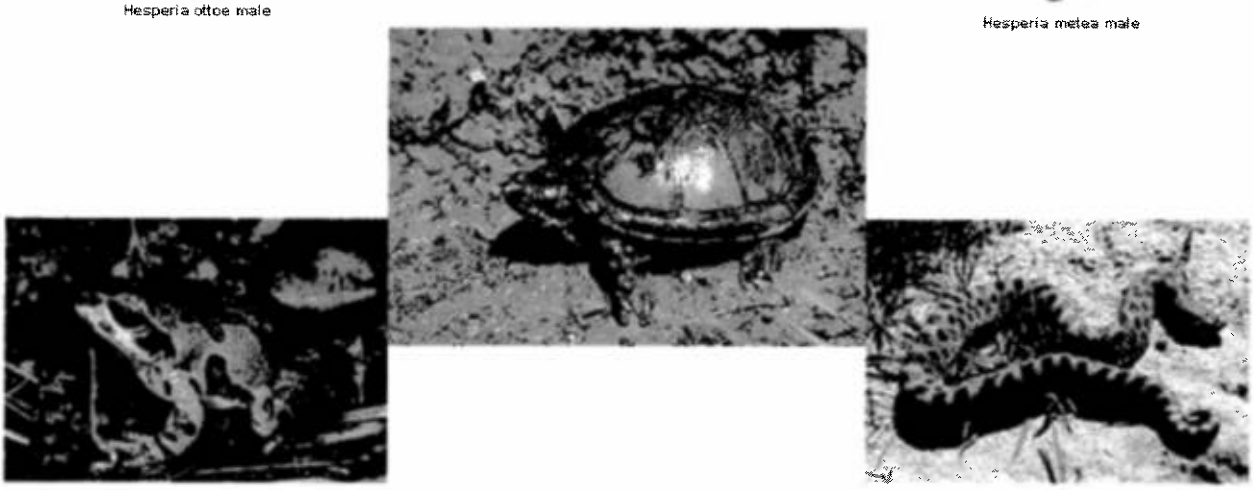
Hesperia ottoe male

Hesperia metea male



CONSERVATION PLAN

November 2003
Revised: January 2005

Regal Fritillary (*Speyeria idalia*)
Ottoe Skipper (*Hesperia ottoe*)
Cobweb Skipper (*Hesperia metea*)
Illinois Mud Turtle (*Kinosternon flavescense*)
Illinois Chorus Frog (*Psuedacris streckeri*)
Western Hognosed Snake (*Heterodon nasicus*)

Potential Impacts from
IDNR/IDOT Road Improvements to Sand Ridge Road West

1A BACKGROUND/ PROJECT DESCRIPTION

The existing Quiver Township road "Sand Ridge Road West" not only serves as the major east/west access road to Sand Ridge State Forest but also provides visitor access to various uses areas within the Forest (e.g., office/visitor center, equestrian & vehicular campgrounds, hunter parking areas, etc). The existing road consists of an unimproved sand surface 18-22 feet wide and approximately 2.5 miles in length (western end) that becomes rutted and nearly impassible during certain periods of the year and an A-3 (oil & chip) surfaced road segment 20 feet wide and approximately .5 miles in length (eastern end). Improvements to Sand Ridge Road West will provide an all-weather surfaced roadway for site and visitor access, bring the road up to DNR road standards, and improve visitor safety in the event of an emergency or fire hazard. IDNR has the authority to improve the road under The "State Forest Act" 525 ILCS 40/5.

It is proposed to upgrade Sand Ridge Road West, from station 20+12.33 to station 185+50.12 (see Appendix 1 - Project Location Map) by installing drainage culverts, providing ditches, and placing 8" of aggregate base course with an A-3 (oil & chip) surface treatment. The project also consists of enlarging an existing borrow pit area within section 35, T22N, R7W that will be required for road construction purposes. These improvements could have a significant impact upon several endangered and threatened species.

1B BIOLOGICAL DESCRIPTIONS OF AFFECTED SPECIES

Regal Fritillary (*Speyeria idalia* [Drury]) is listed as threatened in Illinois (Illinois Endangered Species Protection Board, 1999). It is a large butterfly identified by a wing span of 2 5/8 - 4 1/8 inches (6.7 - 10.5 cm) with the upperside of the forewing being bright red-orange with black markings, the upperside of hindwing black with postmedian row of white spots, the submarginal row of spots is orange in male and white in female. The Regal fritillary's life history consists of males patroling for females with a low, steady flight. Females walk through vegetation to lay single eggs on various plants, even if the host violets are not present. Females can lay up to 2000 eggs. Males and females are seen flying from mid June to mid July. Females undergo a reproductive diapause and become active again in mid August and continue to lay eggs until mid September (Kopper et al., 2001). The caterpillars hatch and overwinter unfed. In the spring they eat leaves of host plants of the violet family which has been thought to including bird's foot violet (*Viola pedata*) and prairie violet (*Viola pedatifida*). Adult feed on the nectar from flowers of such as milkweeds, coneflowers, mountain mint and other prairie flowers. Suitable habitat consists of Tall-grass prairie and other open sites including damp meadows, marshes, wet fields, and mountain pastures (Richard and Heitzman, 1987 ;Bouseman and Sternburg, 2001). The species ranges from tall-grass prairie remnants in Montana and North Dakota south to Colorado, Nebraska, and Oklahoma and east to Pennsylvania. It is increasingly rare east of the Mississippi River. It is a species of concern for the United States Fish and Wildlife Service because it is rapidly vanishing or declining in much of its range. It is listed by The Nature Conservancy as having a Global Rank of G3 which indicates that it is very rare or local throughout its range or found locally in a restricted range and has only 21 to 100 occurrences nationally (NatureServe, 2003). In Illinois the Regal fritillary is known historically from only 18 locations within 8 counties. Mason county has three of the largest 5 populations and is therefore important in terms of meta-population dynamics for this species. Within Sand Ridge

State Forest, the species is known from sections 14,15, 21, 22, 23, 24, 25, 26, 27, 28, 32, 34, and 35 within T23NR7W, and from sections 2, 5, and 6 of T22NR7W both of the 3rd PM (Illinois Natural Heritage Database, 2005). Based upon habitat preference, suitable breeding habitat occurs in isolated patches of the forest where sand prairie openings are over 5 acres in size (LaGesse *et al.*, 2004).

