant to M.L. 344 (1983)

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INTRODUCTION

The 1983 Minnesota Legislature required the Department of Natural Resources to study the effects and impacts of off-road recreation vehicles (ORVs). This legislation responded to requests for legislatively mandated ORV programs, forwarded by special interest groups representing ORV users. While most literature defines off-road recreation vehicles to include trailbikes, four-wheel drive vehicles, three-wheel vehicles and snowmobiles, snowmobiles were omitted from the 1983 legislation. This omission was predicated on the existence of statute and state programs addressing the snowmobile user. On the other hand, because the state lacked clearly communicated and well founded policies on land use for the remaining ORV user groups, and because no active program was serving these constituents, ORVs for the purposes of the legislation and the case study were operationally defined as trailbikes, three wheelers and four wheelers.

In designing the comprehensive study plan that yielded this document, the department set forth a two phase effort to understand ORVs. The first phase consisted of secondary research into ORV use, its benefits and impacts, its history and future. This can be found in Part I of this report. The department accurately anticipated that this effort would yield little information on ORV use in the upper Midwest. The lion's share of the research on trailbikes, three and four wheelers has been carried out in the western and southwestern United States. To temper these secondary findings with information about Minnesota impacts and benefits, a set of case studies was enlisted.

The primary benefits of the case studies are threefold. As mentioned above they assist the interested reader of this study in transferring the findings of prior research shown in Part I to the Minnesota situation. The second benefit lies in establishing a realistic framework for discussions of problems, policies and programs. Without exception, across the United States, attempts to manage ORVs and establish ORV programs have been met with pleading arguments about the inherent good and evil qualities of ORVs and ORV users. Drawn largely along conventional lines of conservation and consumption, these arguments often rely on exaggerated examples of ORV use. In order to keep the level of discussion on a realistic level, case studies were called upon to depict areas of known, significant ORV use as realistically as possible. Lastly, the case studies are designed to stimulate creative ORV policy development. The public experience with ORVs, shown in these case studies, has included experimental local policies and established ORV rules and regulations. These experiences provide a foundation for new ORV policy.

The Sand Dunes State Forest is one of four study areas selected on the basis of use, location and level of administration. Sand Dunes was selected because it is experiencing a high level of use, is within a management unit open to ORVs, is close to the major population concentration of Minnesota, is actively managed for ORVs and is a site with high suitability for a multiplicity of uses ranging from forest and wildlife production to urban development.

METHODOLOGY

Studies of the recreation use, impacts and benefits are often conducted through statistical surveys and plot monitoring. Generally, in order to yield valid results, these studies are administered over an entire use season. In fact, plot monitoring to assess environmental impact on vegetation, wildlife and soils often spans a number of years to obtain useable results.

Unfortunately this approach requires extensive periods of time and large survey teams. The legislatively mandated delivery date of this effort, January 1984, made valid statistical surveys and plot monitoring impossible.

The alternative approach relies on more subjective information gathering techniques. Interviews with officials who are familiar with the study area provide information on user patterns, flora and fauna impacts, violations of regulations, local impact and general recreation behavior. These officials include public employees ranging from DNR forestry employees assigned to the Sand Dunes State Forest, to the area conservation officer, to the County Sheriff.

In addition to subjective interviewing more objective information is obtained through reviews of existing documents covering the study site and neighboring, similiar areas. For example, recreation development plans, environmental assessments of the area and forest plans yield excellent resource and forest development descriptions.

Lastly, despite less than full coverage of the use season, interviews with and surveys of users can give the policy maker additional information upon which to act. Each piece of information gathered through these techniques should be assessed for representativeness or lack thereof. Representativeness is usually compromised through seasonal variations in use that are not detected by partial season surveys and interviews.

HISTORICAL PERSPECTIVE

Sand Dunes State Forest lies in the middle of Orrock Township in Sherburne County. Orrock Township was first settled in 1857. Although yields were low from the sandy droughty soil, the settlers grew grains, corn and potatoes. The 1930s were a devastating decade for Orrock Township. Coupled with the 1933-34 drought, the loose sandy soils began to blow into dunes and Orrock Township became a Minnesota Dust Bowl.

In 1939 Ray Clement of the MN Forest Service and his family scattered a few Norway pine seeds in the area. It had become known as the "Poison Ivy Capitol of the World" because ivy was the only green crop the prairie would produce. An experimental planting of both deciduous and coniferous trees subsequently tested which had the best survival rate.

Clement introduced a bill to the 1943 legislature requesting that 2 sections of Orrock Township be set aside for conservation purposes. The bill passed and the region was named Sand Dunes State Forest. The forest was enlarged from its original 2 square miles to approximately 12 square miles in 1945, and again to its approximate present size of 17 square miles in 1951.

The planting of this man-made forest was accomplished with a great deal of help from conservation-minded groups in the region. The first planting directed by the state took place in 1940 on state trust land and was done by the Zimmerman Grange. The Sherburne County 4-H Club began their planting in 1941 and continued plantings for a quarter of a century. Other groups assisting in forestation efforts included Boy Scouts, Women's Auxilliary of the Isaac Walton League and Conservation Clubs.

The intensive forestation program stabilized the drifting dunes. The Division of Forestry has left in a natural state the last remaining sand dune in the forest to depict the area as it was prior to the planting program.

REGIONAL DESCRIPTION

Location

The Sand Dunes State Forest is located in Sherburne County (RDC 7w) in east central Minnesota, about 40 miles northwest of the Minneapolis/St. Paul metropolitan area. It is three miles west of Zimmerman on County Highway 4 and six miles north of Elk River on County Highway 1. The entire 10,698 acre Sand Dunes State Forest, of which 50% is state owned, lies in the center of Orrock Township.

Landscape Region

Much of Sherburne County is located on the 850 square mile Anoka Sand Plain. This sandy plain has a fairly level surface which was deposited by glacial meltwater streams. A few areas of relief occur where moraine ridges protrude through the outwash. Further roughness was added in large areas when sand dunes were created by prevailing northwesterly winds in the 1930's. Because of the low local relief and a high water table, the sand plains have many wet marshy areas. The presettlement vegetation was oak savanna and wet prairie, but the oaks were stunted by the low fertility of the soil. Many areas still remain scrub oak and wet prairie today.

Climate

The climate of Sherburne County and the forest is typical of areas in the central part of North America. The soil is generally frozen from the first week in December to the first week in April, although in unusually dry years the lack of frozen water fails to stabilize the loose sandy soil. Average annual precipitation is 28.2 inches.

Pleasant summers make areas of Minnesota including Sherburne County, prime spots for outdoor summer recreational activities. Summers can be dry, making it necessary to take precautions to prevent fires. An average depth of snow of 7" on days with snow cover permits winter recreational activities such as snowmobiling and cross country skiing. Snow depths also vary, creating the need to monitor winter trails so damage due to lack of snow does not occur.

Population

The State Demographer's population projections indicate steady growth through the year 2000 for Sherburne County.

Sherburne County Population Trends

*1980 - 29,900	
1985 - 36,900	
1990 - 45,700	*census
1995 - 53,100	
2000 - 60,800	

The steady increase in population will increase the demand for existing recreational facilities, creating potential overcrowding situations and overuse of existing facilities. The rise in population will increase the demand for residential land, a current trend throughout the county that is likely to extend into private lands in the forest.

Land Use

Sherburne County has traditionally been an agricultural area, although recent population increases and the relatively low productivity of the soil are changing this. The highly erodible soils and dust storms of the thirties created the need for an organized conservation effort (see historical perspective above). Since this effort began in the early forties, the face of Sherburne County has changed. Many miles of pine windbreaks were planted. A large percentage of the land has been turned over to pine plantations for timber and Christmas tree use. The Sherburne National Wildlife Refuge has also returned 30,000 acres to conservation practices by allowing the original vegetation to reestablish.

Recreational Facilities

The SCORP survey indicates that the following recreational facilities are found in Sherburne County:

Recreational facilities similar or related to Sand Dunes State Forest

- 7 parks
- 5 resorts
- 14 campgrounds
- 8 public water accesses
- 5 private water accesses
- 2 public beaches
- 11 private beaches
- 24 miles of trails

Demand on these facilities is expected to continually increase.

Recreation Demand

Presently, all the state owned land in the forest is open to recreational uses. Existing facilities consist of the Ann Lake campground and two trail assembly areas with 25 miles of trails. The Ann Lake campground has about 26 campsites, 7 picnic sites and 3 miles of hiking trails. This area is heavily used. Uses of the trail facilities consist mostly of off-road vehicle and trail bike and horseback riding in the summer, and snowmobiling and cross-country skiing in the winter. Other uses of the forest include hunting, fishing, bird-watching and nature study. Most of the other facilities found in the county provide only one type of use, creating a greater demand for multiple-use recreational facilities like those found in the forest. Projections of Regional Development Commission 7w demand/participation in four wheeling and trail biking show four wheeling peaking in 1985 at 6600 occasions and then beginning a slow decline to 5700 occasions in 1995. Trail biking in the region will decline to a low of 65,000 occasions projected for RDC 7w in 1985. At that point use will accelerate through 1995 to 75,000 occasions.

SITE INVENTORY

Soils

All of the soils in the forest are sands. The vast majority are of Zimmerman-Lino-Isanti-peat association, fine sands which tend to be nearly level to undulating, but portions in the southeastern part of the forest are rolling and hilly.

Other soils found in the forest are alluvial land near the St. Francis River, Braham loamy fine sand in two small areas, Emmert gravelly loamy sand in one small area, and Hubbard loamy sand intermixed with Zimmerman soils in the western part of the forest.

Drainage is excessive. Organic matter content and general fertility of these soils is low. Erosion by wind or water is a serious hazard on unprotected areas of these soils, so deep gullies and blowouts will form unless erosion is controlled. There are still several recent blowouts found in the forest.

The 1968 USDA SCS Soil Survey shows that all of the soils in the forest are of class III or worse and have severe limitations on growing crops. The Hubbard and Zimmerman soils are of Woodland Group 1, which is good for pine growth but too droughty for good hardwood growth. The alluvial lands and Lino soils are of Woodland Group 9, which is poor for pines but good for hardwood growth. Peat and muck, Woodland Group 10, will grow some hardwood while the Isanti soils, loamy wetland and marsh, Woodland Group 11, will not support any trees.

Because of the severe erosion hazard and the low soil fertility, most of the land that was once agricultural in the forest has been changed to pine plantings for conservation purposes. Recreational development and other forest management programs should take precautions to ensure that no further erosion takes place. Development should be at a minimum level and avoid unstable areas such as steep slopes.

Water

The majority of the area around the forest is drained by the St. Francis River and its tributaries. The St. Francis River flows through the eastern and south-central portion of the forest. This is a rather slow moving, meandering river which supports fishing as well as waterfowl hunting. The river is canoeable except for a period during the dry summer months.

Ann Lake is located in the north-central portion of the Forest. It contains 226 acres and has a maximum depth of 26 feet. Swimming in Ann Lake is a popular day use of the forest. Ann Lake is classified as a bass-panfish lake. It supports a waterfowl population, particularly in the southern portion which is partially covered by emergent vegetation. Marshy areas and potholes are common due to the low topographic relief and high water table in the area.

Water quality is generally good in the area, providing many opportunities for water oriented activities. The abundance of marsh land makes excellent wildlife habitat. Although no outstanding or unique water features are known in the area, the relative abundance of water features makes the area popular for outdoor recreational activities.

Topography

The generally level to rolling topography was formed by receding glacial action. As the glacier receded a layer of fine sand known as the Anoka Sand Plain was deposited.

The elevation of the forest ranges from about 950 feet to about 1,030 feet below the fire tower on the western side of Ann Lake. The western half is mostly flat or gently sloping toward the southeast and the Jensen slough. The area around Ann Lake has the greatest topographic relief ranging from the lake, 955 feet, to the hill below the fire tower, about 1,030 feet, a 75 foot drop in a few hundred feet. The St. Francis River valley drains a large portion of the eastern portion of the forest. Generally, the forest's southeastern corner demonstrates more topographic variation, and the rolling wave action of the sand has left gently sloping to sloping topography. Elevation in this part varies from 950 to 1,000 feet.

The rest of the land in the forest is self-drained and contains many potholes and marshes. Other than Ann Lake, the only other large body of open water is in the Larson Slough, near the St. Francis River in section 26.

Vegetation

To control erosion on former agricultural land the majority of state owned land in the forest, about 2,500 acres, has been planted in pines or has naturally revegetated to pines from the plantings. Approximately 6,500,000 trees have been planted. Most of the other lands remain in the native cover types ranging from lowland marshes to upland oak woods. There is also a large portion of grassland which was once farmed.

