Please note that all location information has been removed from this document to protect the Blanding's turtle populations.

DRAFT

Blanding's Turtle Research at Weaver Dunes--An Overview of Fieldwork in 1999

A pilot study of the Blandings turtle population at Weaver Dunes was initiated in spring 1999 by Dr. Jeffrey W. Lang, Biology Department, University of North Dakota in Grand Forks. Jeff was instrumental in guiding a comprehensive field study of this species, threatened in Minnesota, at Camp Ripley and in Brainerd/Baxter during the previous three summers. The studies were carried out by two graduate students and an undergraduate assistant, Mark Hamernick, and were supported by the Minnesota DNR and DOT. The population status and critical habitats of the Blandings turtle and the management guidelines for the species were the subjects of detailed reports. This work was summarized at the Blandings Turtle Workshop, at the Bell Museum, U. of Minnesota, in May 1998. As part of the Workshop, there was a field trip to Weaver Dunes in the company of more than 60 turtle biologists and resource managers from across the US, and this field trip served as the impetus for Dr. Lang to initiate a study this past summer with the help of TNC staff members Garth Fuller and Nancy Lee Falkum.

Mark Hamernick has been supported as a research intern funded thru a small grants program reestablished by the Minnesota Chapter of the Nature Conservancy, for the summer, fall, and winter to monitor turtle movements. Mark will use this information as part of his MS program in Resource Analysis at nearby St. Mary's University in Winona. In addition, various volunteers have contributed many hours to the Weaver Dunes turtle project throughout the first season of fieldwork. Mike Pappas, a Rochester resident who initiated the original mark-recapture study of the turtles at Weaver Dunes in the late 1970s, and who has been a tireless advocate for preserving the turtles and their habitats during the past two decades, participated this past summer as an integral member of the research team. Mike continues to be an active collaborator with Dr. Lang on the on-going project. Gretchen Chesley Lang also volunteered her expertise as field assistant, photographer, and support staff. Jeff contributed his experience and time, and also provided most of the financial and logistic support for the project. The estimated direct cost of the project to date, not including compensation for time contributed and not including the component provided by the TNC, is $15,000. The Mn DNR provided scientific permits for the turtle work and use of the SNA.

The pilot study is exploratory, but a number of objectives were identified:

1) What habitats and associated corridors are utilized by individual turtles throughout the year at Weaver Dunes? How much do turtles move annually?
2) Are these habitats and avenues used by the different size-age classes of turtles in the population? Are there sex-specific usage and movement patterns?
3) How are the turtles affected by human activities? Is survival threatened?
4) Is the turtle population at Weaver Dunes viable? Is breeding successful? What is the survivorship of eggs, hatchlings, juveniles, and adults?
5) What is the approximate size of the turtle population? Is it isolated or is it contiguous with other populations?

Spring fieldwork was initiated in late March by Mike Pappas who located groups of turtles as they were emerging in small ponds and pools where they had overwintered. Turtles were active at the water surface as the ice melted around the margins of these wetlands, located near the Mississippi bottomlands and adjacent to the WMA and the old channel of the River. By mid April, 14 adult turtles were radio tagged in order to follow spring movements, and these were also fitted with temperature loggers that recorded ambient temperatures near the turtles. In early May, an additional 8 turtles, including several juveniles and sub adults, were telemetered to provide additional information on pre-nesting movements.

In mid-May, trapping with aquatic hoop traps was begun, and produced within several weeks, over 200 turtles. All turtles captured by net were permanently marked and released with visual tags for recognition, if recovered during the nesting period or afterwards. Female turtles were also routinely x-rayed to determine if the turtle was gravid, and to monitor the number of eggs per clutch. Trapping was suspended in late May, to avoid disturbing turtles preparing to nest. Trapping was attempted intermittently throughout July and August, but was markedly unsuccessful relative to efforts earlier in the season. Fewer than 25 turtles were captured in traps during the remainder of the active season.

During nesting (early to mid June), field work focused on 1) monitoring nesting movements of females across Cty Rd and Road near the , 2) following the nesting movements of radio-tagged females from various spring wetlands surrounding the dunes, and 3) locating nesting females in the centrally-located dune fields north and south of as well as other properties, and following these females back to their wetlands when nesting was completed. Efforts to accomplish these objectives were largely successful. Most of the radio-tagged females (~15 individuals) were located during nesting and important details of nesting behavior and movements noted. Movements of nesting females to and from the dunes were tracked in detail on a daily basis in the vicinity of the property near Cty Rd and Road. Up to 50 animals per hour were observed crossing stretches of road adjacent to the tract on peak days during the 10-12 day nesting period. And finally, more than 20 females not previously captured earlier in the season were located nesting in and around the central dunes, and all were marked and /or radio-tagged before they returned to wetlands after nesting.

The majority of nests were protected to permit an accurate assessment of how nest and other reproductive parameters varied with individual females, as a function of size and/or age. During this nesting season, over 500 viable eggs produced more than 450 hatchlings which were marked and released. Initial observations indicated very high levels of egg predation at unprotected nests, primarily by mammals, especially skunks. Preliminary surveys, including turtles

observed nesting (~40 nests) as well as predated nests (~60 nests), indicate that turtles nest throughout the entire dune complex, usually singly or closely spaced groups of 2-3 nearby nests. Turtles often nested in disturbed sites, including soybean fields and plowed areas, as well as along roadsides, near shrubs and/or woods, as well as out in cleared areas. Nests were usually located in sparse ground vegetation, at high points in the dune terrain. Females were observed to nest at night, typically at dusk or after dark, following movements to nesting areas over a period of 1-8 days in the late afternoon and early evening as weather permitted.