Ottoe Skipper (*Hesperia ottoe* W. H. Edwards) is listed as threatened in Illinois (Illinois Endangered Species Protection Board, 1999). It is a medium sized butterfly with a Wing span of 1 1/4 - 1 11/16 inches (3.2 - 4.3 cm) that can be identified by an upperside of bright brownish orange while the male has narrow black edging on the outer margins of both wings and the female is brighter with diffuse borders. Stigma on male forewing has black or gray felt. The underside of the hindwing is yellow-orange with no markings on the male, and sometimes with faint markings in the female. Adults are strong fliers but most remain local and are seen from June through August. Males perch near the host plants all day to wait for receptive females. Eggs are laid singly at the base of a host plant which is little bluestem (*Andropogon scoparius*), and other grasses. The caterpillars live in a nest of leaves tied with silk, and hibernates as a fourth-stage instar. Adults nectar from flowers of green and common milkweeds, yellow prickly pear, purple coneflower, leadplant, compassplant, sunflower, and blazing star. The preferred habitat is native tall-grass prairie (Richard and Heitzman, 1987). The species ranges from Southern Manitoba and eastern Montana south along the high plains to north Texas; east through Nebraska and Kansas to central Illinois and southwest Michigan. It is listed by The Nature Conservancy as having a Global Rank of G3 which indicates that it is very rare or local throughout its range or found locally in a restricted range and has only 21 to 100 occurrences nationally (NatureServe, 2003). In Illinois the Ottoe skipper is known historically from only 12 locations within 6 counties. Within Sand Ridge State Forest, the species is known from sections 34, and 35 within T23NR7W, and sec 3 T22NR7W, both of the 3rd PM (Illinois Natural Heritage Database, 2005). Based upon habitat preference, suitable habitat occurs in isolated patches of the forest where sand prairie occur.

Cobweb Skipper (*Hesperia metea* Scudder) is listed as threatened in Illinois (Illinois Endangered Species Protection Board, 1999). It is a medium sized butterfly with a wing span of 1 1/8 - 1 3/8 inches (2.9 - 3.5 cm) and is identified as having wings that are dark brown or blackish with few light areas with an underside of the hindwing having a cobwebbed appearance due to white spots extending along the veins. This species flies from March to Early June. Adults although capable of extended flight tend to remain very local. Males perch near the host plants all day waiting for females to fly by. Females lay eggs singly on or near the host plants; Beard grasses including little bluestem (*Andropogon scoparius* and *A. s.* var. *glomeratus*) and big bluestem (*A. gerardi*). Caterpillars eat leaves and live in nests of rolled or tied leaves. Fully-grown caterpillars hibernate. Adult nectar from flowers of low-growing plants such as Labrador tea, wild strawberry, blackberry, bird's-foot violet, vervain, Carolina larkspur, and wild hyacinth. The preferred habitat is dry, grassy openings in woods, pine barrens, oak savannah, open sandy scrub, burned areas, and old pastures (Richard and Heitzman, 1987). The species ranges in a patchy distribution from southern Maine west to Wisconsin and south to central Georgia, the Gulf States, and central Texas (NatureServe, 2003). In Illinois the Cobweb skipper is historically known from only 5 locations within 4 counties (Illinois Natural Heritage Database, 2003). Within Sand Ridge State Forest, the species is known from sections 14,15, 21, 22, 23, 24, 25, 26, 27, 28, 34, and 35 within T23NR7W, 3rd PM (Illinois Natural Heritage Database, 2005). Based upon habitat preference, suitable habitat occurs in isolated

patches of the forest where sand prairie and open sand forest occur.

Results of a 2004 survey of host plants at Sand Ridge State Forest for listed butterflies (LaGesse et al., 2004). As a base line study prior to road construction, a survey for larval host plants (violets and little bluestem) of the listed butterflies was conducted during phenologically appropriate times. A review of past occurrences of these species on the forest was conducted prior to the survey. The survey for the host plants happened to correspond to the emergence and flight times of all of the listed butterflies, however only the Regal fritillary was seen during the survey. Cobweb skippers appear to have an affinity for recently burned sites and were not seen on the site possibly due to lack of suitable habitat on site. However, this species ranges wide in search of suitable habitat so they may return on their own under the proper conditions. The Ottoe skipper was known from only two close locations on the forest, 1 sand prairie opening and one sizable location near the site headquarters. The sand prairie opening has closed in due to woody encroachment and is considered no longer suitable habitat while, in an effort to retain it's open nature, the site near the office was burned several years in a row in the early 1990's and the species has not been seen at the site since. Both species are now presumed extirpated from the site even though the study located extensive populations of the host plants. The Regal fritillary however was considered very common at the site. Potential host plants (*Viola pedeta and Viola sagittata*) were located in over 60 fairly discreet locations including ones within the project area. However, no larval damage was seen on any of the individual viola sp. plants. On 9 May 2004, Regal fritillary larva were seen feeding on Johnny Jump-Up (*Viola rafinesquii*). This is the first time that this species has been documented feeding on this plant. The Johnny jump-up is a biennial and has been considered exotic by some although they were potentially confusing it with the very similar *Viola tricolor* which is exotic. Most lepidopterist did not consider this species as a suitable larval host but over 49% of individuals of that species showed damage characteristic of larval feeding. Over 20 healthy populations of this new host plant were located during the study. None are within the project area but one is immediately adjacent to the project area. Adult emergence was noted at 10 locations within the forest. These sites were all within fields that were greater than 5 acres in size, thus giving us a feel for Regal fritillary habitat preference on the site. Regal larvae raised in captivity preferred any violet offered over the Johnny jump-up. The Regal's in Sand Ridge State Forest however may be forced to host on Johnny jump-up's because they are the only violet that is presently growing in openings of suitable size. For all practical purposes, the host plant for the Regal's at Sand Ridge State Forest will be considered to be the Johnny jump-up. The study also informally documented the habitat use of the Regal's throughout the year while they were there conducting the survey and identified 11 areas where the species was concentrated for nectaring purposes and two of those sites are immediately adjacent to the project area. The study did, while not the main focus of the study, provided comments on the condition of the habitat for Regal fritillary's and indicated that the lack of nectar sources at the forest in the late summer may be limiting to the population. The authors also theorize that the fire lanes within the forest may be "trapping" dispersing butterflies and that wider dispersal corridors could be beneficial. Lastly, they salvaged 5 dead specimens from the road and, based upon personal experience with road mortality and insects, estimate that 2 butterflies a day might be getting killed on the roads within the forest. An estimation of the population was not a goal of the limited study so this mortality could not be put into a population context.