Most of the pine plantations are in the flatter western portion of the forest. The soil is well drained and very good for growing pines. The rest of the upland supports a rather unproductive growth of hardwoods or grasses. The lowlands and marshes provide good wildlife cover, along with the edges and native upland vegetation. The forest's vegetation provides neither outstanding visual features nor any unique recreational features.

Wildlife

The variety of habitat throughout the forest supports a good population of terrestrial birds and mammals, along with the aquatic species found in and around Ann Lake, the St. Francis River and the various marshes and sloughs found in the forest.

The species of animals commonly found in the forest are of the pine-aspen-hardwood timber type. A good population of ruffed grouse also

exists in the forest. The grouse and other species of birds and mammals, along with the fish found in Ann Lake and the St. Francis River, contribute to the quality of the environment and enhance the recreational experience.

Land Use

Presently, the land within the forest is zoned A-1 agricultural-conservation land. Non-farm development is allowed with a minimum lot size of 5 acres, plus a conditional use permit. The objective of this zoning is to preserve the land for conservation purposes. The state owned land and the Sherburne National Wildlife Refuge land are consistent with county zoning objectives.

There is a large portion of the forest used for residential purposes. This development is generally irreversible and prevents expansion of the forest. A small portion of the forest on the western edge and the eastern and northeastern edges is used for agricultural purposes, but the fine sand is not very productive. All of the state owned land is open for recreation purposes.

The adjacent land is used for either residential, timber production, agricultural purposes or part of the Sherburne National Wildlife Refuge. The refuge offers an additional 30,000 acres of open land next to the forest for wildlife habitat and limited recreational opportunities.

The continuing trend toward residential development puts pressure on forest recreational resources, along with the natural resource conservation management programs.

Owner ship

One-half of the land in the forest is state forest land; the rest is divided between scattered private holding (30%) and the Sherburne National Wildlife Refuge (20%).

The state owned land is in two major blocks in the western half and southeastern section. There is a large , privately held residential block dividing them and offering no connection, except on county roads. There are also several smaller privately owned blocks surrounded on 3 or 4 sides by state forest land. These lands form barriers to forest management programs. There is also a small portion of land on the western edge of Ann Lake, adjacent to the Ann Lake Forest Recreation Area, which has a very high recreational potential.

Transportation System

The forest is bordered by Sherburne County Road 5 on the western edge and County 4 on portions of the northern edge. These roads, along with County 15, provide adequate service to the existing development within the forest. There are about 10 miles of township roads ranging from unimproved dirt to maintained gravel roads. About 18 miles of state forest trails serve off-road recreational trail uses. There are also 6 miles of hiking trails on state owned land.

Features

There are several recreational features and features of interest or concern to recreational users. Presently, the recreational opportunities in the forest consist of the Ann Lake campground facility and two loops (18 miles) of snowmobile trails with regionally interconnecting trails. The campground area consists of about 25 campsites, 7 picnic sites and 6 miles of hiking trails. There is also a private campground just outside the forest on Eagle Lake. The wildlife refuge offers some limited recreation also.

There are two areas in which residential development has reached a point where it becomes a major component of the landscape and influences the state owned land.

Use of the Management Unit

The Sand Dunes State Forest is used by a number of types of recreators and industries. Industrial clients of the forest include fuelwood and pulpwood buyers. Some fuelwood harvesting borders on a recreation activity, in which the wood cutting is part of an outdoor experience offering exercise and mental rest and relaxation. More traditional recreation engaged in at Sand Dunes State Forest includes hunting of waterfowl, upland game and big game, camping, fishing, horseback riding, winter trail sports and ORV riding. ORV riding is the primary focus of this study.

Because of this primary focus, an attempt was made to survey the ORV rider during the August/September period of 1983. This effort was made despite the partial coverage of the use season. It is recognized that we would expect spring and late fall use to differ from that found in the August/September period. For example, late fall use should include a greater proportion of users to whom ORVs are means of transportation to hunting sites rather than recreation ends in and of themselves. Nevertheless, we feel that partial coverage is superior to no coverage at all.

Over the survey period 44 useable surveys were distributed and returned. The distribution was based on 100% contact of all users present and reachable at the forest during six to eight hour blocks of time in August and September. The sample doesn't conform to the requirements of equal probability sampling. Nevertheless it will be analyzed and reported using standard statistical techniques requiring an equal probability sample.

The majority of the respondents were frequent ORV riders. Nearly half (45%) used the machine they were on more than four times per month. An additional forty two percent used it more than once a month. Over half of the respondents (59%) had used their ORV in Sand Dunes before and the average repeat user had used Sand Dunes thirteen times. This is not too surprising since almost two-thirds of the users surveyed lived forty-five mile or less from Sand Dunes State Forest and they felt forty to fifty miles to be a reasonable travel distance to use their ORVs.

On the average eighty percent of the use was summer use, twenty percent winter. Most of the users surveyed regularly operated their ORVs on private

land (50%). A smaller but substantial number of users (43%) regularly used public land. Only seven percent regularly used both.

The fact that a large percentage of the users (40%) were first time users and that many users were regular users of private land may signal a rapid growth of ORV riding at Sand Dunes. Undoubtedly, if this is true, much of this increase could be due to recent publicity about Sand Dunes.

The metropolitan area is the heaviest contributor of ORV riders to Sand Dunes State Forest. Sixty-five percent come from the metro area. In fact, Hennepin and Ramsey counties are the top two contributing counties supplying fifty-four and twenty-three percent of the use respectively. Overall, the users are young with an average age of 25 years. Nearly sixty percent (59%) of the users are between fourteen and twenty-five years old.

Most of the users surveyed (60%) were three wheelers. Trailbikers comprised forty percent. No four wheelers were found. Rate of club membership was similar between the two groups. Few of the trailbikers surveyed (19%) belonged to trailbike clubs. Slightly more three wheel riders belonged to three wheeler clubs (25%). Most of the users say they usually use their ORVs in the company of friends (64%). Family groups are the usual company of a small portion of the users (11%). Groups comprised of family and friends are usual companions of sixteen percent of the sample. In general, it appears that this use is a highly socially oriented pursuit. A further analysis shows that trailbikers are far more likely to ride ORVs with friends than three wheelers (88% versus 54%). Conversely, three wheelers are more family oriented than trailbikers.

Racing and meeting new friends were the most popular activities during ORV outings to the Sand Dunes, with nearly one third of the respondents (32%) saying they raced and met new people. Hunting, fishing, and visiting friends were activities often participated in by a quarter (24%) of the sample. Between eleven and sixteen percent said they camped, fished, bar-hopped and took photographs. Trail riding was slightly more strongly preferred than hill climbing and scrambling.

Recreation providers often require information about the sociopsychological motivations of their clientele. They use this information to design facilities and programs that meet the sociopsychological needs of users. They also use it to predict the success or failure of alternative policies and programming.

The most commonly accepted approach to assessing sociopsychological motivations is to use a set of sociopsychological motivations scales developed by Bev L. Driver specifically for recreation motivation assessment. These scales were applied to the users surveyed at Sand Dune State Forest. Over two-thirds of the population were motivated to ride ORVs by a desire to explore (68%), and a need to achieve (77%). Being with others, whether family, friends or new acquaintances was a highly scored motive of fifty-two percent of the sample. Action as a motive, was nearly as prevalent. An even fifty percent of the sample users scored high on the action scale.

Lowest on the motivation scales were escape motivations, where people seek to get away from daily chores and crowds and rest and relaxation motives. A third of the sample (32%) sought escape from everyday pressures through ORV riding. Just eleven percent sought rest and relaxation.

In short, ORV riders seem to be outdoor action oriented people who enjoy recreating in the company of others with the same values.

Other primary users of the forest include loggers and fuelwood gatherers and other recreators. Loggers are limited to areas of prescribed sales and generally number only one to two per year. Fuelwood buyers also are limited to the areas of prescribed sales, and can number up to 250 per year. The logged areas are changed every year. In general, most other users avoid the ORV users.

Because of its accessibility and basically upland nature all portions of the forest are used for recreational purposes. Snowmobilers are confined to designated trails. Hunting takes place throughout the entire forest. The heaviest use by hikers is adjacent to the campground. Equestrian users generally try to avoid ORVs. Their greatest use is in the southeast portion which is hillier, more scenic and provides a larger block of land and less motorized interference. The National Guard and the Army Reserve each carry out maneuvers in the forest once a year in a prescribed area.

Changes in Recreational Use Over Time

John Nelson, Area Forest Supervisor, contrasts present heavy ORV use in the Sand Dunes State Forest to 1975, when he first accepted area responsibility. Then, the forest was smaller--only 3900 acres--and state land was separated by public land into three blocks. Campground attendance was similar to present. Hunting intensity was high and residential expansion was prevalent. Winter snowmobiling was becoming organized and wandering off of the trails commonly occurred. Hunters in four wheel drive pickup trucks drove where they pleased and essentially ignored warnings and signs to keep out. Nelson described management policy for the multiple-use land as "scolding", or the issuance of verbal warnings. Motorbike use was light but not noticeably damaging. Verbal warnings were effective in keeping the activities at a tolerable level. By 1978 motorbike activity had increased to the point where it was discussed at area and district levels as a problem. Some fire access trails were becoming impossible due to formation of moguls and soil collecting on corridors. Verbal scoldings or warnings continued to be the primary management technique. Regional and state level discussion advocated a multiple-use, no-restriction management policy. Complaints about ORV activity came from the local public and township officials who asked what was going to be done with the ORVs. In Nelson's opinion, hiking decreased somewhat due to conflict with ORVs. Complaints by hunters during deer season began to surface and officials received one verbal report of a biker and a car involved in a head-on collision.

By the fall of 1982 it was perceived that three-wheelers and trail bikers were the dominant users of the forest. Again, as in the past, site and area foresters perceived that they had no enforcement authority except NR1 Recreational Sub Area Regulations which could apply to this situation. They

felt impotent. Use at the Ann Lake campsite was again high in 1982 and managers reported complaints by campers. Interviews with campers during the present study did not substantiate these complaints. Area conservation officer, Wayne Forsythe reported fewer snowmobiles using the Sand Dunes and more snowmobile complaints against the ORVs. Forsythe reported receiving local complaints against the ORVs on and off for three years. He also believes that there are fewer ORVs this year since the restrictions have been placed on the forest. It is also his belief that there are fewer machines and fewer violators. This may explain the lack of complaints about ORV's during this case study period.

Since signs were posted in the spring of 1983 to restrict ORV use in the southeast section of the forest, ORV use has been almost eliminated from that area. Gradual healing of the vegetation is now noticeable and natural grass seeding is taking place. On October 31, 1983 all of Sand Dunes State Forest was closed to ORVs. At that time grading began in order to groom the trails for winter snowmobile use.

SAND DUNES STATE FOREST MANAGEMENT, DESCRIPTION AND BACKGROUND

The district forester at Sand Dunes State Forest Gary Swanson, has been there since 1975. Area Forester John Nelson has been responsible for the area for since 1975 and conservation officer Wayne Forsythe has been with Region 3 since 1964. These years of experience provide an extensive temporal perspective on the use and management of the Sand Dunes.

Administration of the Management Unit

A 10 year harvest plan was adopted for the Sand Dunes State Forest. According to Nelson, wildlife and recreation plans must be programmed around the timber plans. Funding is presently available to do a sub-area recreation development plan for the forest. The forest is also scheduled to be a part of an overall unit plan of the area, to be completed within the next biennium. Both of these plans await the completion of this off-road vehicle study.

Forest management varies by tree type. Conifers are intensely managed for wood products and are presently sold for pulpwood. The hardwoods, primarily oak, are managed for firewood and wildlife. Harvest units are arranged to maximize wildlife benefits. Clear-cutting occurs in small areas in mozaic patterns for fuelwood. This pattern accommodates wildlife and recreation. Wildlife and recreation are developed according to existing user demand. The campground sub-area caters to recreational use. Designated trails also receive special consideration for their intended uses. Vegetation management is designed to complement the trails. All activities allowed within the forest integrate forest protection as a prime consideration by necessity.

Nelson states that in managing a forest, protecting the total resource, which he describes as land, timber, water and wildlife, is the major objective.

Historic and Current Management Practices

Theoretically, recreational use of the Sand Dunes State Forest has been managed according to the multiple-use concept of state forest lands. At the Sand Dunes this has meant that the district forester primarily has attended to the planting, harvesting and other care of trees and campground. General rules for recreators were posted, and foresters would issue verbal warnings if violations seemed serious.

