

Home Range of the *Esox lucius*  
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## **Introduction**

The North American Northern Pike, *Esox Lucius*, occurs in clear vegetated lakes, quiet pools and backwaters of creeks and small to large rivers. *E. Lucius* is usually solitary and highly territorial and is distinguished by its long, flat, 'duck-bill' snout, and the rearward position of its dorsal and anal fins. *E. lucius* is a highly popular and aggressive gamefish, the Northern Pike is one of the most sought-after species. Pike are insatiable eaters, and are easily caught due to their set of razor-sharp teeth and strong bite (fishbase.org 2010).

The *E. lucius* choose to hunt their prey using a “hunt and wait” style of predation. This will usually contribute to their relatively inactive lifestyle, where they stay in a fairly small home range and remain fairly inactive. However, *E. lucius* has been documented to be more active under low light conditions.

The activity of *E. lucius* will be monitored at various times throughout two weeks at random times using activity/mortality transmitters. With these it will be able to tell which times throughout the day the subjects are most or least active. The signal will be a very fast chirp for mortality, slow for inactivity, and irregular for activity.

## **Materials and Methods**

Four activity/mortality transmitters will be needed to complete this study. To receive the signal a four element Yagi antenna and standard receiver will be used. For the data analysis, Arcview 9 was used. Other equipment needed was a GPS, Weir nets, a boat, data sheets to record observations, depth finder, and a conductivity meter.

The Northern Pike subjects were captured using the Weir nets that were set up at various points in Lake Itasca. The points are indicated in the central locations of their convex polygons in figures two through five. The Northern Pike were retrieved from their Weir nets and placed in a storage facility.

The Northern Pike then had activity/mortality transmitters surgically implanted in the ventral side of the body. The subjects were anesthetized using a diluted solution containing natural lake water and 250 mg/ L ms-222. After the subject had the transmitter securely in place and was back in stable condition, the subject was released into the general area where it was captured.

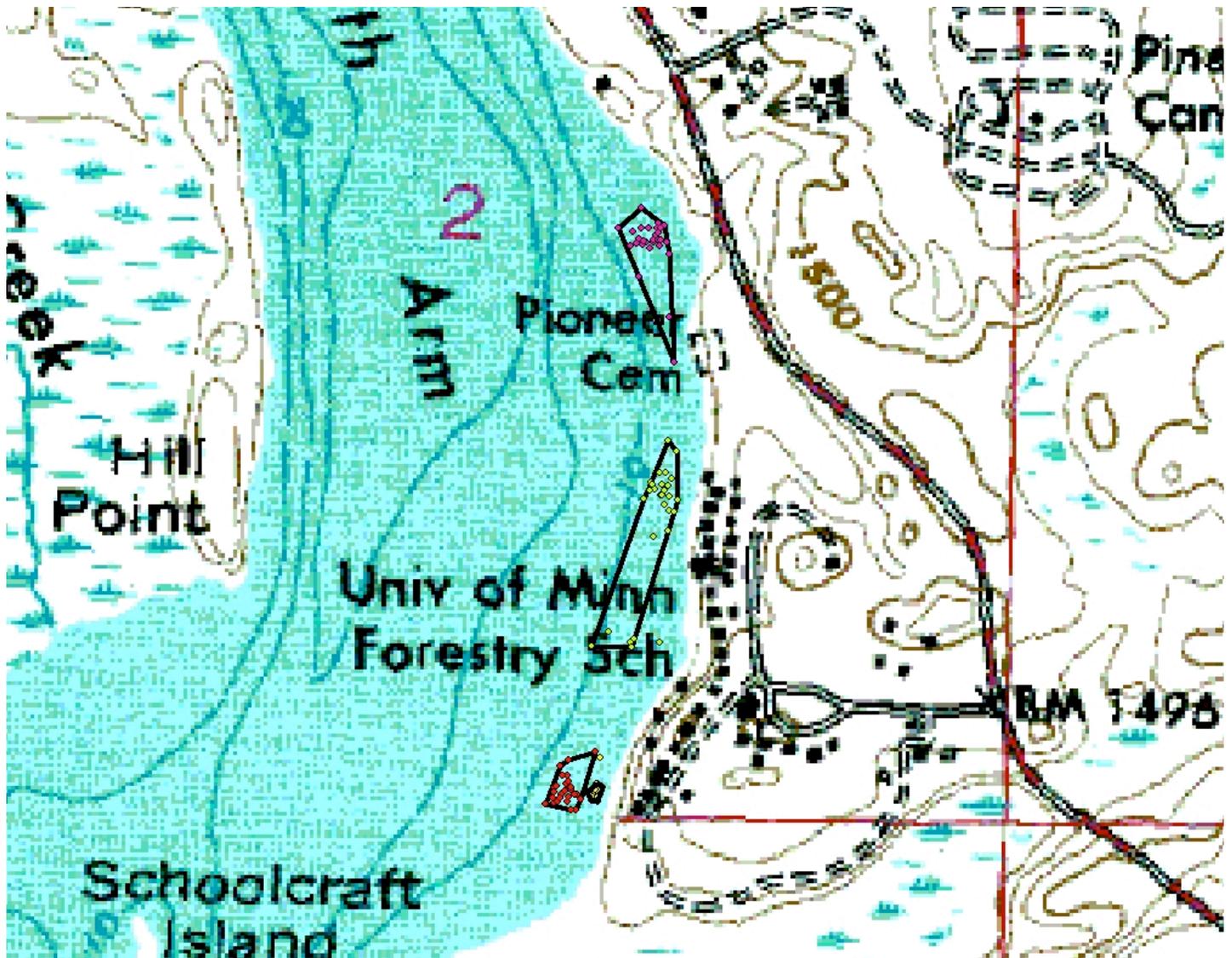
Using a four-element Yagi antenna and a receiver, the subjects were located twice a day with one twenty-four monitoring session. The standard strategy for locating subjects using a Yagi antenna was used. Based on the volume of the signal received on the transmitter would correlate with the general direction heading. When directionality was lost and the “chirping” of the receiver was the same, the coordinates were recording from the GPS.