Illinois Mud Turtle (*Kinosternon flavescens*) is listed as endangered in Illinois (Illinois Endangered Species Protection Board, 1999). This is a small, dark-colored, fossorial, semi-

aquatic turtle. The general coloration is dark brown to black. There is some yellow on the chin and neck and along the edge of the upper shell. The lower shell is normally yellow with some brown coloration along the scute seams. Adult Illinois mud turtles range in upper shell length from 4 to 5 inches (10 to 12.5 cm). The Illinois mud turtle prefers a sand prairie or open sand savanna habitat and avoids areas with dense forest (Moll, 1981). Aquatic habitat includes semipermanent marshes, oxbow lakes and flooded fields. This species spends time in a fishless ponds from mid May through June where feeding and breeding occurs. It hibernates and aestivates the rest of the year buried in the sand. There may or may not be an active period from September to October. It is presumed to eat a variety of aquatic animals and some plants and there is only anecdotal information that feeding may occur when buried. Females lay 3-7 eggs in a shallow burrow in late June through early July (Phillips et al., 1999). In Illinois the Illinois mud turtle is known historically from only 14 locations within 5 counties. Within Sand Ridge State Forest, the species is known from section 3 of T22NR7W, 3rd PM. Individuals have not been found at this pond since 1992 even with repeated surveys (Illinois Natural Heritage Database, 2005). This population may be extirpated. However, the single largest population in the state occurs within 4 miles of this historical pond and any recovery plan for this species should take into consideration the reintroduction of this species at this site.

Illinois Chorus Frog (*Pseudacris streckeri*) is listed as Threatened in Illinois (Illinois Endangered Species Protection Board, 1999). This species is a small (up to 4.7 cm) tan to gray frog with dark brown or black lines on the back with a white belly. It has a stout toadlike body with robust forearms and a dark masklike stripe from snout to shoulder. It's preferred habitat is sand prairies and remnants such as sandy agricultural fields and waste areas. This species burrows in sand and emerges briefly after heavy, early spring rains (late February to early March) to breed in nearby flooded fields, ditches, and other vernal ponds. Eggs are laid in small, jelly-covered clusters attached to twigs and branches underwater. Embryos hatch in a few days and tadpoles transform in about two months. It is unusual because it digs forward with its stout front legs, rather than backward like other species (Phillips et al., 1999). In Illinois the Illinois chorus frog is known historically from only 35 locations within 7 counties. Within Sand Ridge State Forest, the species is known from section 3 within T22NR7W, and section 28, within T23NR7W both of the 3rd PM (Illinois Natural Heritage Database, 2005). This species is currently doing surprisingly well within suitable habitat in Mason County. However most of those populations occur on private ground with no long term protection so Sand Ridge State Forest is a significant site for the long term conservation of this species.

Western Hognosed Snake (*Heterodon nasicus*) is listed as threatened in Illinois (Illinois Endangered Species Protection Board, 1999). It is a medium sized snake (up to 60 cm Total Length), stout with gray or tan back covered with 35-40 dark blotches and an upturned scale at tip of the nose; belly and underside of tail mainly black; prefrontal scales separated by small scales. It's scales are keeled and the anal plate is divided. It's preferred habitat is sand prairies, savannas, and adjacent woodlots in well-drained soil. It is most often observed crossing sandy roads in brushy or weedy sand prairie remnants. This species will widens the neck, hisses, and sometimes strikes when disturbed, then rolls onto its back and feigns death. The snakes mate in the spring and lays eggs in July. The 8-10 young per clutch hatch in August or September at Total Length of 17-20 cm. Moves slowly as it searches during the day for toads, other amphibians, reptiles and their eggs, birds, and small mammals, some of which it digs out of sand with its snout (Phillips et al., 1999). In Illinois the Western hognosed snake is known historically from only 21 locations within 10 counties (Illinois Natural Heritage Database,

2005). The species is not known from the forest but it is known from a location on private property 2 miles east of the forest as well as an unconfirmed possible sighting on private property immediately adjacent to the forest. Suitable habitat for this wide ranging species occurs in isolated patches throughout the forest in the open sand forest/ sand prairie openings.

1C DESCRIPTION OF ACTIVITIES/IMPACTS LIKELY TO RESULT FROM THE PROPOSED TAKING

The road improvement activities on Sand Ridge Road West will be changing the current state and condition of the area where 5 and potentially 6 state listed species have been known to occur. The resurfacing of this sand road has the potential to result in "incidental takes" of; the Regal fritillary, Ottoe skipper, Cobweb skipper, Illinois mud turtle, Illinois chorus frog, and the Western hognosed snake. This take may occur through increased vehicular caused mortality, direct construction related mortality or through general degradation of the surrounding habitat and may occur within the breeding and/or non-breeding portions of the respective species life cycles.

Roads affect biodiversity negatively in seven different ways: direct mortality from road construction, direct mortality from increased collisions with vehicles, modification of animal behavior, alteration of the physical environment, alteration of the chemical environment, spread of exotics, and increase use of the area by humans (Trombulak and Frissell, 1999). Since Sand Ridge Road is currently a road, some of the concerns such as spread of exotics and an increase of use in the area by humans are not major concern. However, alteration of the chemical and physical environment is likely to occur from construction and changes in road usage, with impacts such as: increase in soil density, changes in soil water content (Helvey and Kochenderfer, 1990), surface water and runoff patterns (Megahan, 1972; Wemple et al., 1996), increase in temperature of the immediate surroundings (Asaeda and Ca, 1993; Whitford, 1985), increased inputs of chemicals to the roadside environment of heavy metals (Garcia-Miragaya et al., 1981; Clift et al., 1983; Gjessing et al., 1984; Oberts, 1986; Aratyan and Zakharyan, 1988), salts (Bogemans et al., 1989), organic molecules (Benfenati et al., 1992) and ozone (Flueckiger et al., 1984). Since the forest system is currently being impacted, to differing amounts, by all these physical and chemical alterations due to the current road, the impacts to species diversity from direct mortality and modification of animal behavior are the greatest concern from this surface improvement.