John Nelson took the stand that issuance of "scoldings" without authority to enforce was not a prudent use of foresters' time. In 1978, he began a "no-action" program meant to allow the uncontrolled use of off-road vehicles to run its course. Verbal warnings were no longer issued, since "the people had a right to be there under the law."

It was felt by the region that the only real solution to the ORV problem in the Sand Dunes State Forest would be to develop criteria that would provide support for appropriate rules and be accompanied by the necessary enforcement authority. The decision was made that the ORV situation should be addressed on a statewide basis. The district was advised to begin documenting its case.

In 1982 a plan was initiated to legally separate the campground by signing the area, so that the NR1 rules for recreational sub-areas would be enforceable. The snowmobile law was also cited as an immediate means of trying to preserve the snowmobile trails. During the 1982-83 winter, the trails were posted "Snowmobiles Permitted Only". Enforcement was difficult because three-wheelers were allowed free use of forest land under the multiple-use concept. The forest managers had no enforcement authority--only the sheriff and conservation officers had authority to enforce the snowmobile law. In May 1983, trails were re-signed "No ATV's Except Snowmobiles". The district foresters gained peace officer authority within the 80 acre sub-area and began enforcing the NR1 rules there. They were pleased with the results of their sub-area enforcement.

In June 1983, the Area Forester proposed closing the Sand Dunes to ORV's, believing that no other action could curb their use. This action was supported by the region and the Division of Forestry. The response from the DNR Commissioner's Office was to keep the area open and begin the case study of ORV use.

In August, the majority of the forest was closed to off-road vehicles, leaving only 840 acres in the northwestern corner open until October 31, 1983. The area was posted, and the public was warned that violations were subject to a misdemeanor. The forest was monitored 4 days a week to determine how well the interim rules were working and to survey ORV and other uses.

IMPACTS, FINDINGS OF FACT, ALTERNATIVES AND RECOMMENDATIONS

Impacts

"The most noticeable signs that man exists in the State Dunes today are the marks left by dirt bikers. Since the spring of 1981 roadsides have been denuded of vegetation (NE NW section 21 and NE NE section 16), a marsh has been destroyed (NW NE section 16), and numerous hillsides have been gullied (SW SE section 25, N NE section 17). Many forest access trail in the state forest has been dug up and mogulled to the point of becoming impassable with a standard pick up truck, thus impairing forest fire suppression efforts. "Motocross tracts" have been made from open grass areas (NE SW section 16 and NW NE section 17). Some corners on the trails have been banked so steeply that they must be rounded by leaving the trails completely (N 1/2 NE 1/4 section 16)." ("Swanson and Peltier, June 1983). Three-wheelers and bikers continue to create random new trails through wild wooded tracts.

The fragile prairie grasses tenuously rooted in the sandy soils, are easily uprooted and grassed-over areas are denuded. The area manager describes this destruction to be occurring at an alarming rate. The writer concurs that she observed noticeable increases in denuding and mogulling of trails and roads within a 5 to 6 week period during late summer of 1983.

Snowmobile trails were difficult to groom in 1982, due to the moguls created by the bikes. The Division of Forestry attempted to grade the trails but found them to be so badly damaged that they could not be graded completely smooth with a medium size grader.

The possibility of being unable to contain fire in the area is magnified by the present mogulled state of many of the forest roads to the extent that traffic is limited to four-wheel drive vehicles only. In the event that fire protection would be needed in these areas, the fire equipment would be severely impeded by the poor conditions, if it would be able to pass through the roads at all. In addition to fire dangers inherent to the approximate 3500 acres of pines, the oak savanna area surrounding the Sand Dunes State Forest is a high-risk area because of the flashy nature of grass fires in the droughty sandy soil.

Impacts to the wildlife in the region are unknown at this time. District and area managers express a belief that deer are being driven out of the area by ORV use but there is no documentation at present.

A drastic change in users was noticed in the Sand Dunes State Forest by Fall, 1982. Off-road vehicle users dominated the maintained forest roads, trails, and fire access routes. Hikers, hunters and horseback riders complained of noise and fear of being hit by ORV users. Local residents demanded action and began a campaign to the region in St. Paul, notifying the DNR that a crisis was developing and a corrective solution must be found. Nearly 90 local residents signed a petition requesting action and complaining of destruction of the resource, fire hazards, noise pollution and litter. The Department received letters from a variety of users requesting that ORV's be banned from

the Sand Dunes State Forest. Officers of six area townships registered complaints about the amount and careless nature of ORV's on their roads. Specifically, they cited tearing up of roads, elevated levels of noise near the Ann Lake residential area, and trespassing on fields and destruction of crops.

Sherburne County Sheriff Richard Witschen expressed concern over safety, and predicted an increase in accidents and injuries if restrictions were not put on the land use in the forest. He ordered additional squads to patrol the area in response to citizen complaints of three-wheelers on public roads and trespassing on private property.

In light of these impacts, what have been the effects of the management techniques on the users and on the problem in Sand Dunes State Forest? Since three-wheel began to emerge as a problem in 1978, Area Forester John Nelson reports that he was advised to carry out more weekend patrols to issue verbal warnings. Nelson ignored this advice in the absence of enforcement authority on the part of Forestry personnel. This tactic was successful in calling attention to the foresters' perceived need for rules and associated enforcement authority. Management techniques used in 1983 -- posting of signs consistent with NRI rules, obtaining peace officer status by the foresters, and subsequent issuance of citations -- have reduced user conflicts in the campground.

On the other hand, this method of management has also had costs which are borne by the resource and users. Restriction of ORV's to the posted northwestern area of the forest has created a concentration of ORV users in a very small, densely used area. Because Sand Dunes State Forest had become generally known as "the place" to ride, the confinement of all 3-wheelers and trail bikes to a much smaller area has created other problems associated with violations and safety. Scheduled monitoring of the restricted area during Fall 1983 showed that bikers and 3-wheelers continued to regularly ride outside of the designated ORV area. Safety also presented a problem. The high density of use in the restricted area and the high speed of the sport suggests the need for marked single-directional paths to avoid collision. Presently, users are commenting on the need for directional signs and the inherent danger in having too many users in the small area provided. It seems only a matter of time before collisions will occur. Accidents and collisions have been unofficially reported in the past but effort has not been made to document such occurrences. Supervision to manage the numbers and variations in user ages and recreational vehicle and user type is also called for.

Findings of Fact

For the most part, the original oak/prairie savannah vegetative cover of Sand Dunes State Forest has been altered by the action of man.

Although not confirmed by site investigation, inventories of surrounding areas and similiar dune areas indicate that unique flora probably exist in the Sand Dunes State Forest.

The droughty, sandy soils of Sand Dunes State Forest present on abnormally high fire risk.

The sandy soils of Sand Dunes State Forest are exceptionally subject to the forces of mechanical erosion. The extent of this susceptibility is such that forest roads used by ORVs become virtually impassible. They present impediments to fire suppression equipment and safety hazards to fire fighters faced with a need to quickly withdraw from rapidly advancing fire.

ORV management has been minimal at Sand Dunes State Forest.

The forest crop in Sand Dunes provides raw materials for the forest products industry. The site is well suited for conifer growth.

Historically there has been, and currently there is, multiple recreation use of the Sand Dunes State Forest that includes camping, fishing, hunting, hiking and horseback riding, in addition to ORV riding.

The Sand Dunes State Forest is one of the few recreation facilities in Sherburne County providing multiple use recreation development.

Erosion has been an historic problem in this state forest; however, pine plantings have served to largely stabilize the soil.

The forest's gently rolling topography and intertwined network of trails provide an ideal situation for ORV use as well as other trail uses.

The current level of use of the site can be expected to increase due to word of mouth communication among ORV riders and curiosity generated by the publicity attendant to regulatory efforts undertaken by the Department of Natural Resources.

The Sand Dunes State Forest is located close enough to the bulk of the state's population in the metropolitan area to be extremely attractive to metropolitan ORV riders.

Recent attempts to restrict ORV riders to the northwest 860 acres of the State Forest have been only partially successful.

Free two-way circulation through the trail network and mixed ORV types on these trails present safety hazards that have resulted in one reported collision and many expected near misses.

Forest road repair must be done frequently in order remove moguls and high banked curves that impede passage of fire suppression equipment.

Complaints against ORV riders by local residents have reached a state at which they are a concern of local law enforcement officials.

Significant ORV demand exists in the area of Sand Dunes State Forest.

Alternatives

There are two reasonable alternatives to the current problems at Sand Dunes State Forest.

Accept ORV use as a legitimate activity. Devote sufficient land resource to meet demand and increase management efforts in order to improve user behavior and decrease risks of safety.

Reject ORV use of Sand Dunes State Forest as an activity yielding a net negative public benefit. Close the area to ORV use and rely on dispersal of use to a variety of other more suitable areas to solve the safety and environmental problems associated with concentration of the high demand in the Sand Dunes State Forest service.

Because of the current safety hazards to ORV riders, fire fighters and the resource and the level of local complaints about ORV riders a third alternative - maintaining the status quo - is neither reasonable nor acceptable.

The positive impacts of accepting the first alternative are provision of opportunity for ORV riding in an area capable of servicing a large portion of the state's ORV riding population. The use will be concentrated in a managed area that abuts relatively unpopulated lands.

The negative impacts of accepting the first alternative are substantially increased management costs. Frequent grading and leveling of forest roads will be required to maintain acceptable road quality. A major interpretive and educational effort at the state forest will be necessary to communicate regulations and encourage acceptable ORV behavior. In all probability this effort will include capital investment in a trail center building, as well as a significant increase in signing and staff. It is quite likely that accepting this alternative and investing in the area will increase use of the area. Increased use will undoubtedly increase personnel costs for maintenance, education/interpretation and enforcement. More importantly increased use will undoubtedly increase erosion in the droughty, sandy soil, impair conifer growth on a site with good conifer productivity and good accessibility to market, and increase the probability of forest fire and loss of forest product. Increased use will impact the local settlement at Ann Lake and displace segments of the non-ORV user population. This displacement occurs at one of the few known multiple use sites in the county and is therefore undesirable.

The positive impacts of accepting the second alternative, closing the area to ORV use, accrue mainly to the resource. Impact of erosion and potential fire will be reduced. An additional positive impact will result by preventing displacement of non-ORV users of the multiple use facility.

Whether or not management and development costs are avoided through closure is dependent on how well excluded ORV riding disperses across other available public lands. If the current user group simply concentrates in another area then the management and development costs will be transferred to the

administrator of the new area. Given the social nature of the ORV activity it is quite likely that these users will eventually gravitate to areas of concentrated use offering social interaction. The hope is that any such new area have less erodable soils, having lower forest productivity and higher resistance to fire danger.

The primary negative impact of closure is negative public opinion of the Department of Natural Resources among ORV users.

Whether or not excluding ORV use causes the same problems elsewhere and creates poor public relations between the Department of Natural Resources and ORV users is largely dependent on timing closure of Sand Dunes with the designation of alternative ORV areas that can serve the metropolitan demand. If the department can locate and designate acceptable areas, then negative impacts of closure of Sand Dunes will not materialize.

APPENDIX III

Solicitation of Written Responses
on the ORV Issue for ORV Task Force;

(Responses received September - November, 1983)

- A. Minnesota Off-Road Motorcycle Spokespersons
 - 1. American Motorcyclist Association
 - 2. Golden Eagles Motorcycle Club

- B. Minnesota Three-wheel ATV Spokesperson
 - 1. Minnesota Three Wheelers Association, Inc.

- C. Minnesota 4X4 Wheel ORV Spokesperson
 - 1. Midwest 4 Wheel Drive Association
 - 2. Minnesota Go-4-Wheelers, Inc.

- D. Minnesota ORV Environmental Spokesperson
 - 1. Sierra Club - North Star Chapter
 - 2. Barney L. Oldfield, D.V.M.

