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Field Research
1st and 2nd hour
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Red Fox Telemetry

Introduction

As the year rolled along and time was flying, a research project was rolling along too, the Radio Telemetry of a Red Fox. Radio telemetry huh?? What is that you ask, well radio telemetry is a way of tracking an animal that is collard using radio signals. Radio signals huh?? What are radio signals? A radio signal that we receive from the collar on the fox, we use a radio transmitter to get that signal, with a certain frequency that the transmitter will pick up. That is how we get a signal on the transmitted fox. That is where my question for the project comes in. What is the home range of a Red Fox

I got very interested with this project right from the start. The first time I went with Andy to see if we could pick up a signal of his coyote, I knew that was what I wanted to do. I wanted to get a coyote that was located close to Augusta that I could collect my own data on. With some bad luck, a coyote was killed and an unused collar was set aside, for further pursue. That is when my project started.

Background

Let me get you introduced to the red fox with further information.
Red foxes are 3-3.5 feet in length, trim, long-legged, and built for speed. Adults usually weigh 9-12 pounds, but appear much larger due to their thick, full coat of fur. The 15-inch tail is bushy, almost cylindrical in shape, and characteristically is tipped with white. A long snout, large, erect ears, and yellow eyes with 7 narrow pupils give the fox an appearance, which has undoubtedly contributed to its reputation for cunning and craftiness.

Red foxes vary in color from deep, russet red to sandy blonde. The legs, feet, and back of the ears are usually black. Underparts such as the chin, throat, and belly are white. Black, silver, cross and other color phases occasionally appear in Wisconsin red foxes. Silver foxes have black hair tipped with white. Cross foxes bear a dark brown strip that extends from the head down the center of the back, and is transected by another strip which reaches from shoulder to shoulder. One or more pups in a litter may exhibit a particular phase, or several color phases may appear in the same litter.

Male and female foxes begin to travel together in pairs during mid-December, but often do not breed until mid-January. Juveniles are sexually mature at about 10 months of age, and breed 3-4 weeks after adults become sexually active: Approximately 89% of the adult females and 59% of the juvenile females produce a litter. The red fox's gestation period is 53 days in length. An average litter consists of 5-6 pups, which are born during mid-March. Abandoned burrows constructed by badgers or woodchucks are often enlarged and used by foxes as natal dens. Some foxes give birth to litters in bush piles or rock piles. A female may move her litter to an alternate den site (usually located within 1 mile of the current denning area) if she is disturbed. Fence rows, pastures, farm fields, or woodlots with loose soils are preferred denning habitats. Red fox pups are 6-8 inches long at birth, and weigh 3.5-4.0 ounces. The pups' eyes open when they are about 9 days old. By the time that young foxes are weaned at 8-10 weeks of age, they weigh approximately 3.5 pounds.

Both parents help to feed the pups when they are old enough to eat solid food. At 3 months

of age, young foxes begin to accompany their parents on hunting expeditions. Family ties start to diminish when juveniles are 4-5 months old, but they do not leave their parents' home range until they are 7-8 months of age.

Red foxes eat a wide variety of foods, but show a preference for small and mid-sized mammals such as mice and cottontails. Plants and insects are often eaten during spring and summer. Depending upon the time of year, up to 72% of the total volume of a fox's diet is composed of cottontail rabbits, making them the single most important food item of Wisconsin foxes. Red foxes also consume shrews, squirrels, songbirds, pheasants, ducks, grasshoppers, garbage, carrion, fruit, grass, grain, and other items. Well developed senses of sight, smell, and hearing make the red fox an efficient predator.

Scientific evidence indicates that a red fox can locate a rustling sound within 1 degree of its true location, and can hear a mouse squeal at 150 feet. A variety of hunting styles are used to capture different types of prey. When hunting mice, foxes stalk within pouncing distance, lunge 2-6 feet, and try to pin their quarry with their front feet. If its prey escapes, the fox rears up on its hind legs, turns in all directions searching for the mouse, and makes another pounce if the mouse is spotted. Hunting foxes occasionally kill ground nesting birds such as pheasants. Rabbits are generally stalked, then run down in a high speed chase.