Since Sand Ridge Road West is unimproved, most mobile species do not see this as an impediment to movement. However, Many species view paved roads as an obstacle. Paved roads have been shown to further habitat and population fragmentation (Joly and Morand, 1997), they restrict amphibian dispersal (Gibbs, 98) and are known to be functional barrier to other small-bodied ground dwelling animals such as small mammals, snails and butterflies (Bennett, 1991). "Terrestrial salamanders are especially prone to extinction and recolonization processes which depend upon the maintenance of dispersal connections" (Gibbs, 1998). Paved surfaces selectively impede movements of many salamander species and have an average permeability factor of 0.3% for all salamanders (Gibbs, 1998). Roads have been shown to restrict gene flow in frogs (Reh and Seitz, 1990). This perceived impediment to movement alters animal behavior by causing changes in home ranges (Baur and Baur, 1990; Merriam et al., 1974)) and escape responses (Van der Zande et al., 1980; Madsen, 1985)

which affect overall reproductive success (Paruk, 1987; Norling et al., 1992) and physiological state (MacArthur et al., 1979). Population fragmentation causes stress as the population adjusts to the new situation. Findlay and Bourdages (2002), show that road improvement in proximity to wetlands have negative effects on plant and vertebrate populations that take decades to be fully evident due to a lagged response. Thus, the initial short term assessments substantially underestimate the real effects of the improvements.

Sand Ridge Road West's current condition may limit vehicular collisions by restricting speed and traffic volume. Improvements to the road may therefore increase the incidence of vehicular collisions since direct mortality is related directly to speed and traffic volume (Fahrig *et al.*, 1995). Vehicular collisions have been shown to affect population demographics: road kill is the third highest cause of mortality in deer (Sarbello and Jackson, 1985) and is documented as the limiting factor in the recovery of the endangered American Crocodile (Kushlan, 1989) and a contributing factor to the endangerment of the prairie garter snake (Dalrymple and Reichenbach, 1984) as well as significantly impacting terrestrial land turtles (box turtles) and large aquatic turtles, (Gibbs and Shriver, 2002). The improved surface to the road will effectively attract "basking" herps which will be drawn to the surface for heat conduction at critical times of the year and will thus be put at an increased risk (Dalrymple and Reichenbach, 1984). The current "roadless" area in this portion of the forest is approximately 1,710.5 ha in size, while the road improvement project may result in two functionally separate roadless areas of approximately 921 ha and 789.5 ha in size for some species. This will ultimately create two smaller populations for less mobile species where one large population may have existed in the past. Due to stochastic events which can affect the dynamics of smaller populations, one larger population is preferred over two smaller populations.

A traffic study was completed by IDOT, District 6 using IDNR's attendance counts completed from years 1993 to 2002. The attendance counts were estimated using a permanent traffic counting device in which counts were recorded on a monthly basis and number of vehicle multiplied by 3.5. The traffic count device was located across Sand Ridge Road West near the entrance to the site office/visitor center. The actual monthly counts from the traffic counter device was divided by the number of days in each month to determine the average daily traffic (ADT) on Sand Ridge Road West (Table 1).

Table 1. Average Daily Traffic at Sand Ridge State Forest Based upon 10 year attendance figures.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Jan	74	80	74	89	80	99	62	95	84	91
Feb	65	65	63	96	83	77	64	69	63	68
Mar	72	76	78	89	118	91	78	92	78	57
Apr	110	101	142	128	127	162	141	137	138	113
May	**101**	**80**	**101**	**137**	**131**	**173**	**136**	**108**	**115**	**118**
June	**102**	**78**	**107**	**113**	**96**	**107**	**116**	**137**	**144**	**101**
July	**94**	**90**	**104**	**92**	**101**	**103**	**105**	**103**	**127**	**86**
Aug	**106**	**107**	**109**	**137**	**130**	**133**	**102**	**111**	**123**	**99**
Sept	**138**	**139**	**169**	**160**	**171**	**165**	**128**	**149**	**137**	**122**
Oct	102	124	146	148	95	161	133	135	145	117
Nov	161	152	140	142	131	190	154	137	145	168
Dec	130	132	121	150	142	141	138	145	120	136

	1255	1224	1354	1481	1405	1602	1357	1418	1419	1276
ADT (May -Sept.)	**108**	**99**	**118**	**128**	**126**	**136**	**117**	**122**	**129**	**105**

The critical months of traffic which may affect the endangered species is assumed to be from May 1st to October 1st of each year; therefore, only traffic data from these months will be used and analyzed. Please see the above ADT for these five months of each year.

There seems to be no steady increase in traffic counts from one year to the next over these recorded years, but the trend shows an anticipated increase of approximately 0.6% per year by grouping and averaging three year periods over this recorded time. Please see below for the anticipated projected traffic counts in the future considering the existing sand road with no major improvements, but only routine maintenance (Table 2).

Table 2. Projected ADT for Sand Ridge Road West with "No Improvements" and existing speed limit signing remaining at 35 mph.

Year	(2003)	(2005)	(2015)	(2025)
ADT	**120**	**121**	**129**	**137**

The following anticipated traffic counts are projected in the future considering the proposed improvement of reconstructing the road by installing drainage culverts, providing ditches, the placement of 8" of aggregate base course, and providing an A-3 (oil & chip) surface treatment with the existing speed limit remaining at 35 mph (Table 3).

Table 3. Projected ADT for Sand Ridge Road West with "Proposed Aggregate Base with an A-3 (Oil & Chip) Surface Treatment" and the existing speed limit signing remaining at 35 mph.

Year	(2003)	(2005)	(2015)	(2025)
ADT	**120**	**125**	**133**	**141**

The following anticipated traffic counts are projected in the future considering the proposed improvement of reconstructing the road by installing drainage culverts, providing ditches, the placement of 8" of aggregate base course, and providing and A-3 (oil & chip) surface treatment with the existing speed limit decreased to 20 mph (Table 4).

Table 4. Projected ADT for Sand Ridge Road with "Proposed Aggregate Base with an A-3 (Oil & Chip) Surface Improvement" and existing speed limit signing decreased to 20 mph.

Year	(2003)	(2005)	(2015)	(2025)
ADT	**120**	**123**	**131**	**139**

The proposed improvement to Sand Ridge Road West will not greatly increase traffic on this road, but make it more passable and safer for the existing users. We do anticipate a slight increase in traffic (4 vehicles per day, a 3.3% increase) directly after the improvements are

completed. Local residence traveling between Goofy Ridge and Forest City may be more likely to use this road after being improved than other existing local roads that they are using now (especially during the times in the past when the existing sand road became impassible under certain weather conditions). The traffic increases on this road will cause decreases on other roads (where the same endangered species may exist).