- E. Minnesota ORV Governmental Spokesperson
 - 1. Minnesota DNR - Trails & Waterways Unit
 - 2. Minnesota Department of Transportation
 - 3. Minnesota Department of Public Safety

4. Metropolitan Council
 5. Region 5 Regional Development Commission
(North Central Minnesota)
 6. Headwaters Regional Development Commission
(West and Northwest Minnesota)
 7. Washington County Highway Department
- F. National Off-Road Motorcycle Spokesperson
1. Motorcycle Industry Council, Inc.
- G. National Three-Wheel ATV Spokesperson
1. Specialty Vehicle Institute of America
- H. National 4X4 ORV Spokespersons
1. United Four Wheel Drive Associations
 2. California Association of 4 Wheel Drive Clubs, Inc.
 3. United Four Wheel Drive Associations
 4. Pacific Northwest 4-Wheel-Drive Association
 5. Subaru Mid-America, Inc.
- I. National ORV Spokesperson
1. American Recreation Coalition

Solicitation of Response for ORV Task Force

(received September - November, 1983)

A. Minnesota Off-Road Motorcycle Spokespersons

1. American Motorcyclist Association

Dale Greenwald, Congressperson for:

District 23 (Minnesota)

5240 Ewing Avenue North

Brooklyn Center, MN 55429

(612) 535-0501 (business) (612) 533-9105 (home)

Response:

Mr. Greenwald prepared a 3-ring notebook containing the following information:

- a. U.S. Department of the Interior, 1979 (?). Planning for Trailbike Recreation. Heritage Conservation and Recreation Service, 93 pp. This volume contains 28 signed articles addressing all aspects of ORV use, including land manager responsibility, industry responsibility, ORV planning, policy on federal land, cyclist's desires, noise, trail development, assessments of various programs, environment, enforcement and education. The author's come from a wide range of pertinent disciplines.

- b. American Motorcyclist Association, 1982. Landowner Liability Laws. 14 pp. This small pamphlet introduces the topic of landowner liability and recreational users. It has question/answer format, additional references, and a listing of liability statutes for all states. The pamphlet is based upon a more exhaustive study done by AMA.

- c. American Motorcyclist Association, Sept. 1983. Facts About Trail Riders. 4 pp. This is a very short summary of some recent survey information.

- d. American Motorcyclist Association, August 1973. A Trail Rider's Guide to the Environment. 60 pp. This booklet, written by ecologist Shaun Bennett, has been used as a basic handbook for teaching environmental sensitivity to trailbikers.

- e. Motorcycle Industry Council, Inc., no date. The Recreational Trailbike Planner. Vol. 2, No. 7. 8 pp. This edition primarily discusses motorcycle types and their uses.

- f. American Motorcyclist Association, 1977. Five State Approaches to Trailbike Recreation Facilities and Their Management. 64 pp. This booklet by Robert Rasor, Associate Director of the AMA Legislative Department, discusses programs in Florida, Louisiana, California, Missouri and Washington State.

- g. American Motorcyclist Association, April 1978. Turkey Bay Off-road Vehicle Area at Land Between the Lakes. 28 pp. This booklet by Douglas Nelson McEwen of Southern Illinois University addresses philosophy, background events, planning, design, development, monitoring, and user preference.
- h. American Motorcyclist Association, Oct. 1982. Trail Riding in America: A Guide to Recreational Off-Road Riding. 128 pp. This is a highly useable atlas which includes an introduction discussing equipment, safety, environment and landowner liability. A useful discussion on riding on federal lands is included. The state-by-state entries include a state map, a statewide overview, state programs, state legislation, use of state, private and federal lands, and includes the addresses of clubs. Telephone numbers of state and federal offices are also included.

2. Golden Eagles Motorcycle Club

Michael J. Quinn, Sec.

P.O. Box 6351

Rochester, MN 55903

(507) 288-2612

Response:

Mr. Quinn is primarily interested in motorcycle management techniques. Basic points include: provide cycling facilities separate from 4X4s; prefer trail vs. set-aside areas; wildlife not disturbed by cyclists; need for self-responsibility landowner

liability laws. Mr. Quinn estimates that 2000 members of AMA live in Minnesota, equalling a \$2,000,000 impact into the state economy annually from cycling activity.

B. Minnesota Three-wheel ATV Spokesperson

1. Minnesota Three Wheelers Association, Inc.

Harold Tompkins, President

Route 3, Box 239

Cambridge, MN 55008

(612) 330-6290 (business)

Response:

Goal is to pass a 3-wheel registration bill. Approximately 40,000 3-wheel ATVs are now used in Minnesota. Mr. Tompkins desires that 3-wheel ATVs not be lumped together with other ORVs, but would be willing to work together with others for registration.

C. Minnesota 4X4 ORV Spokespersons

1. Midwest 4 Wheel Drive Association

David Jones, Minnesota Director

838 Blair Avenue

St. Paul, MN 55104

(612) 224-7107

Response:

Mr. Jones does not oppose other users or uses of public lands. He believes that everyone should be able to use public lands in an orderly manner. His group is willing to pay for special license allowing them to use primitive roads or trails.

Mr. Jones believes that the economic value of promoting 4X4 ORVs should not be overlooked. Mr. Jones 4X4 Club participates in a Memorial Day event in Wisconsin which generates \$100,000 just between club members of nine MW4WDA clubs in Minnesota.

This letter has the following enclosures:

- a. U.S. Dept. of Agriculture, Forest Service, no date. "Woodsy Owl on 4-Wheeling and Trail Biking" (FS-330). 4 pp. This pocket-size pamphlet gives brief guidelines for planning a trail ride.
- b. Mid West 4 Wheel Drive Assn., no date. "membership pamphlet" 4 pp. briefly describes the organization.
- c. MW4WDA, no date. "pocket size information pamphlet" 6 pp. briefly describes the organization.
- d. U.S. Dept. of Agriculture, 1979. 4 Wheeling. Forest Service, Lakewood, Colorado, 32 pp. Contains practice advice on four-wheeling.

- e. U.S. Dept. of Agriculture, no date. "Off-Road Vehicles on the Chippewa National Forest" Cass Lake, MN, 2 pp. includes safety tips and ORV policy.
- f. Washington Statutes, Chapter 46.09 (Off-Road and Non-Highway Vehicles)

- 2. Minnesota Go-4-Wheelers, Inc.
P.O. Box 12248
Minneapolis, MN 55412

Response:

In a letter signed by 38 members, this group expressed the hope that the task force recommendation would provide more permanent use areas. They indicated a more willingness to pay for the privilege of using the land.

D. Minnesota ORV Environmental Spokespersons

- 1. Sierra Club - North Star Chapter
Nelson T. French, Director
Boyd Place, Suite N
2929-4th Avenue South
Minneapolis, MN 55408
(612) 827-3850

Response:

The response letter from Sierra Club addressed itself primarily to enforcement and/or management questions. Their position is that no lands should be open to ORV use until after an inventory and classification of those lands is completed. This process can best be achieved through the use of existing unit management plans or criteria set up by the ORV Task Force.

The Sierra Club suggests a thru-phase implementation process. The first step would be to determine reasonable use areas for certain seasons. Secondly, restricted use areas could be determined by season, day, locality, vehicle type, or density of use. A third phase would be to determine nonuse areas.

The recommended first step would involve the prohibition of all ORVs on state units, followed by permitted use in designated areas. This would involve a shift in policy from "exclusion" area management to "allowable use" area management.

A major concern of the Sierra Club is the impact of the sheer number of ORVs. Their concern is to be aware of the effects of the many small impacts.

Attachments:

Attached to the Sierra Club response is a copy of their Off-Road Vehicle Policy, adopted by their Board of Directors on February 5-6, 1972.

2. Barney L. Oldfield, D.V.M.

P.O. Box 273

Goodhue, MN 55027

Response:

Mr. Oldfield made some general comments about ORV management. He believes that they should be controlled and regulated before ORV damage occurs. He also believes that ORVs generally conflict with non-motorized recreationists. New ORV areas should be opened only after in-depth study of possible consequences.

E. Minnesota ORV Governmental Spokespersons

1. Minnesota DNR - Trails and Waterways Unit

Donald M. Carlson, Special Assistant to the Commissioner

Box 52, Centennial Office Building

St. Paul, MN 55155

(612) 296-4822

Response:

The position of the Trails and Waterways Unit is that the use of ORVs on public land is one that needs better resolution than what present policy allows. The irregularities and uncertainties of present legal use of ORVs should not be left to continue. Therefore, Trails and Waterways recommends that the ORV Task Force use the attached section of the Minnesota Trail Plan as a basis for discussing the most appropriate legislative recommendations. These guidelines are as follows:

- a. A multiple-and-sustained-yield land-management approach must be maintained.
- b. DNR should clarify and make known to the public which DNR-administered lands are presently providing ORV opportunity.
- c. Those areas presently used for ORVs, (and found to be environmentally suitable), should be regularly monitored.
- d. DNR must be able to adequately enforce any future ORV designation. The recommendation is to pursue a "closed unless designated open" policy rather than the present "open-unless-designated closed" policy which exists on many public lands.
- e. ORV use should be isolated from other non-motorized recreationists.
- f. ORV use should be avoided during the spring thaw (approximately March 15 through May 15).
- g. A user-fee system should be implemented if DNR-sponsored ORV opportunity is developed.
- h. A study should be done on the feasibility of a pilot "ORV Trail-Park" consisting of approximately 150 acres and/or 20 miles of trail to be located within 40 miles of the Twin Cities metropolitan area.

2. Minnesota Department of Transportation

C.W. Christie, Director

Office of Maintenance

Room G-20, Transportation Building

St. Paul, MN 55155

(612) 296-6763

Response:

The response of Mn/DOT centered primarily on ORV management/enforcement issues. The number one problem with ORVs is that the first area pressed into use is the roadside ditch and back slope. This poses an auto safety problem. The largest ORV expense to Mn/DOT involves erosion damage to the roadside as a result of ORV activity.

If ORVs were legalized in roadside ditches. The ditches would need to be maintained barrier-free. This would be very expensive and failure of this maintenance could result in large tort claims against the state. Such maintenance would also conflict with present roadside wildlife management efforts.

Attachments:

Six color photos of ORV damage and a letter from a concerned citizen. This citizen has observed a "secondary road system" for ORVs evolving along highway rights-of-way. He enumerates the problems with such development.

3. Minnesota Department of Public Safety

Paul J. Tscida, Commissioner

211 Transportation Building

St. Paul, MN 55155

(612) 296-6642

Response:

The Commissioner's response was a emphasis of a letter sent February 22, 1983 by Major Glenn E. Gramse to Rep. Welch in reference to use of three-wheelers on public rights-of-way. Mn/DPS believes that these vehicles must be street legal if they are to enter the right-of-way. Mn/DPS also expressed concern about 3 wheel use which could easily be extended to year-around use by juveniles.

4. Metropolitan Council

William G. Kattner, Park Planner

300 Metro Square Building

7th and Robert Streets

St. Paul, MN 55101

(612) 291-6359

Response:

Mr. Kattner states that ORV use can be legitimate recreation and deserves proper attention. He states that, in the metro area, most uncontrolled ORV use is in areas where private landowners are not particularly concerned about their presence on their property. He believes that ORV areas should be defined and use-regulations should

be established. A primary consideration should be the impact upon adjoining landowners.

Mr. Kattner cautioned the Task Force about recommending ORV areas only in outstate areas. Something that needs to be explored is who should be providing ORV opportunity.

Attachments:

Attached was a letter received from Roger E. Lake, President of the Ramsey-Washington Metro Watershed District. This letter describes the extent of damages at Battle Creek Park after it was closed off from vehicle activity to allow for the first stage of park development. Extensive vandalism was inflicted by the users of 4X4 vehicles.

5. Region 5 Regional Development Commission

(North Central Minnesota)

Kathy Gaalswyk, Executive Director

611 Iowa Avenue

Staples, MN 56479

(218) 894-3233

Response:

Both the Community Development Advisory Committee and the Region 5 Regional Development Commission reviewed the ORV issue and agreed that ORV damage can be a problem in some places. They, however, did not have any specific comments or suggestions to offer.

6. Headwaters Regional Development Commission
(West and Northwest Minnesota)

Tom Varberg, Economic Development Planner

P.O. Box 586

722-15th Street

Bemidji, MN 56601

(218) 751-3108

Response:

Mr. Varberg's response focused primarily upon enforcement/management issues. ORVs were discussed at the commission's regularly scheduled meeting of October 20, 1983. Interesting questions raised include the following:

- a. Is DNR responsible or liable for ORVs on state-owned land?
- b. The State's motivation for licensing ORVs would be revenue, not regulation.
- c. The City of Blackduck passed an ordinance requiring licenses for ORVs.
- d. All drivers of ORVs should be licensed drivers.

Attachments:

Written response from RDC #2 county highway engineers and sheriffs.
Six responses were received. Those officials interested in more ORV

regulations focused their concern upon three-wheelers. ORV complaints focused primarily upon illegal (unlicensed) use of public roads by three-wheelers.