Our nesting results indicate that turtles inhabiting the wetlands to the east alon , to the southeast , to the south , to the southwest, west, and northwest bordering the , all move inland into the upland dune fields closest to their wetland of origin. Overland movements ranged from 100-2500 m in most instances, and typically traversed boundaries of private and public lands. For example, one turtle emerged from emergent wetland i in the Mississippi bottomlands, crossed private property before nesti borderir . Another females moved fro wetland across two private properties, before nesting in a third private property. Other females moved across a roa .

Following nesting (late June-September), radio-tagged turtles (a total of 41) were monitored once or twice weekly to determine activity and movement patterns during the remainder of the summer. Aside from specific movements associated with nesting, most telemetered turtles have displayed a wide variety of movement patterns during the active season. The majority of juveniles have remained near their wetland of capture, or moved to an adjacent wetland nearby. On the other hand, males dispersed rapidly over long distances from overwintering sites to large wetlands where each has remained in the general vicinity, averaging smaller movements of <250 m/day. Females have displayed the widest variety of movements, with some moving short distances to nest and then returning to or near their overwintering wetland, while others moved numerous times, in various directions over variable distances. For example, a female which overwintered in a shallow pond has remained there all summer, only moving once onto land (<200m) on a single evening to lay her eggs close by. On the other hand, another female made several long movements (>1500m) prior to nesting, then made a lengthy, weekly trip (>1000m) into a cultivated field to nest, and remained on land for several days after nesting before returning via the same route to the previous wetland.

A total of 380 Blandings turtles, including 256 females, 94 males, and 30 juveniles, were captured during the 1999 field season. Of these, 62 (50 females and 12 males) were recaptures from 1976-1987, for an overall recapture rate of 23% females (50/221) and 15% males (12/82). In several areas where turtles had been

marked earlier, 16-50% of the adult females and 12-20% of the adult males that were captured this season had been marked previously. The majority of these long term recaptures exhibited negligible growth, and were located very close to their original capture locations where they had been released 12-23 years earlier. Recaptured females typically were gravid, and produced viable eggs which successfully hatched. The estimated age of these recaptured adults is 35 to 50 years old as of this season, and these findings emphasize that individuals in this population are long-lived, presumably reproducing annually for 20 years or more.

Of critical importance, with respect to the capture data, are the numerous juveniles of various age cohorts captured during the current season. A number of these were outfitted with radios which allowed close monitoring during the summer, fall, and overwintering period. These individuals appear to have habitat requirements which are very similar to those of adults inhabiting the same wetlands. Additionally, the presence of a relatively large sample of juveniles (~30 individuals) among those captured suggests that there is at present successful and continuous recruitment of juveniles into the adult population. We are also developing techniques for sexing juveniles, determining age-size at sexual maturity, and for monitoring growth between recaptures of marked individuals, especially of younger animals with well-defined growth annuli on the scutes.

Overall, our studies on the Blandings turtles at Weaver Dunes indicate:

1) The turtles utilize a variety of habitats throughout the year, including seasonal wetlands, semi-permanent marshes and ponds, and adjacent uplands, primarily rolling naturally vegetated dunes.

2) Individual turtles travel seasonally, and most utilize complex mosaics of private and public lands, including farmland, woodland, and wetlands owned privately, TNC protected areas, state WMAs and SNAs, and federal bottomlands habitats.

3) Telemetered turtles moved with familiarity across wetlands and uplands, sometimes over distances of 1-2 km, in days and weeks. Long distance, upland straight line movements were typical of nesting females, and extended over days. Routes often included brief stops or extended stays in seasonal wetlands. Most monitored turtles returned to the same areas for overwintering that were used the previous season, despite extended residencies elsewhere through the summer.

4) Nesting occurs throughout the entire dune topography, including areas extensively altered by human activities as well as those with natural vegetation characteristic of the sand prairie. Travel routes involve overland movements by females for 1-8 days, during which time females reside on land and shelter in available vegetation scattered throughout the dunes.

5) Nest predation is judged to be very high, possibly 80-90% or higher. The principal predators are medium sized mammals, including raccoons, foxes, and especially skunks.

6) Despite high egg predation on most nests within days of laying, there is evidence of successful recruitment of hatchlings. This season, numerous hatchlings were observed moving across roads in late August, throughout September, and some were found along pond margins in October.

7) The number of juveniles captured by hand and in traps of various age-size classes suggests that juveniles of various size-age classes are surviving, and eventually being incorporated into the adult breeding population.

8) Capture records indicated a substantial recovery (20-25%) of adults previously marked in 1976-1987. Many of these recaptures showed negligible growth, but are continuing to reproduce successfully, and were found close to their release sites. These data suggest that the adult population is "healthy," and likely to be stable or increasing.

9) In particular, the Dubray property is clearly a critical corridor for the movements of nesting turtles in early to mid June, and later in the season, for the movements of hatchlings to wetlands to the west. In addition, the uplands provide many suitable nesting sites in a variety of settings. Management strategies for this property and adjacent areas should incorporate provisions for the unimpeded travel of turtles of various sizes during these periods of increased movements, as well as possible ways to control mammalian egg predators to minimize predation on the eggs and on the hatchlings.

10) Specific recommendations for enhancing and protecting the population of Blanding turtles at Weaver Dunes should focus on ways to reduce road-induced injury and mortality along , and to a lesser extent along . In addition, measures that would result in direct protection to reduce the likelihood of unwarranted collection and removal of turtles from the area should be considered in future management strategies. Fortunately, at present, neither threat seems to be responsible for the loss of signficant numbers of turtles.

11) With additional information gained during the next field season (in 2000), it may be possible to highlight additional habitats and/or corridors that are important to the Weaver Dunes turtle population, but not currently receiving land protection. With these data in hand, it may be possible to make further recommendations for habitat acquistion and/or protection.