After Sand Ridge Road West is improved, traffic is still anticipated to only be increased at approximately 0.6% per year (same as the current growth rate). The only way traffic could increase greatly on this road is if there happens to be some type of local development that would increase visitors to the site or provide additional local jobs to increase the population in the direct area. Reducing the speed limit to 20 mph is not anticipated to deter a significant amount of traffic from using this road.

While vehicle traffic may not increase dramatically on the road, the speed traveled by those vehicles may increase if not restrained. Therefore, a speed study was undertaken to determine the difference in speed between traffic on the unimproved sand road and the improved surface of Cactus Drive. Only seven vehicles were recorded in 4 hours with 5 of the seven being vehicles operated by the site. Due to the low traffic volume this study was ineffectual at differentiating speed differences between the two surface types. It is postulated and reasonable however that improvements to the road will result in higher vehicle velocity. Higher velocity is directly correlated with greater roadside mortality (Fahrig et al., 1995).

1D EXPLANATION OF ADVERSE EFFECTS

Population levels of the listed butterflies, the Illinois mud turtle, the Illinois chorus frog and the Western hognosed snake within Sand Ridge State Forest are unknown. Estimates of vehicular mortality within those groups is either non-existent in the literature or are dependent on population density, habitat structure or other variables. Although, it is known that Regal fritillary's are susceptible to vehicular mortality (2 per day estimated, LaGesse *et al.*, 2004), this lack of information makes the estimation of potential impact due to this vector hard to quantify. The width of the sand road varies in spots but will correspond closely with the width of the improved road and only roughly 3 acres of existing vegetation will be destroyed in order to complete roadside ditches for this project. This acreage reflects only about 7/1000th of similar acreage on the forest. It is unlikely, though possible, that this habitat destruction will result in direct mortality to an Illinois mud turtle, Illinois chorus frog or Western hognosed snake which may be in the affected area. More probable, though still unlikely, is mortality to larval butterflies as host plants are destroyed. However, no host plants (Johnny jump-up) for the Regal Fritillary were found in the project area and based upon characteristics of the known emergence areas, it is likely that no larvae would be impacted. Vehicular mortality remains a threat to the population although unquantifiable at this point. Long term degradation caused by the road construction is harder to quantify but should be kept in check through added vigilance and management.

2A PLANS TO MINIMIZE AREA AFFECTED BY PROPOSED ACTION

Measures have already been taken during the design phase of this project to minimize impacts to all species by reducing the size and slope of roadside ditches from 4:1 fore slopes, 3:1 back slopes, 3 foot deep and 2 foot wide ditches, to 3:1 fore slopes and back slopes, 1 foot deep and 2 foot wide ditches. This change should not impact drainage at the site and decreases the impact to existing vegetation from 6 acres to 3 acres. Measures will be taken during the construction phase of the project to minimize impacts to all species by constructing the major improvements (clearing, culverts, ditching, and roadbed preparation) in the dormant season (October - February) for the species in question and not allowing vehicles or equipment out of the roadway footprint. Seeding of the ditch slopes and the A-3 (oil & chip) surface treatment may occur in the warmer months as required.

2B/C/F PLANS TO MITIGATE AND MANAGE AREA AFFECTED BY PROPOSED ACTION

Attempts will be taken to mitigate any expected impacts of the road improvements on the listed species and the forest community as a whole through a combination of voluntary speed limit reductions, public education, planting of native grasses and forb species, continued management of the road corridor, and the creation of a shallow water wetland. These compensation measures should remedy any impact of the road for all groups of species as well as increase critical habitat for all groups except for the Western Hognosed and other snakes. IDNR has the authority to implement these proposed conservation measures under The "State Forest Act" 525 ILCS 40/9.

This project is authorized by IDNR which receives funding from the Illinois General Assembly and the Federal Government in carrying out its programs. The projected cost of the preferred alternative for the project is $900,000. The cost of this project includes all monies necessary to implement the mitigation measures within the conservation plan. IDNR has provided funds for the pre-construction monitoring of the butterfly host plant survey (04) as well as a general butterfly habitat survey to be conducted in the summer of 05. The post construction monitoring will be accomplished by department personnel as part of their regular duties paid for through regular operating funds which are subject to appropriations. It is the intent of the IDNR to honor the conservation plan and it does not anticipate any changes or unforseen circumstances, but funds can not be guaranteed because of the actions of the Illinois General Assembly.

This project has been reviewed under IDNR's Comprehensive Environmental Review Process (CERP) which ensures compliance with all applicable federal and state regulations and has been given conditional approval based upon successful completion of the Incidental Take process and the approval of this Conservation Plan.

Public Education - A public education campaign will be conducted by posting "Break for Wildlife" signs identifying a recommended slower speed limit. The project contractor will provide all signage during construction.

Native Grass & Forbs Planting - The backslopes of the ditches (approx. 1.8 acres) the area around the created wetland (approx. 1.4 acres) and the impacted area associated with the borrow pit will be planted with a low profile native seed/forbs mix that compliments the current

vegetation of Sand Ridge State Forest and includes the native larval host as well as critical adult nectar plants for the butterfly species (Appendix 2). This will create suitable habitat for the butterfly species. While this seems counter-intuitive, Ries *et al.*, (1999) have shown that while native vegetation increases the density of butterflies present, it actually reduces vehicular mortality since they tend to stay off the road and in the vegetation. The 1.8 acre backslope seeding and the .25 acre wetland creation will compensate for the 1.2 acres of ditch foreslope that will be planted to exotic grasses for mowing purposes. Mowing along the road corridor during the growing season will be restricted to the foreslope of the ditch. The 1.4 acres of wetland seeding will compensate for the anticipated 1.4 acres of borrow area disturbance necessary for road construction.

Shallow Water Wetland Creation - A shallow water wetland (approximately .25 acres) will be created in Section 35, T22N, R7W. The creation of this wetland/native grass and forb planting will help benefit the butterfly species, the Illinois Chorus Frog, the Illinois Mud Turtle, potentially the Western Hognosed Snake, as well as other wildlife species. The wetland, in conjunction with the native grass and forbs planting is compensation for the seeding of the ditch foreslopes to exotic grasses for mowing purposes.