7. Washington County Highway Department

Michael Fox, Park Planner

Highway Department

11660 Myeron Road North

Stillwater, MN 55082

(612) 439-6058

Response:

Mr. Fox's response focused primarily on management questions. The two management questions brought forth were liability for ORV activity, and ORV facility siting. Actual problems in Washington County have included destroyed fences and gates, driving upon earthen dams, and illegal ORV use of state trails. Complaints have included noise, speed, and vegetation damage. An ORV park was recommended because of the following three reasons:

- a. it would pay for itself
- b. it would bring in needed business
- c. it would reduce damage elsewhere.

F. National Off-Road Motorcycle Spokesperson

1. Motorcycle Industry Council, Inc.

Mark W. Anderson, Director of Off-Highway Vehicle Planning

3151 Airway Avenue, Building P-1

Costa Mesa, CA 92626

(714) 241-9251

Response:

Mr. Anderson enclosed the following items for our review:

- a. Motorcycle Industry Council, Inc., 1983 Motorcycle Statistical Annual., 46 pp. This annual publication includes information on market, manufacture and distribution, retail marketplace, usage and ownership.
- b. U.S. Department of the Interior, 1979(?). Planning for Trailbike Recreation., 93 pp. For a synopsis, see above.
- c. U.S. Department of the Interior, 1980(?). Planning for Trailbike Recreation - Part II. Heritage Conservation and Recreation Service., 47 pp. This booklet contains 16 signed articles on a variety of topics, including trailbike registration, funding, management and education.
- d. Motorcycle Industry Council, Inc., no date. Land Use Information Kit. This is a collection of material including a

bibliography, summary of state laws, newsletters, and related materials.

G. National Three-Wheel ATV Spokeperson

1. Specialty Vehicle Institute of America

David W. Sanderson, Director of ATV Programs

P.O. Box 66

West Newbury, MA 01985

(617) 363-5700

Response:

Mr. Sanderson stated that Minnesota has been one of the top states nationally in ATV sales and growth. In 1979 there were about 3,000 ATVs in the state, and as of late 1983 there were about 40,000 ATVs. 1982 ATV sales were 10,400. 1983 sales are estimated at about 12,000. Minnesota ranks 5th nationally in ATV sales.

Mr. Sanderson recommends using a unique definition for "ATV" in any management techniques Minnesota may choose to adopt. SVIA has developed such a definition. Registration of ATVs should be at point of sale. The proper use of registration funds would be critical to gaining public support for continued registration.

The SVIA shares staff with the Motorcycle Industry Council. It has also contracted with the Motorcycle Safety Foundation for development of an ATV training course, which should be available in early spring, 1984.

Mr. Sanderson's letter has two attachments: SVIA recommendations for ATV use and regulations (4 pp.), and "ATV and Motorcycle Owner Demographic and Usage Comparison" (3 pp.).

H. National 4X4 ORV Spokespersons

1. United Four Wheel Drive Associations

Stu Bengson, Director, Land Use

8900 North Camino de Anza

Tucson, AZ 85704

(602) 297-9381

(612) 791-2920

Response:

Mr. Bengson explained that 4X4 recreationists should not be confused with ORV interests. 4X4 recreationists are generally trail riders on established jeep trails where they can partake of a "wilderness experience". Mr. Bengson supports reasonable regulations which are aimed at protecting the environment. The 4X4 community has a wealth of volunteers waiting to be asked to help develop 4X4 management solutions.

2. California Association of 4WD Clubs, Inc.

Ed Dunkley, Administrator

5831 Rosebud Lane, Unit M-1

Sacramento, CA 95841

(916) 338-4540

Response:

Mr. Dunkley believes the greatest problem for Off-Highway Vehicle is adequate enforcement. The U.S. Forest Service will not prosecute OHV offenders unless damages exceed the cost of legal fees. Also, the courts are lenient even when offenders are prosecuted.

3. United Four Wheel Drive Associations

Dave Hannum, President

2021 South Bell

Kokomo, IN 46902

Response:

4X4 Off-Highway Vehicles are especially needed in regions like Minnesota for necessary winter transportation. An area set aside for 4X4s can be a major asset to local merchants. Local 4X4 clubs can play an important role in safety education and responsible use. Local clubs can also opt to adopt certain trails for construction and upkeep. This has worked well in Colorado and California.

4. Pacific Northwest 4-Wheel-Drive Association

Mary Zentner, Oregon Exec. Director

33294 S.W. Dutch Canyon Road

Scappoose, OR 97056

(503) 543-2342

Response:

These Oregon 4X4 recreationists helped the BLM protect fossil beds from ORVs by fencing them off. The purpose of this organization is to educate 4X4 users on the need to stay on the trail. Many of the events of this club have been held on private rented or leased land. After club races, they try to return the land to a condition perhaps better than before.

The one public ORV park in Oregon known to this club is a county-managed facility.

Attachments:

- a. Pacific Northwest Four Wheel Drive Association, no date "membership brochure", 6 pp., pocket size.
- b. Washington Dept. of Natural Resources, Nov. 1976. Operating All-Terrain Vehicles in the State of Washington., 14 pp. Question and answer format.
- c. U.S. Dept. of the Interior, May 1982. BLM News - Oregon and Washington. Lead article on Mammoth Motorcycle race held in April, 1982.
- d. United Four Wheel Drive Associations, August 1983. United's Voice. 16 pp. A national 4X4 newspaper (bimonthly).
- e. Pacific Northwest Four Wheel Drive Assn., October, 1983. Tri-Power. 8 pp. A regional 4X4 newspaper (monthly).

f. U.S. Dept. of Agriculture, 1981. The Oregon Dunes National Recreation Area Activities. 10 pp. pocket brochure. Includes reference to three large dune areas open to ORV use.

5. Subaru Mid-America, INC.

Peter H. Seed, Sales Promotion Manager

301 Mitchell Court

Addison, IL 60101

(312) 952-1188

Response:

Mr. Seed focused his response on 4X4 market information. He suggests that 4X4s under 2500 lbs. be considered in a category separate from other 4X4s for purposes of regulation. Mr. Seed mentions that less than 5 percent of Subaru owners ever use their vehicle in off-road situations. Mr. Seed supports realistic controls on ORVs, but would oppose using vehicle classifications which would increase the price of all 4X4s and restrict legitimate 4X4 use on paved roads.

I. National ORV Spokesperson

1. American Recreation Coalition

Derrick A. Crandall

Suite 700

1901 L Street, NW

Washington, D.C. 20036

(202) 466-6870

Response:

Mr. Crandall focused his response upon trends in market research. He believes studies in recreational participation are not enough because they fail to provide "advance warning" data needed in forecasting.

Mr. Crandall identified the following trends which bear upon the ORV issue:

- a. U.S. population is aging and living in smaller households.
- b. The U.S. population is engaging in greater economic planning, i.e, investing in more tangibles (goods) rather than intangibles (services).
- c. The U.S. population is returning to a trust in technology after over a decade of emphasis on "naturalism" and simplicity.

Mr. Crandall's interpretation of the above trends is as follows:

- a. Continuing growth in peer-group recreation rather than family-based recreation. This will effect user safety and education, and may suggest school-based programs in these areas.
- b. Expanded sales of vehicles having broad recreational as well as utilitarian value.
- c. More senior citizens will be buying greater numbers of "on the road" vehicles and associated ORVs.

Attachments:

U.S. Senate testimony on the wisdom of user fees for continued recreation opportunity.

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APPENDIX IV

Technical Note
Present and Future Demand For Recreational Motor Vehicles
Chapter II

The methodology applied in the construction of Table 3 and 4 is described in detail below. This description is provided because it is difficult to explain fully the methodology without reference to a step-by-step computational outline.

The collected information contained in, or used in the preparation of Table 3 and 4 is the following:

1. 1978-1983 Michigan off-road vehicle mix (Table 2).
2. Number of two-wheeled vehicles used off-road in Minnesota in 1978 (=102,000 -- Table 3).
3. 1978 SCORP activity occasion data for two- and four-wheeled vehicles (Table 4).

All of the remaining information in Table 3 and 4 was derived from the three preceding sources of collected data. The derivations of the remaining information were performed as follows:

- A. Estimation of the number of three- and four-wheeled vehicles used off-road in 1978 (Table 3.)

Given 102,000 two-wheeled vehicles used off-road in 1978, and given that two-wheeled vehicles comprised 65 percent of the Michigan off-road vehicle market in 1978 (Table 2), a total of 157,000 (=102,000/.65) 1978 off-road vehicles was derived for Minnesota (Table 3). The numbers of 1978 three- and four-wheeled vehicles are based on this 157,000 total figure and the Michigan market percentages (Table 2) of 2 percent for three-wheeled vehicles (=3,000 vehicles -- Table 3) and 32 percent for four-wheeled vehicles (=50,000 vehicles -- Table 3).

- B. Derivation of the mean number of driving occasions per vehicle (see footnote to Table 4).

For two- and four-wheeled vehicles, the number of 1978 SCORP activity occasions (Table 4) divided by the number of 1978 vehicles (Table 3) gives the mean number of activity occasions per vehicle. Based on these two- and four-wheeled vehicle means and on additional information for snowmobiles (see footnote to Table 4), a mean figure of eleven activity occasion per vehicle was selected to represent three-wheeled vehicles. The 1978 activity occasion figure for three-wheeled vehicles (=33,000 -- Table 4) was derived from this mean number of occasions per vehicle (=11) and the number of vehicles (=3,000 -- Table 3). Projected three-wheeled activity occasions for 1985 and 1990 were also produced by multiplying the mean number of occasions per vehicle by the 1985 and 1990 estimated number of vehicles in Table 3.

- C. Projected 1985 and 1990 activity occasions for two- and four-wheeled vehicles (Table 4).

Projected activity occasions are taken from SCORP. They are based on 1) age/sex activity participation rates in 1978 and 2) age/sex population forecasts for 1985 and 1990.

- D. Estimated 1985 off-road vehicle mix for Minnesota (Table 3).

For two- and four-wheeled vehicles, the number of 1985 vehicles (Table 3) was derived from 1985 activity occasions (see 'C' above and Table 4) and the mean number of activity occasions per vehicle (see 'B' above and footnote to Table 4).

The sum of 1985 two- and four-wheeled vehicles was used with an extrapolation to 1985 (see Figure 2) of the 1978-1983 Michigan off-road vehicle mix (Table 2) to estimate the total number of 1985 Minnesota off-road vehicles used off-road (Table 3). In the extrapolation of the Michigan off-road vehicle mix, two- and four-wheeled vehicles were estimated to comprise 81 percent of the total off-road vehicle market (Figure 2). Utilizing that 81 percent figure with the 1985 estimate for two- and four-wheeled vehicles in Minnesota gives a 1985 total vehicle estimate of 181,000 ($=147,000/.81$ -- Table 3).

The three-wheeled portion of the 1985 Michigan off-road vehicle market (Figure 2) was derived in the same fashion as the two- and four-wheeled portions described above. The three-wheeled proportion is estimated to comprise 19 percent of the total 1985 off-road vehicle market (Figure 2). In other words, the number of three-wheeled vehicles ($=34,000$) is 19 percent of the total estimated number of 1985 off-road vehicles (Table 3). As described above, 1985 three-wheeled activity occasions (Table 4) were computed from the 34,000 vehicle figure and the mean number of activity occasions per three-wheeled vehicle, which is eleven (see 'B' above and footnote to Table 4).

The foregoing is the methodology utilized to produce all of the 1978 and 1985 derived data presented in Table 3 and 4. To derive the 1990 data in Table 3 and 4, repeat 'D' above for 1990.

APPENDIX V

PARTIAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

Notes & Sources

* Note 1: Federal acreage is for 1979.

Note 2: Acronyms used in the table have the following meanings:

2W = 2 wheeler	LUG = Local unit of government
3W = 3 wheeler	MC = Motorcycle
4W = 4 wheeler	NH = Non-highway
2W = MC	OR = Off-road
APV = All purpose vehicle	ORV = Off-road vehicle
ATV = All terrain vehicle	SM = Snowmobile
Assn = Association	WMA = Wildlife Management Area
BLM = Bureau of Land Management	

Sources: Statistical Abstract of the United States 1982-1983: National Data Book and Guide to Sources, U.S. Department of Commerce-Bureau of the Census, 103rd Edition. (Table No. 381, Total and Federally Owned Land, 1960 to 1979, and by States, 1979.)