Foxes may kill more than they can eat at the moment. Less preferred foods are then cached under loose dirt, leaves, or snow for future use. Foxes often mark their cache sites by urinating on a nearby object. By interpreting various combinations of food and urine scents at cache sites, foxes can avoid investigating unproductive spots, thereby increasing their foraging efficiency.
Habitat quality and food availability influence the size of a red fox's home range. In ecologically diverse habitats, red foxes may live in an area 142-400 acres in size. Where less diverse habitat exists, such as extensive agricultural areas, red foxes may require as much as 2-3 square miles to fulfill their needs. Geographic features such as ridges, streams, fencerows, and woodlots may influence the shape of a fox's home range.

Red fox families maintain well defined, non-overlapping territories. Threat displays and chases allow resident foxes to defend their territory from intruders without serious fights. For example, in a lateral threat display, a fox stands broadside to its opponent, arches its back with hair erect, and charges broadside at the other fox in a stiff-legged gait. Several related foxes may work together to chase and harass an intruder until it leaves. Like dogs, foxes also mark their territory by urinating on rocks, grass, and other low objects to ward off strangers.

Red foxes are most active at night. They begin foraging approximately 2 hours prior to sunset, and may continue until 4 hours following sunrise. Peak activity generally occurs within 2-3 hours of sunset. Daylight activity increases during winter when food becomes scarce. Areas with a great variety of plants and animals are preferred for hunting. Individual foxes range extensively throughout the family territory each night. Males move an average of 9 miles per night; females travel about 6 miles. Foxes usually spend the daytime resting in forests, ravines, or woodlots. Dens are rarely used for shelter' except during the litter rearing period. Red foxes prefer to rest in the open, even during winter, when they curl up and use their long, bushy tail to protect their face and underparts from the cold. Juvenile foxes leave, or disperse, from their parents' home range during October or November. Males are more likely to disperse, and travel greater distances than females. Wisconsin research indicates that 88% of juvenile males and 58% of juvenile females disperse from where they were born. Juvenile males move an average of 20 miles when dispersing; females move close to 17 miles. One red fox tagged in southern Wisconsin moved 245 straight-line miles before it was recaptured in Indiana.

Hunting and trapping account for up to 80% of annual mortality to Wisconsin fox populations. Trapping is a major mortality factor from October to December. During January and February, when foxes become more visible due to the snowcover, hunting predominates as a source of mortality. Roadkills are responsible for a large share of mortality to juveniles during the post-denning and dispersal periods.

Wisconsin foxes are susceptible to a variety of diseases and parasites. Rabies, leptospirosis, La Crosse encephalitis, canine distemper, and infectious canine hepatitis are of particular concern because humans or domestic pets can become infected. Mange was responsible for considerable losses to Wisconsin fox populations during 1967-'68. Most of this information on the fox was taken from ***http://www.jsonline.com/outdoors/wildlife/redfox.stm.***

Now that you know a little more about the red fox, thanks to jsonline and of corse me. I can start to explain how and what was used to conduct this project, you know a little about the transmitters, but this next selection will further your knowledge even more.

Methods/Materials

To start this project off, we needed to first catch a coyote, we had a professional trapper help us out with the supplies that we needed. The supplies that we needed from him, was pretty much all his trapping materials, he provided us with the traps that we used which were coil traps also known as leg holds. He was also kind enough to let us use his home made scents and baits. Once we had all the materials, we were set. I learned a little about trapping, safety and precautions. Which is a must in the trapping world, I later found out. We started in late fall and continued trapping until late winter. One cold morning we finally caught what we were finally waiting for, well kind of what we were looking for. We hadn't had any luck with coyotes, so we decided that we were going to collar a fox if we got one. Well on this cold morning that is what we caught, a Red Fox.

Once the Fox was captured, Andy Rosentreter and my Grandpa took the collar and got the fox contained with a neck hold, and slipped and cut the collar to fit around the female fox's neck. They took the hold off and set her free.

Now the data collecting begins.

The next part of the research began, data taking. I then received the radio transmitter and antenna. Like I said in the beginning, the antenna detects the collar on the fox, and sends a signal to the radio, which then allows that data taker to get a reading on the fox. By taking the weakest signal at two points in 360 spin, and in the middle of that is where they fox should be located

Data

The next part is writing down the data. We had received aerial maps and data sheets to write down where it's approximate location were. We went out almost every day and gathered data. `(If you take a look at my Powerpoint it is explained in there with pictures, it may give you a better idea of the different tests that were ran)

Then we took it back to school, and then we put our information in to a program which is call Arc View. Which is a data analyst program, where you can run different tests on the data entered. One of the tests that you can run is the Rang Probability, which shows the main areas of the fox, and the lesser areas of the fox, where it was transmitted. It gives the acreage of the fox's home range.