2D/E MONITORING MITIGATION & ADAPTIVE MANAGEMENT PRACTICES

As noted, even after the host plant survey, insufficient data is available to provide high levels of certainty regarding the potential magnitudes of incidental takings associated with this project however, all are considered to be extreemly low. The Department proposes to continue to monitor vehicle volume by keeping a traffic counter in the same location so numbers will be comparable with past counts and to ensure that traffic volume increases are in line with projections. A more intense speed study will be conducted before and both immediately and one years post completion to monitor speed limit compliance. If the traffic volume and speed increases beyond reasonable expectations, the Department will respond by formally petitioning jurisdictional authorities to reduce the speed limit through the project area, then monitor results.

Butterflies

For the Regal Fritillary, Ottoe Skipper, and Cobweb Skipper, the study conducted during the 2004 season has identified that (1) the Ottoe Skipper and the Cobweb Skipper are presumed extirpated from the site, (2) potential host plants due occur in the project zone, (3) that suitable nectar plants also occur in the project zone, (4) that while the Regal fritillary butterflies utilize the areas, it is primarily for dispersal and (5) that some mortality does occur through vehicular collisions. This data will be valuable in monitoring the impact of the road on these species.

The baseline data indicate that late summer nectar sources may be limiting and the project has been planned to provide additional acres of high-quality habitat for these species for this purpose, which , if utilized, should result in greater utilization of the forest by the Regal fritillary. In such a case, even a proportionate increase in mortality along the road should yield a net benefit, enhancing survival and recovery of this species.

The success of habitat planting will be assured under the terms of the contracts let for construction. Post-construction habitats will in no case be less in quantity or quality than pre-construction habitats.

Two years following construction, a vegetational survey will also confirm the success of nectar plants, affirm the continued use of habitats near the project unaffected by construction by the Regal fritillary. Mortality from road use will also be comparably measured and compared to the 2004 estimate. Data will be reported to the Endangered Species Program. This monitoring will be repeated in the fifth year following construction.

After either monitoring regime, should road mortality prove to increase precipitously, the Department will respond by formally petitioning jurisdictional authorities to reduce the speed limit through the project area, then monitor results.

After either monitoring regime, should the nectar plants not persist, the Department will investigate the reasons for non-establishment (fertility, disease, pesticides, excessive or inappropriate mowing, etc.), then attempt to re-establish plant populations after taking appropriate steps to address the problem. Reestablishment after 3 years will be at the expense of the Department.

Illinois Mud Turtle; Illinois Chorus Frog

As noted, the local population of the Illinois Mud Turtle may be extirpated, or nearly so. The Conservation Plan includes measures to provide additional habitat which may be beneficial to any individuals which remain. However, the risk to this species from the project is considered so slight the only monitoring proposed is routine observation and reporting of road kills, if any, by Site staff in conjunction with their normal duties. If a turtle road-kill cannot readily be identified as some other species, it's location will be recorded, then it will be collected, preserved, and submitted to the District Heritage Biologist for positive identification. Should a road-kill of the Illinois Mud Turtle be confirmed, the Department will petition jurisdictional road authorities for a reduction in the speed limit as indicated above, and renew its efforts to identify and describe the Sand Ridge population of this species.

The Conservation Plan includes measures to provide additional breeding habitat for the Illinois Chorus Frog. The Department will be alert for road-kills of this species prior to construction in an effort to quantify mortality under current conditions. The new habitat will be monitored during appropriate seasons for Chorus Frog reproduction and the results reported to the Endangered Species Program. Lack of use by the species will not be considered a failure or require adaptive management. Road-kills identified as Illinois Chorus Frogs, if any, will be tallied each season and compared to estimates of the local breeding population. If the level of road-kill appears to be unsustainable, the Department will petition jurisdictional road authorities for a reduction in the speed limit as indicated above.

Western Hognose Snake

This species has not been documented within the boundaries of the Sand Ridge State Forest. However, it has been reported from adjacent properties. Consequently, though its occurrence on the Forest is likely, population numbers and locations are unknown. Further, this range and habitat is shared by a closely related species, the Eastern Hognose Snake, *Heterodon platirhinos*, which cannot be readily distinguished from *Heterodon nasicus* without close examination of the individual. One distinguishing feature is that, for the Eastern Hognose, the underside of the tail is always lighter than the belly, whereas for the Western Hognose, the belly and underside of the tail are mostly black. There is some variation, however, and other characteristics must be examined for positive identification.

Monitoring for this species will consist of observations of snake road-kills by site staff throughout the forest and solicitation of sighting reports from Forest users. The locations of road-kills will be recorded, and the remains will be collected and provided to the Heritage Biologist for positive identification. Positive identification will document the presence of the Western Hognose within the forest and will provide useful information on the occurrence of other snakes in the Forest.

Should the level of snake road-kills within the project limit show a significant increase following construction, the Department will petition jurisdictional road authorities for a reduction in the speed limit as indicated above.

Monitoring Schedule:

Pre-construction:	Conduct speed study
Post completion:	Conduct speed study
	Routine observation of road kills with particular emphasis on turtles, snakes and frogs.
Completion +1:	Conduct speed study
	Compare traffic volume to previous years
	Continue routine observations of road kills
Completion +2:	Conduct vegetation survey
	Continue routine observations of road kills
	Conduct vehicle mortality study for Regal fritillary
Completion +3:	Continue routine observations of road kills
Completion +4:	Continue routine observations of road kills
Completion +5:	Conduct speed study
	Conduct vegetation survey
	Continue routine observations of road kills
	Conduct vehicle mortality study for Regal fritillary

3) ALTERNATIVE ACTIONS CONSIDERED

No-action - The no-action alternative is defined as no change in the existing road. This alternative was not considered due the need for all-weather site and facility access for Forest visitors, and public health and safety concerns.

Design A - The Design A alternative is defined as the current road design with 4:1 fore slopes, 3:1 back slopes, 3 foot deep and 2 foot wide ditches with exotic grasses planted on the fore and back slopes. This alternative was not considered because of excess habitat and vegetation loss.

Design B (Preferred Alternative) - The Design B alternative is defined as the current road design with 3:1 fore slopes and back slopes, 1 foot deep and 2 foot wide ditches with native vegetation planted on the backslope.

4 AFFECTS ON SPECIES SURVIVAL AND RECOVERY

The project will not jeopardize, and is likely to enhance, the long term survival and recovery of the **Regal Fritillary** since the species is a prolific and strong flier able to colonize new habitat. This project will result in the creation of 3.5 acres of additional habitat with suitable larval hosts while destroying only marginal habitat.