Telephone conversations with:

California Department of Parks and Recreation, Division of
Off-Highway Motor Vehicle Recreation
Florida Game and Wildlife Commission
Iowa Department of Conservation
Maine Department of Conservation
Michigan Department of Natural Resources, Forestry Division
New Hampshire Department of Economic Development, Bureau of
Parks, OHRV Division
North Dakota Department of Parks and Recreation
Ohio Department of Natural Resources, Forestry Division
South Dakota Department of Game, Fish and Parks
Washington Department of Parks and Washington Department of
Natural Resources
Wisconsin Department of Natural Resources

Table prepared by: MnDNR-Office of Planning
Policy and Management Analysis Unit
December 1983

TOTAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

State	Land Area (1000 acres)*	ORV Definition & Number	Land Available For ORV Use	Program Origin, Length and Budget
California	100,207 total 46,702 federal	- ORV means: 2W, 3W, 4W, SM & dunebuggy - In 1982: 5300 SM, 15,000 dunebuggies, 200,000 2W & 3W	- 5 areas of state land: including beach, desert, mountain terrain. (37,800 acres) - Largest state park of 500,000 acres permits ORV's on all primitive old trails so people can go back and see the scenery. - State advertises 5 areas through brochure; advisable to get annual update for federal areas. - 5 areas are 1-1 1/2 hrs from major metro centers. - National forest and BLM land also open to ORV use. Some county areas. Private areas on the wane due to high insurance costs.	- Original problem was uncontrolled and unmanaged ORV use. Five areas owned by the state had prior ORV use. 11 year-old program - \$10-12 million budget per year 80% - from gas tax; 15% - appropriations; 5% - registrations, fines, admission fees. Used for grants, operations, land acquisitions. User ed program mandated by law, run by local rangers.
Florida	34,721 total 4,041 federal	- ORV means: 2W, 3W, 4W, swampbuggies half-tracks, full-tracks, airboats - 4-5,000 registered (all types) 4W: guesses 10-20,000.	- Approximately 4.5 million acres (mostly water) of wildlife management areas are available for ORV use. - ORV's are not permitted in the Everglades National Park. - ORV's are used extensively on private property. - Not much advertising of areas; organized clubs know where areas are.	- \$50,000 annual budget is just enough to administer program - send permits.
Iowa	35,860 total 227 federal	- ORV means: All ORV's under 1000 lbs. that run on skis, belts, or balloon tires. Broad definition of SM in statute includes these.	- Less than 1% of state is public land; but because 50% of the trails go through state parks, WMA's or along highway right of ways for some distance, ORV's must be registered - 1000's of miles of private land available to ORV's, but hard to keep track of because clubs lease land annually with private landowners; no permanent trails. - Only one public area available for 4W; 2 or 3 private areas available to them for a fee. - Little publicity needed; clubs know areas because they've done work building trails.	- Original problem was uncontrolled use of SM's. Enforcement officers couldn't catch them. Six year old program. - \$60-70,000 annual budget; earmarked funds. 50% to LUG's in grants, 50% to state. State money used to develop trails in parks & WMA's, for administration and enforcement. (Officers are supplied w/SM's.) User education program run jointly by state and SM Assn: state teaches volunteer instructors, supplies SM's for learning operation and enforcement people to tell law.
Maine	19,848 total 135 federal	ORV means: 2W, 3W, 4W, ATV that is multi-track, multi-wheel, belt driven or amphibious. SM under different law.	- State has extensive SM program on both public and private land. State owns and maintains 250 miles of SM trails in 4 areas of the state, but 90% of SM trails are on private land. - Some SM trails start in state parks - Illegal for most ORV's to go on SM trails, highways or into state parks. Can go on dirt roads not open to public traffic, can use other private land if they have landowner's permission. 4W's can go on highways.	- Problem was controversy over where 3W's could go, especially SM trails. Some were using SM trails illegally, harrasing park managers, couldn't be caught by enforcement people. 4W pulling contests in mud were creating localized problems, and 4W's were getting stuck on SM trails. - SM program budget is \$320,000/yr. Dept. of Conservation gives grants, does trail maintenance. Dept. of Inland Fisheries and Wildlife does enforcement, safety program, registration.

PARTIAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

Program Management Features

- 2W, 3W SM and dunebuggies must register every 2 years for OR use. Dual purpose 2W and 4W must have license for street use.
- Grants are given to local and federal agencies to create areas and trails for ORV use.
- State department manages state program, provides money and equipment to local clubs who supply labor to create trails. Department certifies trail at end.
- State trails are designated and signed as to difficulty.
- State lands may be closed between June and November (dry season) when fires are a hazard. Local rangers have authority to close wet areas. Federal lands may be closed during heavy snowfall or animal migrations.

Program Appraised

- Program encountered initial resistance from state agency people and the public, but was created because response to environment and to hiker-biker conflicts was needed.
- Program now accepted except ORV area near San Diego is needed.

Statutory Treatment

ORV law passed 1972

State

California

- All vehicles not registered for street use must register for OR use.
- No ORV grant programs.
- Any bridge or road built by the wildlife management people are for its purposes only, although ORV's can use them. In some WMA's there are designated trails; in others, ORV's can go wherever the vehicle can travel.
- WMA has authority to restrict 4W's to certain paths when there are problems with them. During hunting season, half and full tracks are under a quota system and a random drawing is held to determine users.

- As the program now exists it satisfies most people. In the future, the Department may want to limit access points to WMA's or close over-used areas. 3W's don't cause as much environmental damage, but cause social problems and may be limited in the future.

ORV law exists

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- ORV's must register every 2 years for OR use. They must be licensed for street use.
- 98 of 99 counties in Iowa have County Conservation Boards which meet annually to determine extent of program they want. Counties enter into contracts with SM clubs that develop and groom trails according to state recommendations. Local clubs meet state guidelines for expenses and are reimbursed by the counties. Counties buy materials, clubs do work. Reimbursements range from 50-100% of project costs. Any ORV club could get these grants, but only SM clubs have been organized enough to date.
- State supplies signs for trails.
- Any ORV as defined by statute can use these trails, but entire program is limited to winter use only.

- State has good relationship with state SM Assn., usually approach the legislature jointly. SM's & 3W's started in program together, pay same registrations, are both accepted.
- Clubs and landowners get along because clubs want to have leases renewed.
- Potential conflicts: too few areas for 4W's; summer use for 3W's; enforcement in non-trail areas.

Law with broad definition of SM passed 1977

Iowa

- Remains to be seen what ORV programs will look like. New law requires registration with Dept. of Inland Fisheries and Wildlife so that number of vehicles and services users want can be determined. Unlikely to be the same type program as for SM's.
- In SM program, Conservation Dept. maintains records of 3-5 year permits landowners have given state for SM trails on private land. Each permit is different - defines permitted roads, bridges to be used, defines zones of use and exempts landowners from liability.
- SM grant program has 2 parts - grants to municipalities and grants to SM clubs for trail development. Reimbursements to municipalities may be from 50-70%, ranged from \$500-25,000 recently. Reimbursements to clubs may be 100% up to a maximum of \$750 for 30 miles, with clubs paying for anything over 30 miles. (There have been 172 club projects.)

- Agency with which ORV's are to register anticipates that registration fee is too low presently to develop any trails or areas. Fees collected will be just enough to cover program administration.

ORV law passed 1983; effective 7-1-84. SM law older

Maine

PARTIAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

State	Land Area (1000 acres)*	ORV Definition & Number	Land Available For ORV Use	Program Origin, Length and Budget
South Dakota	48,882 total 3,492 federal	ORV means: SM, primarily. 10,000 SM's are registered with the state. Number of ORV's unknown, but sales of 3W's are increasing.	<ul style="list-style-type: none"> - Corps of Engineers owns an area near Pierre which is used for hill-climbing by 2W's and 4W's. - No state land explicitly available for ORV's, but 3W's do go on SM trails. - For SM's, 200 miles of federal land available in Black Hills and several hundred miles available on state leased private land in the eastern part of the state. - All SM areas are very near population centers - people can ride right out of town on SM's. 	<ul style="list-style-type: none"> - No ORV program. - Original problem was that SM's had nowhere to ride, and the state SM Assn. lobbied for a law. - SM program budget is about \$200,000/year from registrations and the gas tax refund. It is an account earmarked for SM's. - SM budget used for administration, trail development and maintenance, payments to landowners for leased trails, and user education.
Washington	42,694 total 12,473 federal	ORV means: Any wheeled vehicle used off roads passable by traditional 4W vehicles. SM's not included. 15,000 ORV's registered in state.	<ul style="list-style-type: none"> - State owned land includes 200 miles of trails for trailbikes and 1000 acres of sand dunes in the eastern half of the state used by all ORV vehicles. - Harder to pin down total acreage available for NH program, since the areas and trails are multi-use. - The seven national forests have about 2,000 miles of trails available for ORV use. The most progressive for ORV use is the Wenatchee National Forest (900 miles of trails. Several thousand miles of forest roads available to street-legal ORV's). - Little private land is available, other than for motor-cross racing, but the Forest Service will enter agreements with private landowners where forest trails cross private land. - The Forest Service does a lot of publicity on its available ORV areas. The service is currently revising a 1980 publication promoting the areas. - The available ORV areas are not near the major population centers, due in part to the political situation with the LUG's. Most people can get to an area with 1-1 1/2 hr drive. 	<ul style="list-style-type: none"> Origin was lobbying by ORV-MC clubs that wanted riding areas. Budget: \$2 million/year. Sources: ORV permits and 1% of gasoline tax refund Uses: 1/2 gas refund and 80% of permit money goes to Interagency Recreational Committee (IAC) to give grants to federal agencies and LUG's for ORV projects. Uses: 1/2 gas refund and 20% of permit money goes to state DNR for ORV and NH facility development, land acquisition, administration, and enforcement.
Wisconsin	35,011 total 1,868 federal	ORV means: 2W, 3W (ATV), not 4W. Separate statutes for SM's and MC's. Recent sales figures: 50,000 2W, 35,000 3W (ATV)	<ul style="list-style-type: none"> - Estimates about 1 million acres owned by the state. In 2 areas there are trails available to 2W's and 3W's for summer use: one 14 miles long, the other 6 miles long. In state's northern forests, forest roads are available for use by licensed vehicles. - Counties own about 1 million acres also, from tax forfeited lands. Approximately 800 miles of county forest roads are available to 4W's. - Most of the land available for ORV uses is within 2-5 hrs driving distance from major population centers. 	<ul style="list-style-type: none"> No program specifically for ATV's or 4W's at state level.

Program Management Features

- ORV's other than SM's are not required to be registered unless they are going to be used on highways.
- For SM's - 2 different aspects of program. In Black Hills, state enters cooperative agreement w/US Forest Service. The Service provides the administration and the state does all the trail development and maintenance. Federal regulations prohibit wheeled vehicles on trails, state aids in enforcement of regulations. In the eastern part of state, land is leased from private landowners who get paid even when there is insufficient snowfall. State maintains the SM trails.
- State makes no grants to LUG's or SM clubs. SM clubs get involved in finding landowners who would like to participate, but state then pays these people directly for leased land.
- State SM trails are open all the time. They are designated and have signs on them.

Program Appraised

- No organized ORV effort to get trails.
- Even though 3W's use SM trails, the use does not seem to create friction yet.
- 4W's are a problem in the Black Hills.
- System works for SM. Planning expansion of SM trail system in 1984. SM clubs more interested in trails than areas.

Statutory Treatment

SM statute passed 1973. SM gas tax refund statute passed 1975.

State

South Dakota

- All vehicles must register for highway use or get an ORV permit.
- State ORV program has 2 major components: an ORV part and a NH (non-highway) part. The ORV facilities contain trails, campgrounds, trailheads for ORV users. The NH program consists of forest roads maintained for NH use, which is use by traditional 4 wheeled vehicles.
- Educational materials on proper ORV use are developed and distributed through state parks, the state department of education and libraries.
- The state contracts with county deputies for enforcement in some of the trail areas.
- State closes its forest trails near Olympia during the 80-100 inches per year rainy season. The US Forest Service will close its trails for a variety of reasons, e.g., winter snow, spring melt, spring movement of elk.
- State ORV program relies on volunteers to help build trails, but pays no monies to individuals for trail development. State will contract with counties for studies of potential ORV use areas and with trail-building firms, however.
- The IAC gives money to federal agencies and LUG's strictly for ORV trail development. The bulk of this money has gone to the US Forest Service.

