

START

0011596

4

MOVEMENT PATTERNS OF COYOTES IN SOUTH-CENTRAL WASHINGTON
AS DETERMINED BY RADIO TELEMETRY

By

JOSEPH TUCKER SPRINGER



A dissertation submitted in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

WASHINGTON STATE UNIVERSITY
Department of Zoology

1977

Work performed under contract EY-76-C-06-1830 with the U.S. Energy Research
and Development Administration.

The author was a NORCUS Appointee during 1975 and 1976 assigned to the
Ecosystems Department Pacific Northwest Laboratories. 6879 6

91120501598

MOVEMENT PATTERNS OF COYOTES IN SOUTH-CENTRAL WASHINGTON

AS DETERMINED BY RADIO TELEMETRY

ABSTRACT

By Joseph Tucker Springer, Ph.D.
Washington State University, 1977

Chairman: Vincent Schultz

This study was conducted between October, 1974, and June, 1976, on the United States Energy Research and Development Administration (ERDA) Hanford Reservation. The Hanford Reservation is in south-central Washington State, a shrub steppe area typified by sagebrush and grasses.

The first part of the study was to investigate sources of bias and sampling error in radio triangulation. Data were collected using transmitters at known locations and at known distances from the receiver sites. Statistical analyses were made of the data. Bias was considered to be the difference between the average reading and the true value ($\bar{x} - \mu$), and sampling error was considered in terms of pooled standard deviation (s_{pooled}). The most obvious difference between two treatments was seen when the two methods of obtaining readings were compared. Other factors examined were: observers, days, receivers, distance between transmitter and receiver, and transmitters. None of these other factors had significantly different biases, but there were significant transmitter-distance and transmitter-observer interactions. It was shown that error arcs could be drawn about averaged readings, and that the intersection of two or more error arcs formed an error polygon. Because each error arc has a known probability of

91120501599

containing a radio-equipped animal, the probability that the animal is within the intersection of those arcs is the product of the individual probabilities.

During this study 10 coyotes were caught and fitted with radio transmitters. Coyotes were located once each day when possible over different lengths of time (from one to fifteen months). It was found that the distribution of location points did not fit the conventional concept of home range. Nearly 83% of all locations were concentrated in less than 7% of the total "home range." The term "home range" was therefore considered not applicable, and the term "impact area" was defined as the area through which a coyote travels, within which he may interact with other animals, and within which he will have small areas of concentrated use. These latter areas were termed "core areas." Impact areas were measured using a modified minimum area method, based on the average distance between locations on consecutive days (average daily movement). Average daily movements were 3.39 ± 0.21 km. These average movements are comparable to those found by other authors. The impact areas were 87.91 km^2 , larger than home ranges reported by other authors. The average core areas were $6.10 \pm 1.56 \text{ km}^2$.

The third part of this study was to determine if coyotes dispersed measurable amounts of radionuclides within or near the Hanford Reservation. Coyote scats were collected from three areas on the Reservation: Area I was within 2.0 km of a radiological waste burial site (the B-C Cribs); Area II extended from 7.5 to 15 km of the Cribs; Area III extended from 16.5 to 27 km of the Cribs, and was on the far side of the Columbia River. Twenty scats were collected from each area. Of the 60 scats, only five had activities of ^{137}Cs high enough to measure. All the scats had measurable activities of ^{90}Sr , but most scats had levels of less than one pico Curie per

91120501600

gram (pCi/g) of scat. The average specific activity levels for the three areas were: Area I--9.68 pCi/g; Area II--0.91 pCi/g; and Area III--0.36 pCi/g.

v

91120501601