Standard error of the average locations as well as with the error of the GPS were calculated and allotted in the generation of a convex polygon on the maps. This would represent the general home range of each of the subjects. Lastly using the Kernel, the density of the overall locations would also be plotted to see we portions of the readings were outliers and further demonstrate a closer and more accurate home range.

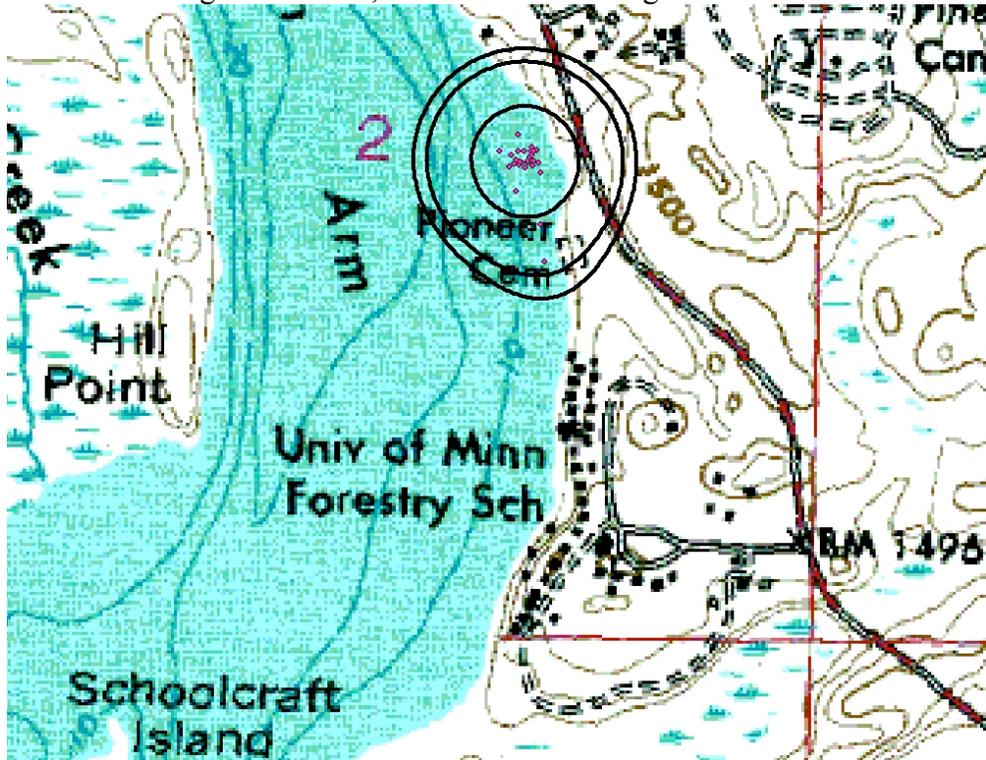
## Results

Pike T.#(MHz)	Weight (g)	Length (cm)	Home Range Area (m <sup>2</sup> )	Vegetation*	Ave. Depth (m)
165.671	705	50	6567	HSBR, WR	1.05
165.693	590	48.7	11657	HSBR, WR	1.22
165.621	648	50.4	2784	YL, WR	1.13
165.711	756	53.5	278.5	YL, WR	0.61

**Table 1:** Data from the weight and length of the subjects, home range, vegetation and depth when located.



**Figure 1:** .671 MHz home range = 6567 m<sup>2</sup>, .693 MHz home range = 11657 m<sup>2</sup>, .621 MHz home range = 2784 m<sup>2</sup>, .711 MHz home range = 278.5 m<sup>2</sup>.