- The most controversy revolves around the inaccessibility of ORV areas. The population of Kittitas County in the Wenatchee National Forest doubles from 40-60,000 normally to over 100,000 on summer weekends because of the influx of ORV riders from metropolitan areas.
- It is easier to manage the use in a progressive fashion than ignore the use and hope it will go away.
- MC's are upset about wider 3W's on 2W trails and SM's are upset about 3W's on SM trails. 3W's seem to be oblivious of the controversy around their use of these other trails.

The "ATV Act" passed 1972; was amended as the "ORV Act" in 1977.

Washington

- The state makes grants to LUG's for the MC and the SM programs. Counties have discretion to issue permits to ATV's also and some have done so. 68 of the 72 counties participate in the SM program, and 2 counties make the SM trails available to ATV's.
- ATV's are officially limited to using county trails in winter only, but one county does make its trails available to ATV's in the summer time also, although it is not widely publicized.
- Counties can permit ATV's on MC program trails, too, where reasonable.

- State SM Assn. has expressed concern to the state UNR because of the counties' interpretation of the SM law. Feels ATV's are inappropriately using SM trails in the two counties.
- 4W's area problem on state forest roads periodically.

- Because there is no ATV statute yet, they have no legal standing. Bill for ATV's is currently pending in the Legislature.

Wisconsin

- MC program is 10 years old.

APPENDIX IV

Technical Note
Present and Future Demand For Recreational Motor Vehicles
Chapter II

The methodology applied in the construction of Table 3 and 4 is described in detail below. This description is provided because it is difficult to explain fully the methodology without reference to a step-by-step computational outline.

The collected information contained in, or used in the preparation of Table 3 and 4 is the following:

1. 1978-1983 Michigan off-road vehicle mix (Table 2).
2. Number of two-wheeled vehicles used off-road in Minnesota in 1978 (=102,000 -- Table 3).
3. 1978 SCORP activity occasion data for two- and four-wheeled vehicles (Table 4).

All of the remaining information in Table 3 and 4 was derived from the three preceding sources of collected data. The derivations of the remaining information were performed as follows:

- A. Estimation of the number of three- and four-wheeled vehicles used off-road in 1978 (Table 3.)

Given 102,000 two-wheeled vehicles used off-road in 1978, and given that two-wheeled vehicles comprised 65 percent of the Michigan off-road vehicle market in 1978 (Table 2), a total of 157,000 (=102,000/.65) 1978 off-road vehicles was derived for Minnesota (Table 3). The numbers of 1978 three- and four-wheeled vehicles are based on this 157,000 total figure and the Michigan market percentages (Table 2) of 2 percent for three-wheeled vehicles (=3,000 vehicles -- Table 3) and 32 percent for four-wheeled vehicles (=50,000 vehicles -- Table 3).

- B. Derivation of the mean number of driving occasions per vehicle (see footnote to Table 4).

For two- and four-wheeled vehicles, the number of 1978 SCORP activity occasions (Table 4) divided by the number of 1978 vehicles (Table 3) gives the mean number of activity occasions per vehicle. Based on these two- and four-wheeled vehicle means and on additional information for snowmobiles (see footnote to Table 4), a mean figure of eleven activity occasion per vehicle was selected to represent three-wheeled vehicles. The 1978 activity occasion figure for three-wheeled vehicles (=33,000 -- Table 4) was derived from this mean number of occasions per vehicle (=11) and the number of vehicles (=3,000 -- Table 3). Projected three-wheeled activity occasions for 1985 and 1990 were also produced by multiplying the mean number of occasions per vehicle by the 1985 and 1990 estimated number of vehicles in Table 3.

- C. Projected 1985 and 1990 activity occasions for two- and four-wheeled vehicles (Table 4).

Projected activity occasions are taken from SCORP. They are based on 1) age/sex activity participation rates in 1978 and 2) age/sex population forecasts for 1985 and 1990.

- D. Estimated 1985 off-road vehicle mix for Minnesota (Table 3).

For two- and four-wheeled vehicles, the number of 1985 vehicles (Table 3) was derived from 1985 activity occasions (see 'C' above and Table 4) and the mean number of activity occasions per vehicle (see 'B' above and footnote to Table 4).

The sum of 1985 two- and four-wheeled vehicles was used with an extrapolation to 1985 (see Figure 2) of the 1978-1983 Michigan off-road vehicle mix (Table 2) to estimate the total number of 1985 Minnesota off-road vehicles used off-road (Table 3). In the extrapolation of the Michigan off-road vehicle mix, two- and four-wheeled vehicles were estimated to comprise 81 percent of the total off-road vehicle market (Figure 2). Utilizing that 81 percent figure with the 1985 estimate for two- and four-wheeled vehicles in Minnesota gives a 1985 total vehicle estimate of 181,000 ($=147,000/.81$ -- Table 3).

The three-wheeled portion of the 1985 Michigan off-road vehicle market (Figure 2) was derived in the same fashion as the two- and four-wheeled portions described above. The three-wheeled proportion is estimated to comprise 19 percent of the total 1985 off-road vehicle market (Figure 2). In other words, the number of three-wheeled vehicles ($=34,000$) is 19 percent of the total estimated number of 1985 off-road vehicles (Table 3). As described above, 1985 three-wheeled activity occasions (Table 4) were computed from the 34,000 vehicle figure and the mean number of activity occasions per three-wheeled vehicle, which is eleven (see 'B' above and footnote to Table 4).

The foregoing is the methodology utilized to produce all of the 1978 and 1985 derived data presented in Table 3 and 4. To derive the 1990 data in Table 3 and 4, repeat 'D' above for 1990.

APPENDIX V

PARTIAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

Notes & Sources

* Note 1: Federal acreage is for 1979.

Note 2: Acronyms used in the table have the following meanings:

2W = 2 wheeler	LUG = Local unit of government
3W = 3 wheeler	MC = Motorcycle
4W = 4 wheeler	NH = Non-highway
2W = MC	OR = Off-road
APV = All purpose vehicle	ORV = Off-road vehicle
ATV = All terrain vehicle	SM = Snowmobile
Assn = Association	WMA = Wildlife Management Area
BLM = Bureau of Land Management	

Sources: Statistical Abstract of the United States 1982-1983: National Data Book and Guide to Sources, U.S. Department of Commerce-Bureau of the Census, 103rd Edition. (Table No. 381, Total and Federally Owned Land, 1960 to 1979, and by States, 1979.)

Telephone conversations with:

California Department of Parks and Recreation, Division of
Off-Highway Motor Vehicle Recreation
Florida Game and Wildlife Commission
Iowa Department of Conservation
Maine Department of Conservation
Michigan Department of Natural Resources, Forestry Division
New Hampshire Department of Economic Development, Bureau of
Parks, OHRV Division
North Dakota Department of Parks and Recreation
Ohio Department of Natural Resources, Forestry Division
South Dakota Department of Game, Fish and Parks
Washington Department of Parks and Washington Department of
Natural Resources
Wisconsin Department of Natural Resources

Table prepared by: MnDNR-Office of Planning
Policy and Management Analysis Unit
December 1983

PEOPLE IN OTHER STATES CONTACTED FOR THE
PARTIAL SURVEY OF STATE ORV PROGRAMS
December 1983

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Florida Game and Wildlife Commission
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Roy Downing
Iowa Department of Conservation
(phone: 575-281-5145)

Scott Ramsey
Maine Department of Conservation
(phone: 207-289-3821)

Michael Barrett
Maine Inland Fisheries and Wildlife Department
Licensing Division
(phone: 207-289-2043)

Robert Tyler
Michigan Department of Natural Resources
Forestry Division
(phone: 517-373-1275)

Douglas Eoute
New Hampshire Department of Economic Development
Bureau of Parks
OHRV (Off-Highway Recreational Vehicle) Division
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Leo Hennessey
North Dakota Department of Parks and Recreation
(phone: 701-224-4887)

Dave Bergman, Chief
Ohio Department of Natural Resources
Division of Forestry
(phone: 614-265-6694)

Doris M. Thompson
Pennsylvania Department of Environmental Resources
(phone: 717-783-1364)

Rolland Noem
South Dakota Department of Game, Fish and Parks
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James Horan (snowmobiles)
Washington Department of Parks
(phone: 206-754-1253)

Terry Graham (ORV Specialist)
Washington Department of Natural Resources
(phone: 206-753-2400)

Greg Lovelady
Washington Inter-Agency Recreation Committee (IAC)
(phone: 206-753-7140)

Larry Freidig (snowmobile)
Wisconsin Department of Natural Resources
(phone: 608-266-5897)

Non-State

Mike Dolfay (ORV coordinator)
Washington Wenatchee National Forest
(phone: 509-662-4375)

Skip Underwood, Ranger
Ramparts Range Cycle Park
Colorado Pike National Forest
(phone: 303-234-5707)

Jerry Conley
Turkey Bay ORV Area
Land Between the Lakes
Kentucky - Tennessee
(phone: 502-924-5602)

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ORV law exists

Florida

- ORV's must register every 2 years for OR use. They must be licensed for street use.
- 98 of 99 counties in Iowa have County Conservation Boards which meet annually to determine extent of program they want. Counties enter into contracts with SM clubs that develop and groom trails according to state recommendations. Local clubs meet state guidelines for expenses and are reimbursed by the counties. Counties buy materials, clubs do work. Reimbursements range from 50-100% of project costs. Any ORV club could get these grants, but only SM clubs have been organized enough to date.
- State supplies signs for trails.
- Any ORV as defined by statute can use these trails, but entire program is limited to winter use only.

- State has good relationship with state SM Assn., usually approach the legislature jointly. SM's & 3W's started in program together, pay same registrations, are both accepted.
- Clubs and landowners get along because clubs want to have leases renewed.
- Potential conflicts: too few areas for 4W's; summer use for 3W's; enforcement in non-trail areas.

Law with broad definition of SM passed 1977

Iowa

- Remains to be seen what ORV programs will look like. New law requires registration with Dept. of Inland Fisheries and Wildlife so that number of vehicles and services users want can be determined. Unlikely to be the same type program as for SM's.
- In SM program, Conservation Dept. maintains records of 3-5 year permits landowners have given state for SM trails on private land. Each permit is different - defines permitted roads, bridges to be used, defines zones of use and exempts landowners from liability.
- SM grant program has 2 parts - grants to municipalities and grants to SM clubs for trail development. Reimbursements to municipalities may be from 50-70%, ranged from \$500-25,000 recently. Reimbursements to clubs may be 100% up to a maximum of \$750 for 30 miles, with clubs paying for anything over 30 miles. (There have been 172 club projects.)

- Agency with which ORV's are to register anticipates that registration fee is too low presently to develop any trails or areas. Fees collected will be just enough to cover program administration.