The core range test, shows it's main locations that it was transmitted at. It's core activity ranges, from the most locations to the least locations. I also ran a test with that in which I put the

types of habitat behind the core locations and found out what type of habitat that the red fox was most likely to be located in. (Refer to map 1)

Another test that I ran was the Range Fidelity test. This test takes one data point from the data and does a random walk on the map. This shows if the data is territorial or not. (Refer to map 2)

Pie Graph 6 attached shows the percentages of the habit that the fox was located in.

The last test that I ran was the Harmonic mean test. This gives you the areas where it is most likely to be found and where it will be most active. (Refer to map 3,4 and 5)

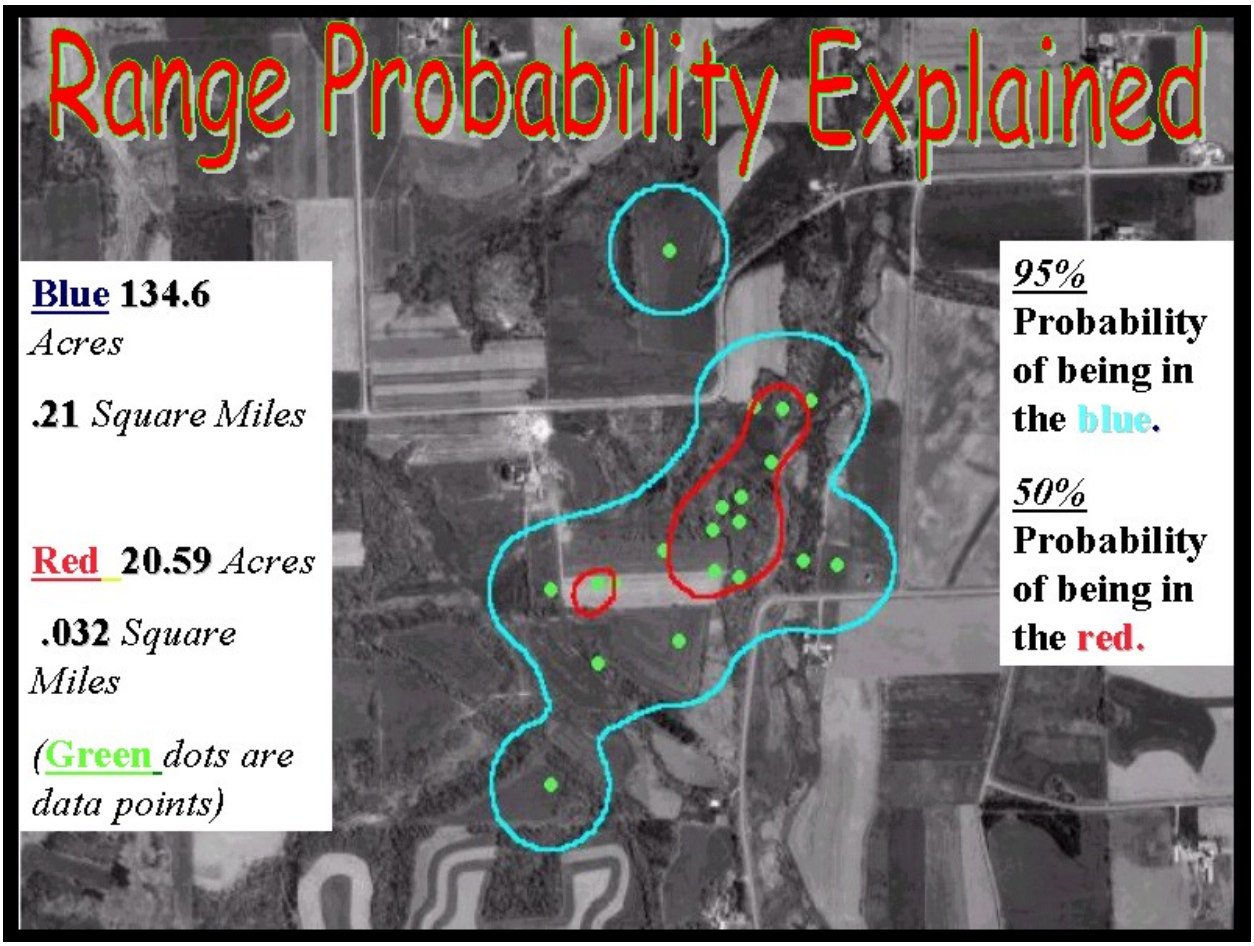
Conclusion

In doing my background, I learned that a fox usually has a home range of 142 to 400 acres. The fox that I have on collar, had a home range of 132 which is relatively close to what they had found out in there findings.

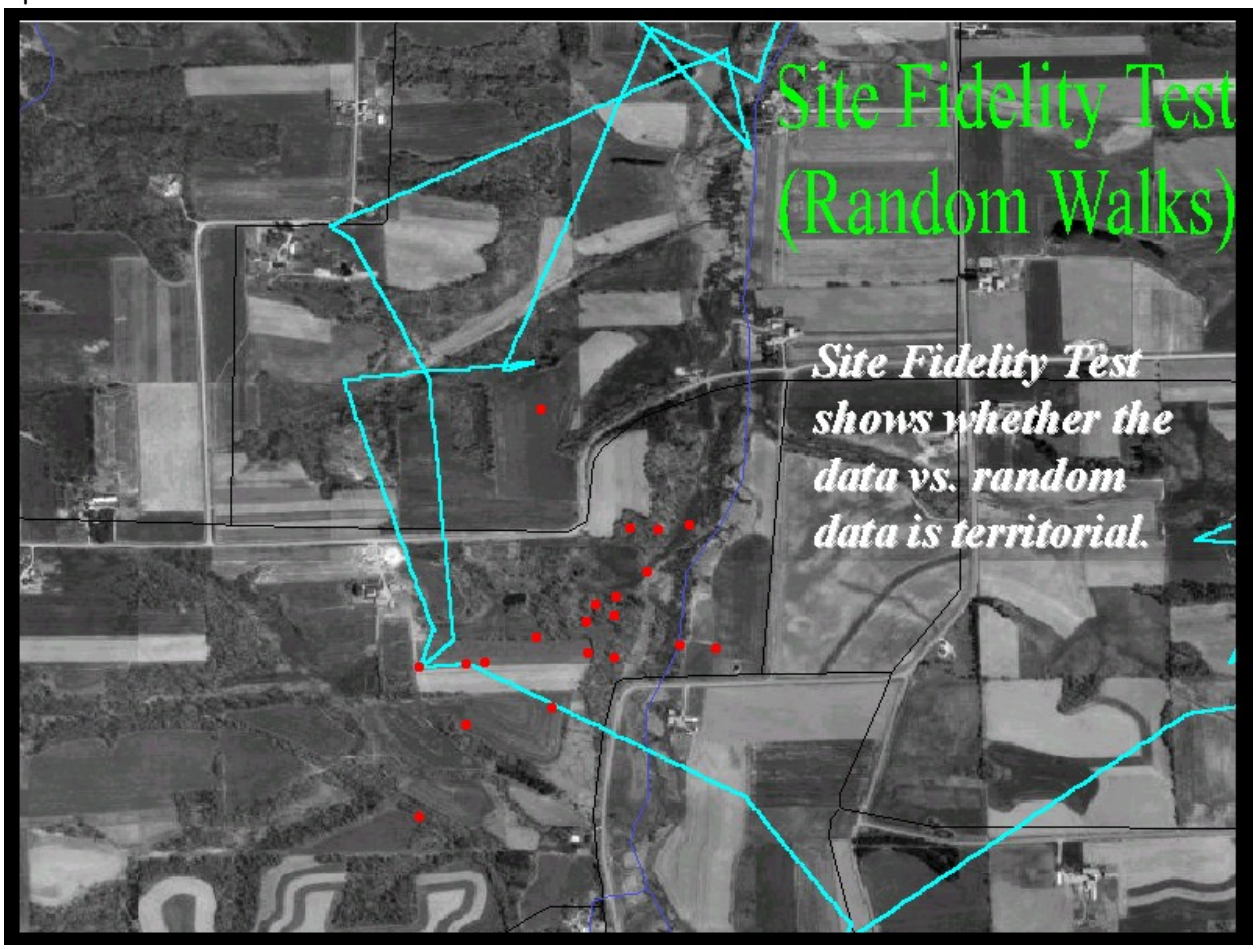
In doing this research project, I have learned a lot about territorial mapping and such, with arc view. It was to my reasoning that I thought why the fox staying in a certain area after the data was analyzed, is because it was female and that it probably had a den (which was never found) and a litter of kits. If you take a look in my Powerpoint you will be able to see its distribution over an area that was it's home range.