Since the **Ottoe Skipper** is presumed extirpated from the forest, the project will not jeopardize, and is likely to enhance, the recovery of the **Ottoe Skipper** in Illinois since the species is not very mobile and tends to disperse along the road corridor. This project will result in the creation of 3.5 acres of additional habitat with suitable larval hosts while destroying only marginal habitat.

Since the **Cobweb Skipper** is presumed extirpated from the forest, the project will not jeopardize, and is likely to enhance, the recovery of the **Cobweb Skipper** in Illinois. This project will result in the creation of 3.5 acres of additional habitat with suitable larval hosts while destroying only marginal habitat.

All data suggests that the **Illinois Mud Turtle** population has either been extirpated from the site or is so small and isolated as to not be a viable population. Therefore, the project will not jeopardize the survival or recovery of this species in the State, even if it results in individual mortalities.

Populations of **Illinois Chorus Frogs**, while present on the forest have not been recorded close enough to the impacted area to greatly affect the population. Dispersing Chorus frogs routinely cross paved surfaces. Therefore any incidental taking will not jeopardize the survival or recovery of this species in Illinois.

The **Western Hognosed Snake** has not been recorded from the forest, indicating it is so rare that it has not been previously encountered. The local population may be so small as to not be viable. While the probability of an incidental taking is greater than zero, it remains a very small risk. Very few snakes of this species may be taken, and probably none. The survival and recovery of this species in Illinois will not be jeopardized by this proposed action.

5 IMPLEMENTING AGREEMENT

IDNR Regional, Site, and District Staff will be responsible for overseeing all monitoring, mitigation, and adaptive management efforts identified within the Conservation Plan. IDNR Restoration Ecologist or their designee will be responsible for providing local seed/plugs or for the vegetating of the pond.

IDOT will be responsible for planning, contract execution and construction supervision for the entire project.

The successful project contractor will be responsible for the execution of the contract and construction of the road as well as for implementing mitigation measures including informational signage, all materials and labor necessary for the construction of the shallow water wetland and the planting of the required warm season grass and forb mixture on the backslope, around the pond and at the borrow pit under the supervision of IDOT District 6.

LITERATURE CITED

Araratyan, L. A. And S. A. Zakharyan. 1988. On the contamination of snow along main highways. Biologicheskii Zhurnal Armenii 41:514-519.

Asaeda, T., and V. A. Ca. 1993. The subsurface transport of heat and moisture and its effects on the environment: a numerical model. Boundary Layer Meteorology 65:159-179.

Baur, A., and B. Baur. 1990. Are roads barriers to dispersal in the land snail *Arianta arbustorum*? Canadian Journal of Zoology 68:613-617.

Benfenati, E., S. Valzacchi, G. Maniani, L. Airoldi, and R. Farnelli. 1992. PCDD, PCDF, PCB, PAH, cadmium and lead in roadside soil: relationship between road distance and concentration. Chemosphere 24:1077-1083.

Bennet, A. F. 1991. Roads, roadsides, and wildlife conservation: a review. Pages 99-118 in D. A. Saunders and R. J. Hobbes, editors. Nature Conservation 2: the roal of corridors. Surrey Beatty and Sons, Chipping Norton, New South Wales, Australia.

Bogemans, J., L. Nierinck, and J. M. Stassart. 1989. Effects of deicing chloride salts on ion accumulation in spruce (*Picea abies* (L.) sp.). Plant and Soil 11:3-11.

Bouseman, J. K., and J. G. Sternburg. 2001. Field guide to Butterflies of Illinois. Illinois Natural History Survey, Manual 9, 264pp. Champaign, IL.

Clift, D., I. E. Dickson, T. Roos, P. Collins, M. Jolly, and A. Klindwort. 1983. Accumulation of lead beside the Mulgrave Freeway, Victoria. Search 14:155-157.

Dalrymple G. H., and N. G. Reichenbach. 1984. Management of an endangered species of snake in Ohio, USA. Biological Conservation 30:195-200.

Fahrig, L., J. H. Pedlar, S. E. Pope, P. D. Taylor, and J. F. Wenger. 1995. Effect of road traffic on amphibian density. Biological Conservation 73:177-182.

Findlay, C. S., and J. Bourdages. 2000. Response time of wetland biodiversity to road construction on adjacent lands. Conservation Biology 14:86-94.

Flueckriger, W., H. Fluckiger Keller, and S. Braun. 1984. Untersuchungen ueber waldschaeden in der Nordwestschweiz. Schweizerische Zeitschrift fuer Forstwesen 135:389-444.

Garcia-Miragaya, J, S. Castro, and J. Paolini. 1981. Lead and Zinc levels and chemical fractionation in road-side soils of Caracas, Venezuela. Water, Air and Soil Pollution 15:285-297.

Gibbs, J. P. 1998. Amphibian movements in response to forest edges, roads and streambeds in Southern New England. J. Wildl. Manage. 62(2):584-589.

Gibbs, J. P., and W. G. Shriver. 2002. Estimating the Effects of Road Mortality on Turtle Populations. Conservation Biology 16:1647-1652.

Gjessing, E., E. Lygren, L. Berglind, T. Gulbrandsen, and R. Skanne. 1984. Effects of hyway runoff on lake water quality. Science of the Total Environment 33:247-257.

Helvey, J. D., and J. N. Kochenderfer. 1990. Soil Density and Moisture content on two unused forest roads during first 30 months after construction. Research paper NE-629. U.S. Forest Service, Northeast Forest Experiment Station, Broomhall, Pensylvania.

Illinois Endangered Species Protection Board. 1999. Checklist of Endangered and Threatened Animals and Plants of Illinois. Illinois Department of Natural Resources, Springfield IL. 20pg.

Illinois Natural Heritage Database. 2005. Biological and Conservation Database. Illinois Department of Natural Resources, Springfield IL.

Joly, P., and A. Morand. 1997. Amphibian diversity and low-water ecotones. Pages 161-182 in J.-P. Bravard and R. Juge, editors. Biodiversity in land -water ecotones. Man and Biosphere series. Volume 18. United Nations Educational, Scientific and Cultural Organization, Paris.

Kopper, B. J., S. Shu, R. E. Charlton, and S. B. Ramaswamy. 2001. Evidence for reproductive Diapause in the fritillary Speyeria idalia (Lepidoptera: Nymphalidae). Annals of the Entomological Society of America. 94:427-432.