ORV law passed 1983; effective 7-1-84. SM law older

Maine

PARTIAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

State	Land Area (1000 acres)*	ORV Definition & Number	Land Available for ORV Use	Program Origin, Length and Budget
Michigan	36,492 total 3,467 federal	ORV means: 2W, 3W, 4W-SM under different law. In October 1983: 66,500 ORV's (includes 12,000 3W's), 240,000 SM's	<ul style="list-style-type: none"> - State has about 10,000 miles of 2-track roads (old forest roads) available for all ORV's and SM's. - For MC, 650 miles of state-owned trails available, another 400 miles contracted for development. Goal is 1500 miles of state-owned trails for MC. 3W's can use these trails also. - 3W's can go on any SM routes owned and posted by the state except those that are leased or seasonal. - 4W's use 2-track roads and have one state park area available. A second area is being acquired for their use. - There are 2 privately owned areas available to ORV's but they are very small. - The dept. does not publicize the availability of these areas itself but helps others promote by providing maps, etc. - Trails and areas for ORV use are close to population centers. From major cities of Detroit, Lansing and Grand Rapids, ORV users would not have to drive more than 100-150 miles. 	<ul style="list-style-type: none"> - Original problems were: (1) SM's - rumors of running down wildlife, illegal hunting; (2) MC and SM - noise problem, solved now; (3) 3W's - conflict, real or imagined, with SM's; (4) MC - visual erosion evidence from hill climbs; (5) public demand for trails. - ORV budget: \$450,000 per year \$200-250,000 to DNR for ORV program \$60-80,000 to Secretary of State to handle registration \$80,000 to forestry to develop trails \$100,000 for enforcement and user education User education program only partially successful - it doesn't teach people to use ORV's. SM's liked it originally because kids needed to be certified to be able to cross roads.
New Hampshire	5,769 total 722 federal	<p>ORV means: Any vehicle used off the road, except SM's, for recreational purposes (including vehicles like golf carts)</p> <p>In 1983, industry estimates: 10,000 3W's in state (2,000 registered w/state), 20,000 2W's in state.</p> <p>In 1982: 20,000 SM's registered w/state</p>	<ul style="list-style-type: none"> - State has 180 pieces of tax forfeited property that are used for multiple recreational uses, including 30 miles of trail specifically designated for ORV's. ORV's are prohibited in other parts of these areas, but a study is currently underway to see if 3W's can use these other parts, too. - All other state land is off-limits to all ORV's except SM's. - SM program leases 220,000 acres of private land for trails all over the state. Some discussions with private landowners indicate that they would be receptive to ORV use when there's no snow. - 3W's can go on leased trails when they're snow-covered if 3W's get owner's permission and state's permission. 	<ul style="list-style-type: none"> - Program started because of demand for trails. - 1984 budget: \$418,000 (depends on registration) Sources: registrations and 1% of the gas tax Uses: 45% for trail development & maintenance 55% for administration of registrations, safety training and enforcement. User education program includes how to use an ORV, first-aid, law, and for kids, a 1 hour field experience using their ORV's.
North Dakota	44,452 total 2,386 federal	<ul style="list-style-type: none"> - No statutory definition. No solid figures on how many ORV's in state, but industry says that state is one of the leading sales areas for 3W's. 	<ul style="list-style-type: none"> - No state land is currently available for ORV use. It is illegal for them to be on state land. - On 2 parcels of federal land (Corps of Engineers land) along the Missouri River that the state leases for wildlife management purposes, totally uncontrolled use of ORV's is permitted by the Corps. Both areas average between 100-200 acres. The hilly, rolling area is a favorite w/4W's, while 2W's like the floodplain area. 	<ul style="list-style-type: none"> - No program for ORV's yet. SM program budget is about \$40,000/year. Used for trails development and administration of registrations. State tries to purchase abandoned railroad right of ways using other department funds.
Ohio	26,222 total 345 federal	<p>ORV means an APV: any vehicle used for cross-country travel over land or water that runs on wheels, treads or air cushion. Includes ATV's, mini-bikes and trailbikes, but excludes vehicles not used for personal transportation or ones covered by other statutes.</p> <p>Estimates: Several thousand in state if 4W's are included.</p>	<ul style="list-style-type: none"> - There are 4 trails on state forest land available for APV's, and one of them is also used by SM's. The lengths of the trails are: 5, 9, 16 and 6 miles, respectively, for a total of 36 miles. There is another state forest land trail of 10 miles used only by SM's. - Only publicity on program occurs when newspapers do a feature on the state forests and mention the APV-ORV uses and activities. 	<ul style="list-style-type: none"> - Original problem was that there was demand from ORV users for trails. - Annual budget not mentioned. - Money from registrations goes into state recreational fund and then a portion is returned to the department to provide trails and enforce the laws.

Program Management Features

- Except for competition vehicles, ORV's must be registered every 3 years for OR use and must be licensed annually for street use by the Secretary of State.
- The state has a grant program focused now on the development of the 1500 miles for MC use. State contracts with local clubs and pays them \$120/mile to cut and clean the trail. Clubs then hold 3 events of 100-200 vehicles to break in the trail after which the state reviews and certifies the trail.
- All state trails are always available to ORV's and SM's unless posted otherwise, but vehicles are not supposed to go where there is no visible trail - they are not supposed to create a trail.
- Because SM trails are not continuous, counties give permission for SM's to use plowed county road right of ways and unplowed county roads. Counties do not permit 3W's on these.
- Some 3W clubs and local foresters are cooperating to create trails specifically for 3W's. The state is more interested in having SM and 3W trails be parallel but having separate treadways because it would mean less search time for new trail areas, people of varying ability could switch trails and there wouldn't be conflict even if cross-over occurred on the trails.

Program Appraised

- Feels programs are working well now. Potential problem areas: 4W's in parks, unwillingness of counties to let 3W's use county road right of ways, SM's concern that 3W's will ruin SM trails.

Statutory Treatment

ORV law passed 1975; SM law passed 1968. Regulations exist for 1500 miles of state MC trails

State
Michigan

- Vehicles used OR are supposed to register annually for that use. 4W must be licensed annually for highway use. In the past, MC's used on streets needed to pay an additional fee for OR use.
- Grant program exists between state and local SM clubs. (The same type of program could be set up for 3W's once the registrations come in.) State provides 50% monetary match to clubs, also helps clubs to buy equipment for construction and grooming, and then helps club actually construct trails.

- Hard to get a program going for 3W's because agency director does not yet believe demand is there. Few are registered w/state. There are no 3W clubs just one rudimentary organization, contrasted with 120 SM clubs that have been in existence for 12 years.
- Have to have more registrations to be able to fund a program for 3W's.
- Conflicts exist between 3W's & SM's because 3W's generally do not get landowner permission like SM's did and 3W's do no work to groom SM trails.

ORV law passed 1973; amended 1983.

New Hampshire

- No registration required to use any ORV for OR use. Vehicles must be registered if they will be used on streets.
- Unrestricted ORV use permitted in 2 "sacrifice areas" designated by Corps of Engineers. There are no designated trails within those areas.

- There are problems with 3W's on SM trails.
- 3W's are not organized like SM's who come in and testify for proposals before the Legislature.
- Some ORV users are tired of the designated areas and use private land or state parks, which creates an enforcement problem. But farmers are less irritated with 3W's than with 4W's.
- 5-6 inches annual snowfall in the state makes it a perfect place for 3W use year-round. Only internal discussion in the department thus far about what to do.

No statute for ORV's, just for SM's.

North Dakota

- Vehicles must either be registered as APV or for street use, one way or the other.
- State-owned trails are designated and signed. They are open 6 AM-11PM and vehicles must have headlights for after-dark use. Trails have never been closed down, but they would be if there were a fire hazard or a safety problem of some other kind.
- Some volunteers help maintain the trails, but most maintenance is done by the department.
- No state grant programs to LWG's or ORV clubs.

- Program is not very big in Ohio, but seems to meet the current demand for APV's. SM's would like more trails, however.

"APV" law including SM's but not including 3W's, was passed in 1972.

Ohio

PARTIAL SURVEY OF STATE ORV PROGRAMS, DECEMBER 1983

State	Land Area (1000 acres)*	ORV Definition & Number	Land Available For ORV Use	Program Origin, Length and Budget
South Dakota	48,882 total 3,492 federal	ORV means: SM, primarily. 10,000 SM's are registered with the state. Number of ORV's unknown, but sales of 3W's are increasing.	<ul style="list-style-type: none"> - Corps of Engineers owns an area near Pierre which is used for hill-climbing by 2W's and 4W's. - No state land explicitly available for ORV's, but 3W's do go on SM trails. - For SM's, 200 miles of federal land available in Black Hills and several hundred miles available on state leased private land in the eastern part of the state. - All SM areas are very near population centers - people can ride right out of town on SM's. 	<ul style="list-style-type: none"> - No ORV program. - Original problem was that SM's had nowhere to ride, and the state SM Assn. lobbied for a law. - SM program budget is about \$200,000/year from registrations and the gas tax refund. It is an account earmarked for SM's. - SM budget used for administration, trail development and maintenance, payments to landowners for leased trails, and user education.
Washington	42,694 total 12,473 federal	ORV means: Any wheeled vehicle use off roads passable by traditional 4W vehicles. SM's not included. 15,000 ORV's registered in state.	<ul style="list-style-type: none"> - State owned land includes 200 miles of trails for trailbikes and 1000 acres of sand dunes in the eastern half of the state used by all ORV vehicles. - Harder to pin down total acreage available for NH program, since the areas and trails are multi-use. - The seven national forests have about 2,000 miles of trails available for ORV use. The most progressive for ORV use is the Wenatchee National Forest (900 miles of trails. Several thousand miles of forest roads available to street-legal ORV's). - Little private land is available, other than for motor-cross racing, but the Forest Service will enter agreements with private landowners where forest trails cross private land. - The Forest Service does a lot of publicity on its available ORV areas. The service is currently revising a 1980 publication promoting the areas. - The available ORV areas are not near the major population centers, due in part to the political situation with the LUG's. Most people can get to an area with 1-1 1/2 hr drive. 	<ul style="list-style-type: none"> Origin was lobbying by ORV-MC clubs that wanted riding areas. Budget: \$2 million/year. Sources: ORV permits and 1% of gasoline tax refund Uses: 1/2 gas refund and 80% of permit money goes to Interagency Recreational Committee (IAC) to give grants to federal agencies and LUG's for ORV projects. Uses: 1/2 gas refund and 20% of permit money goes to state DNR for ORV and NH facility development, land acquisition, administration, and enforcement.
Wisconsin	35,011 total 1,868 federal	ORV means: 2W, 3W (ATV), not 4W. Separate statutes for SM's and MC's. Recent sales figures: 50,000 2W, 35,000 3W (ATV)	<ul style="list-style-type: none"> - Estimates about 1 million acres owned by the state. In 2 areas there are trails available to 2W's and 3W's for summer use: one 14 miles long, the other 6 miles long. In state's northern forests, forest roads are available for use by licensed vehicles. - Counties own about 1 million acres also, from tax forfeited lands. Approximately 800 miles of county forest roads are available to 4W's. - Most of the land available for ORV uses is within 2-5 hrs driving distance from major population centers. 	<ul style="list-style-type: none"> No program specifically for ATV's or 4W's at state level.

Program Management Features

- ORV's other than SM's are not required to be registered unless they are going to be used on highways.
- For SM's - 2 different aspects of program. In Black Hills, state enters cooperative agreement w/US Forest Service. The Service provides the administration and the state does all the trail development and maintenance. Federal regulations prohibit wheeled vehicles on trails, state aids in enforcement of regulations. In the eastern part of state, land is leased from private landowners who get paid even when there is insufficient snowfall. State maintains the SM trails.
- State makes no grants to LUG's or SM clubs. SM clubs get involved in finding landowners who would like to participate, but state then pays these people directly for leased land.
- State SM trails are open all the time. They are designated and have signs on them.

Program Appraised

- No organized ORV effort to get trails.
- Even though 3W's use SM trails, the use does not seem to create friction yet.
- 4W's are a problem in the Black Hills.
- System works for SM. Planning expansion of SM trail system in 1984. SM clubs more interested in trails than areas.

Statutory Treatment

SM statute passed 1973.
SM gas tax refund statute passed 1975.

State

South Dakota

- All vehicles must register for highway use or get an ORV permit.
- State ORV program has 2 major components: an ORV part and a NH (non-highway) part. The ORV facilities contain trails, campgrounds, trailheads for ORV users. The NH program consists of forest roads maintained for NH use, which is use by traditional 4 wheeled vehicles.
- Educational materials on proper ORV use are developed and distributed through state parks, the state department of education and libraries.
- The state contracts with county deputies for enforcement in some of the trail areas.
- State closes its forest trails near Olympia during the 80-100 inches per year rainy season. The US Forest Service will close its trails for a variety of reasons, e.g., winter snow, spring melt, spring movement of elk.
- State ORV program relies on volunteers to help build trails, but pays no monies to individuals for trail development. State will contract with counties for studies of potential ORV use areas and with trail-building firms, however.
- The IAC gives money to federal agencies and LUG's strictly for ORV trail development. The bulk of this money has gone to the US Forest Service.

- The most controversy revolves around the inaccessibility of ORV areas. The population of Kittitas County in the Wenatchee National Forest doubles from 40-60,000 normally to over 100,000 on summer weekends because of the influx of ORV riders from metropolitan areas.
- It is easier to manage the use in a progressive fashion than ignore the use and hope it will go away.
- MC's are upset about wider 3W's on 2W trails and SM's are upset about 3W's on SM trails. 3W's seem to be oblivious of the controversy around their use of these other trails.

The "ATV Act" passed 1972; was amended as the "ORV Act" in 1977.

Washington

- The state makes grants to LUG's for the MC and the SM programs. Counties have discretion to issue permits to ATV's also and some have done so. 64 of the 72 counties participate in the SM program, and 2 counties make the SM trails available to ATV's.
- ATV's are officially limited to using county trails in winter only, but one county does make its trails available to ATV's in the summer time also, although it is not widely publicized.
- Counties can permit ATV's on MC program trails, too, where reasonable.

- State SM Assn. has expressed concern to the state UNR because of the counties' interpretation of the SM law. Feels ATV's are inappropriately using SM trails in the two counties.
- 4W's area problem on state forest roads periodically.

- Because there is no ATV Wisconsin statute yet, they have no legal standing. Bill for ATV's is currently pending in the Legislature.
- MC program is 10 years old.

Wisconsin