Even though we had a rough time with the process of catching a coyote, we uncounted many fun times that came with it, catching a variety of different animals was one of them, we caught almost anything and everything. Except the coyote. But now that we have to fox it was interesting to see the different patterns between the fox and the coyote.

I also plan to keep up with the project over the summer. It will be cool to see if the female will move more now that her kits will be older and able to take care of them selves. I would like to continue and see how the summer data would counteract with the winter/spring data. It would be interesting to know how the territorial range expands or stays the same. Or see different patterns in the different seasons.


Range Probability Explained
Blue 134.6 Acres
.21 Square Miles
Red 20.59 Acres
.032 Square Miles
(Green dots are data points)
95% Probability of being in the blue.
50% Probability of being in the red.

Map 1


Site Fidelity Test (Random Walks)
Site Fidelity Test shows whether the data vs. random data is territorial.

Harmonic Mean Description

In the core activity areas of the Red Fox, it's core areas out of six, were found in Ag. Forage crops.

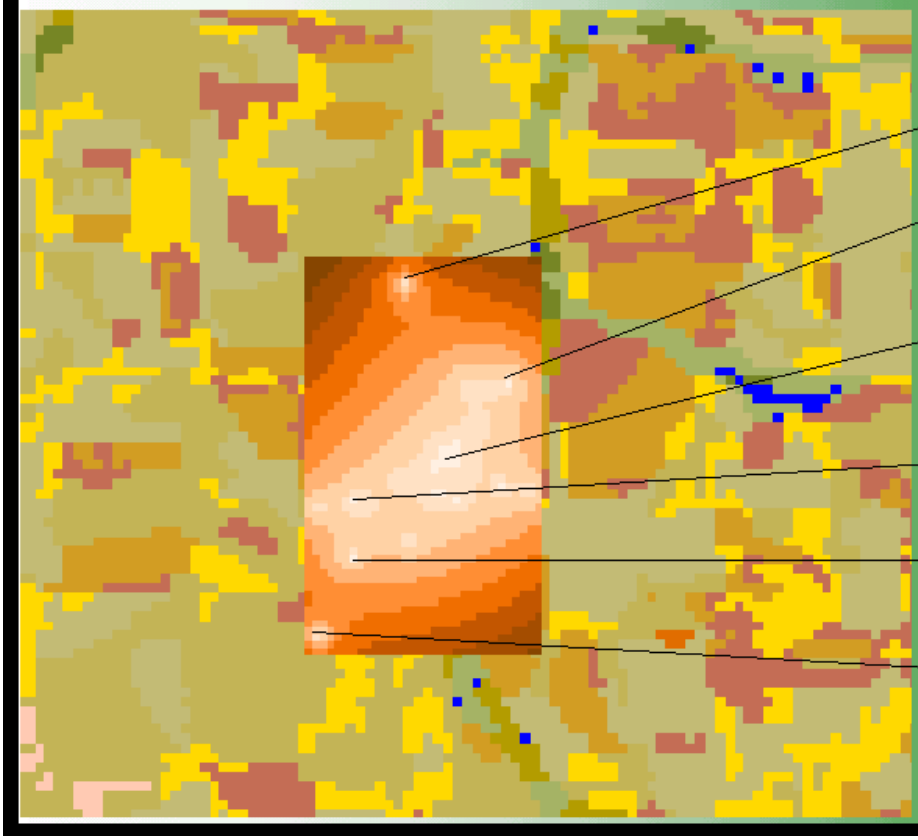
Forage crop areas

Mixed Forest

Grassland

Map 2
Map 3
Map 4

Habitat Types of Harmonic Mean



Ag forage crops

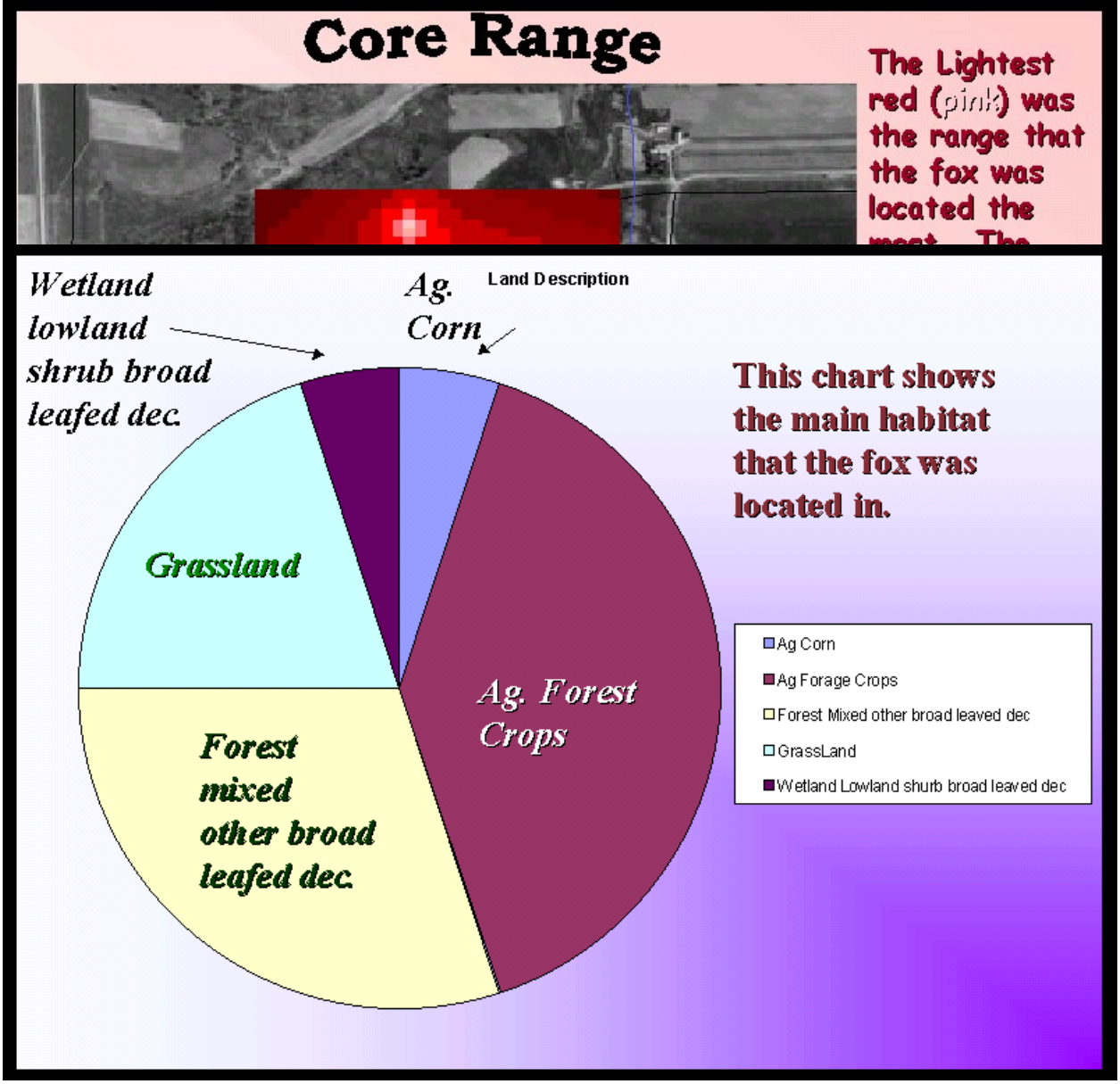
Forest mixed

Ag forage crops

Ag Forage Crops

Grassland

Forest mixed


Core Range
The Lightest red (pink) was the range that the fox was located the
Land Description
Wetland lowland shrub broad leafed dec.
Ag. Corn
This chart shows the main habitat that the fox was located in.
Grassland
Ag. Forest Crops
Forest mixed other broad leafed dec.
Ag Corn
Ag Forage Crops
Forest Mixed other broad leaved dec
GrassLand
Wetland Lowland shurb broad leaved dec

Map 6