**Figure 2:** Kernel analysis for subject 165.671

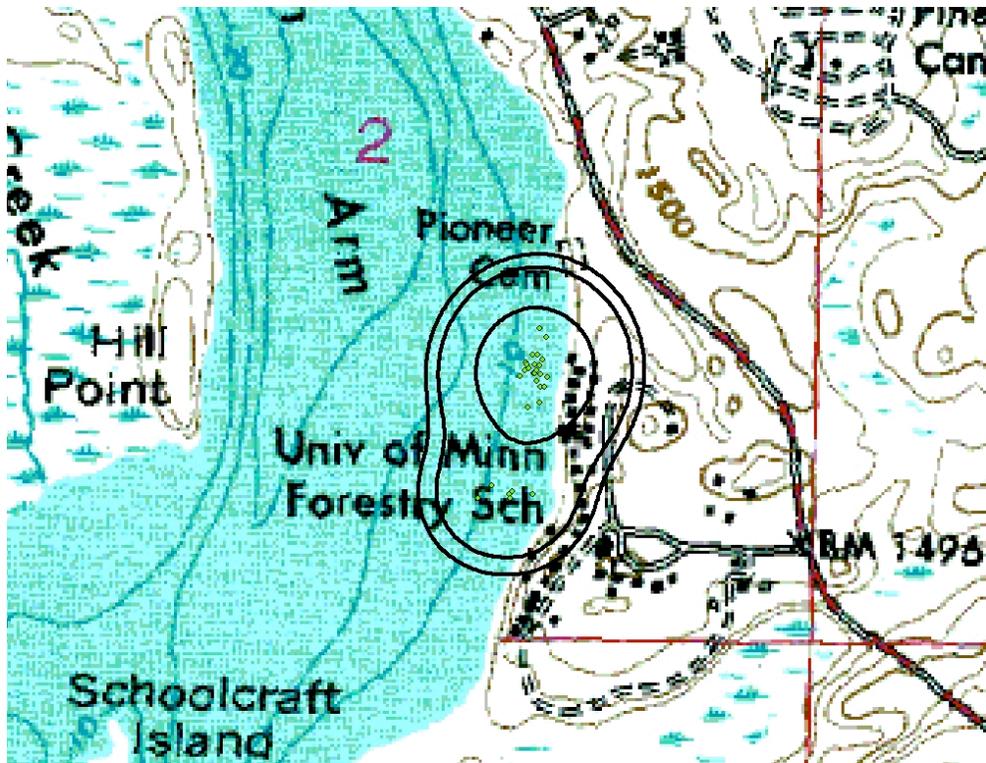


Figure 3: Kernel analysis for subject 165.693

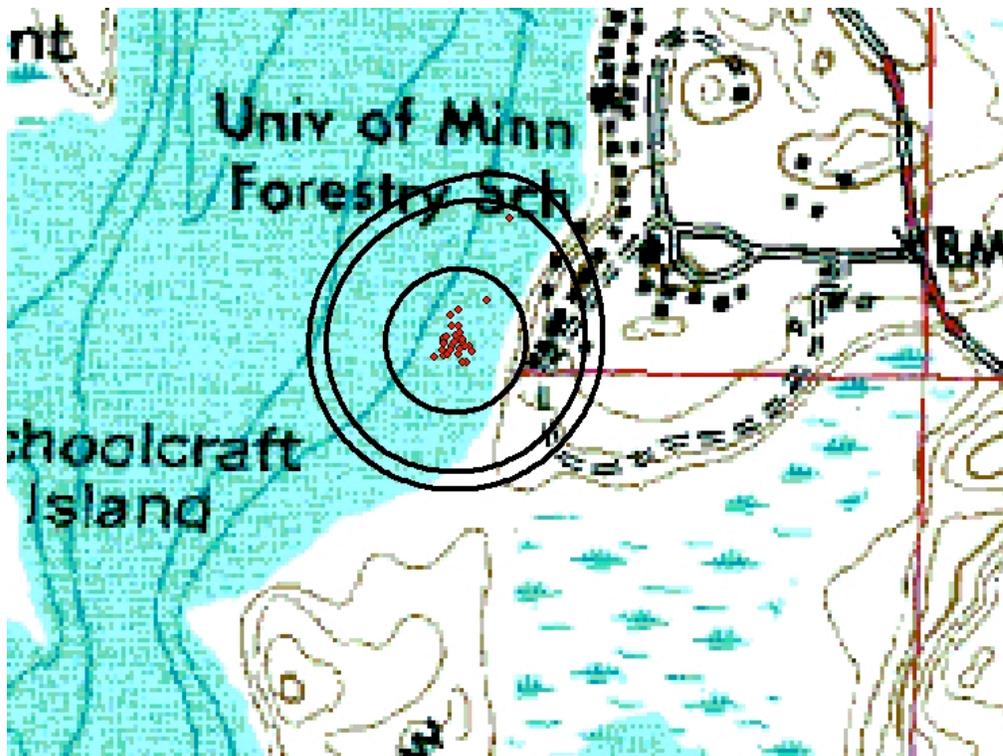
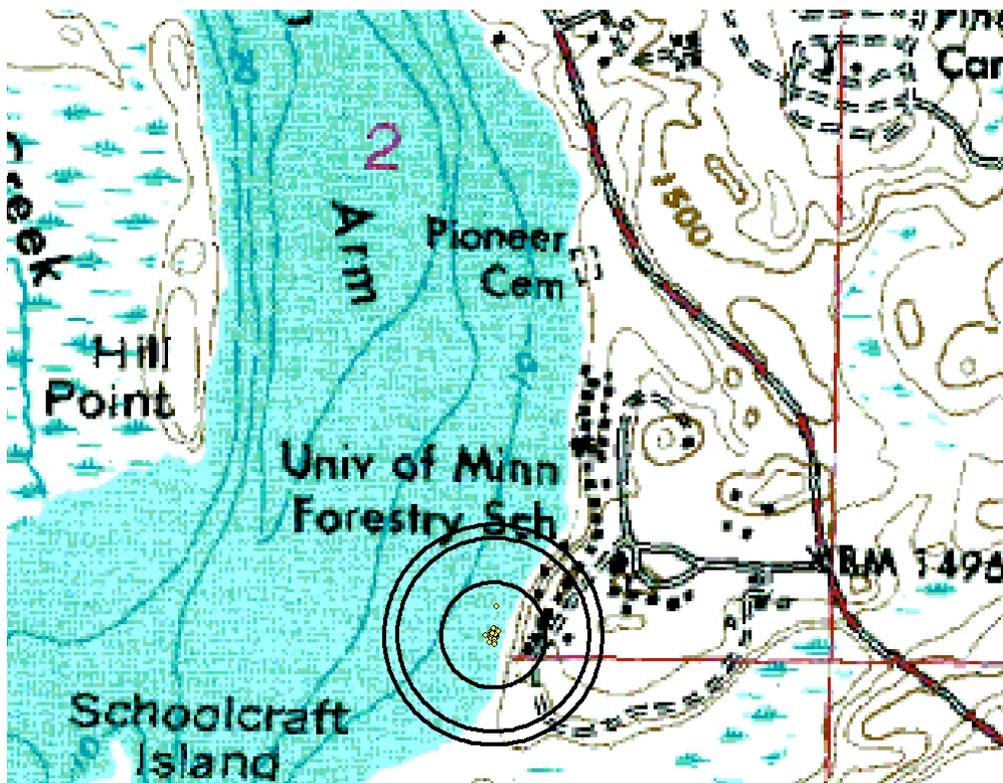


Figure 4: Kernel analysis for subject 165.621



**Figure 5:** Kernel analysis for subject 165.711

### **Discussion**

The overall home range, including the standard error as well as the GPS error, calculated to be plus or minus 16.21 m. This is a reasonable amount considering the size of the home range calculated for the subjects, except for 165.711 who had a considerably smaller range.

According to the data on table one, there was a small correlation between the size and mass of the fish, and the distance traveled. The smallest subject (165.693) had the largest home range by a considerable margin, while the largest subject had the smallest home range. The second largest had the second largest home range, while the second smallest had the second smallest home range.

The study originally started with six subjects. One transmitter seemed to be faulty from the beginning while the other just disappeared. This could be due to multiple reasons such as predation, a major migration to where the signal would have been picked up, or lastly just a failure with the equipment.

The four subjects left in the study stayed fairly close to the spots in which they were released. There was no significant correlation with fish size and depth either. The subjects stayed at a fairly average range of depth according to table one.

Structurally complex environments strongly affect the behaviors and foraging efficiencies of predators and prey (Elkov 1995). There are many possibilities as to why each subject would choose to stay fairly inactive in one location or move from place to place. There could be a more bountiful food supply in a shallower area, which is what the case is believed to be for subject 165.711. Also temperature and light and vegetation are potential factors that could affect the subjects behavior.

## Bibliography

1. [www.fishbase.org](http://www.fishbase.org) *Esox lucius* (TSN 162139). [Integrated Taxonomic Information System](#). Retrieved on 8 December 2004.
2. Elkov, Peter. 1995 Effects of habitat complexity and prey abundance on the spatial and temporal distributions of perch (*Perca fluviatilis*) and pike (*Esox lucius*). Department of Animal Ecology, Umeå University.