Kushlan, J. A. 1988. Conservation and management of the American crocodile. Environmental Management 12:777-790.

LaGesse, V. A., W. McClain, C. Falco, and J. Wiker. 2004. Little bluestem and violet populations at Sand Ridge State Forest, Mason County Illinois: Implications for rare butterfly survival. Final Report submitted to Illinois Department of Natural Resources, June 2004 in fulfilment of contract. 20pp.

MacArthur, R. A., R. H. Johnston, and V. Geist. 1979. Factors influencing heart rate in free ranging bighorn sheep: a physiological approach to the study of wildlife harassment. Canadian Journal of Zoology 57:2010-2021.

Madsen, J. 1985. Impact of disturbance on field utilization of pink-footed geese in West Jutland, Denmark. Biological Conservation 33:53-64.

Meghan, W. F. 1972. Subsurface flow interception by a logging road in mountains of centeral Idaho. Pages 350-356 in Proceedings of a national symposia on watersheds in transition. American Water Resources Association, Bethesda, Maryland.

Merriam, G., M. Kozakiewicz, E. Tsuchiya, and K. Hawley. 1989. Barriers as boundaries for metapopulations and demes of Peromyscus leucopus in farm landscapes. Landscape Ecology 2: 227-236.

Moll, E. O. 1981. Ecology and Management of the Illinois mud turtle at Sand Ridge State Forest. Preliminary report to the Illinois Department of Conservation. 17 p.

NatureServe. 2003. Website (http://www.natureserve.org/), Providing the scientific basis for effective conservation. The Nature Conservancy.

Norling, B. S., S. H. Anderson, and W. A. Hubert. 1992 Roost sites used by Sandhill Crane staging along the Platte River, Nebraska. Great Basin Naturalist 52:253-261.

Oberts, G. L. 1986. Pollutants associated with sand and silt applied to roads in Minnesota. Water Resources Bulletin 22:479-483.

Paruk, J. D. 1987. Habitat utilization by Bald Eagles wintering along the Mississippi River (USA). Transactions of the Illinois State Academy of Science 80:333-342.

Philips, C. A., R. A. Brandon, and E. O. Moll. 1999. Field guid to amphibians and reptiles of Illinois. Illinois Natural History Survey, Manual 8. 300pp. Champaign, IL.

Reh, W., and A. Seitz. 1990. The influence of land use on the genetic structure of populations of the common frog *Rana temporaria*. Biological Conservation 54:239-249.

Richard, J., and J. E. Heitzman. 1987. Butterflies and moths of Missouri. Missouri Department of Conservation. Jefferson City, MO.

Ries, L., D. M. Debinski, and M. E. Wieland. 2001. Conservation value of roadside prairie restoration to butterfly communities. Conservation Biology 15:401-411.

Sarbello, W., and L. W. Jackson. 1985. Deer mortality in the town of Malone, N.Y. Fish and Game Journal 32:141-157.

Trombulak, S. C., and C. A. Frissell. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. Conservation Biology 14:18-30.

Van der Zande, A. N., W. J. Ter Keurs, and W. J. Van der Weijden. 1980. The impacts of road on the densities of four bird species in an open field habitat-evidence of a long-distance effects. Biological Conservation 18:299-321.

Wemple, B. C., J. A. Jones, and G. E. Grant. 1996. Channel network extension by logging roads in two basins, western Cascades, Oregon. Water Resources Bulletin 32:1195-1207.

Whitford, P. C. 1985. Bird behavior in response to the warmth of blacktop roads. Transactions of the Wisconsin Academy of Sciences Arts and Letters 73:135-143.

Appendix 2. Proposed seeding mix for planting along the backslope of the roadside ditch and created wetland. Seeding rate is calculated per acre.

1	= number of acres	
40	= seeds/square foot 40-60	
60	= % of to be forbs	
	Results below	
	1742400	= # of seed needed

Forbs		
Common name	Scientific name	Oz needed
Thimbleweed	*Anemone cylindrica*	1.375
Butterfly weed	*Asclepias tuberosa*	6.125
Whorled milkweed	*Asclepias verticillata*	1.625
Heath aster	*Aster ericoides*	0.25
Cream wild indigo	*Baptisia leucophaea*	0.25
Pale indian plantain	*Cacalia atriplicifolia*	1.5
Partridge pea	*Casia fasciculata*	16.125
Wild senna	*Cassia hebecarpa*	0.625
Lance leved coreopsis	*Coreopsis lanceolata*	1.75
Prairie coreopsis	*Coreopsis palmata*	1.25
Purple prairie clover	*Dalea purpureum*	1.875
Illinois tick trefoil	*Desmodium illinoensis*	2
Sessile-leaf tick trefoil	*Desmodium sessilifolium*	0.875
Sweet everlasting	*Gnaphalium obtusofolium*	0.125
Woodland sunflower	*Helianthus divaricata*	0.375
Rough sunflower	*Helianthus hirsutus*	0.25
Western sunflower	*Helianthus occidentalis*	0.125
Stiff sunflower	*Helianthus rigidus*	0.25
Early sunflower	*Heliopsis helianthoides*	0.375
Dotted St. John's Wort	*Hypericum punctatum*	0.125
Round headed bush clover	*Lespedeza capitata*	3.25
Rough blazing star	*Liatris aspera*	0.25
Wild bergamont	*Monarda fistulosa*	0.625
Spotted bee balm	*Monarda punctata*	0.375
Pale beardstongue	*Penstemon pallidus*	0.25
Hairy mountain mint	*Pycnanthemum pilosum*	0.25
Yellow coneflower	*Ratibida pinnata*	1.125
Black eyed susan	*Rudbeckia hirta*	0.5
Wild petunia	*Ruellia humilis*	0.125
Prairie ragwort	*Senicio plattensis*	0.125
Goats rue	*Tephrosia virginiana*	3.5
Ohio spiderwort	*Tradescantia ohiensis*	5.5
Bird foot's violet	*Viola pedata*	0.5
Prairie violet	*Viola pedatifida*	0.625
Arrowleaf violet	*Viola sagittata*	0.375
		54.625

Grasses and Sedges		
Common name	Scientific name	Oz needed
Side oats grama	*Bouteloua curtipendula*	37
Canada wild rye	*Elymus candensis*	6
Little bluestem	*Schyzachyrium scoparium*	22
		65