Relative Abundance of the Northern River Otter, *Lutra canadensis*, in Three Drainage Basins of Southeastern Oklahoma

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Northern river otter (*Lutra canadensis)* distribution and relative abundance was estimated from sign surveys conducted during January and February, 1993 and 1994. Bridge crossings over perennial streams were used as survey stations within three drainage basins in southeastern Oklahoma. Based on sign surveys, river otters were distributed throughout southeastern Oklahoma. The San Bois River drainage basin had the greatest relative abundance of river otters for both 1993 and 1994, with 50% and 30% detection rates respectively. The lowest relative abundance of river otters for both 1993 and 1994 (17% and 7% detection rates respectively) was observed in the Little River Drainage Basin. *©1997 Oklahoma Academy of Science*

INTRODUCTION

In the early nineteenth century in Oklahoma, northern river otters were considered to occur statewide (*1*). In 1834, 67 otter skins were reportedly shipped from a trading post in present-day Muskogee County (*2*). By the beginning of the twentieth century, otter populations in Oklahoma had been severely reduced by unregulated harvest (*1*).

Historically, river otters probably did not occupy a large portion of present-day Oklahoma. Because river otters must have permanent sources of water to survive, unsubstantiated historical speculation concerning river otter distribution may be questionable. Prior to the Flood Control Act of 1944, most perennial water sources found in the state today did not exist. Between 1952 and 1976, the former Soil Conservation Service constructed 1,652 impoundments in Oklahoma to meet the requirements of the Act. Also, in this century 145 major reservoirs have been constructed, creating significantly more surface acres of permanent water and shoreline than existed pre-settlement.

Between 1917 and 1971, only four documented accounts of the northern river otter in Oklahoma were recorded (*1*). Since the late 1970's, several sightings and accidental captures of otters have occurred in southeastern Oklahoma, during nuisance beaver control activities conducted by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control Unit (*1*). River otter populations have been increasing throughout Arkansas (*3*), suggesting that recent otter observations in southeastern Oklahoma may be the result of immigration of river otters from Arkansas.

In 1984 and 1985, the Oklahoma Department of Wildlife Conservation (ODWC) attempted to reintroduce the otter into Oklahoma (*4*). In March 1984, 10 animals (five males and five females) were released at Wister Wildlife Management Area (WMA) in LeFlore County. In April 1985, four more males and three females were released at McGee Creek WMA in Atoka County.

Although otters were reintroduced into southeastern Oklahoma and evidence of their presence there exists today, little is known of their relative abundance and distribution. Determining these aspects of otter ecology was the objective of this study.

MATERIALS and METHODS

The study area was three river drainage basins in southeastern Oklahoma, the Little River (LRDB), the Poteau River (PRDB) and the San Bois River (SBRD) (Figure 1).

Survey stations consisted of bridge crossings over perennial streams, following Clark (*5*). Permanent watercourses were highlighted on Oklahoma Department of Transportation (ODOT) county road maps within their respective drainage basins. All bridges were located and individually numbered on the ODOT maps within each drainage. Crossings on divided highways were excluded because river otters reportedly avoid these highly disturbed areas (*5*). Survey stations were selected at random until there was one station per 16.1 km of waterways in each basin. Survey stations selected within 2 km of one another were omitted and re-selected to insure independence of survey stations (*5*). We chose 29 survey stations within the LRDB, 21 within the PRDB, and 10 within the SBRD (Figure 1).

Each station was surveyed between January 13 and February 22, once during 1993 and again in 1994. The months of January and February were chosen to correspond to the river otter's breeding season (*6-9*). A 100×5 m area along the water's edge, on one side of the stream, was examined for river otter sign, both upstream and downstream at each station. In order to insure that animal sign had not been obliterated, stations were not surveyed within three days following a heavy rain (*6*).

River otter sign searched for included haul-outs, bedding sites, rolling sites, scrapes, dens (river bank holes, holes under trees or other large objects). Tracks, single scats, diggings, and scent posts (*10*) -Tracks were identified by using Peterson's field guide to animal tracks (*11*).

Within each drainage, detection rates were calculated as (otter-positive stations)×100 / (total number of stations). Relative abundance was estimated by comparing detection rates between years and among drainage basins.

Figure 1. Survey station locations and drainage basins.

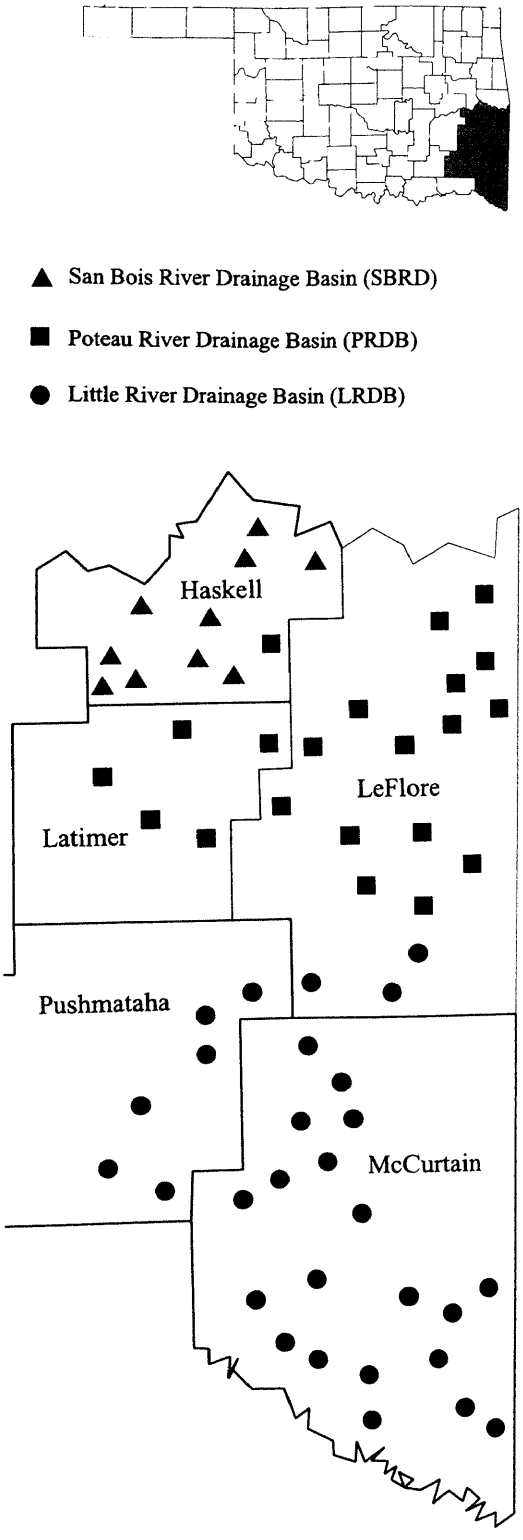

TABLE 1. Relative abundance of northern river otters (*Lutra canadensis*) in southeastern Oklahoma drainage basins.

Drainage Basin	Number Stations Surveyed 1993	1994	Number Stations Visited 1993	1994	Detection Rate 1993	1994
Little River (LRDB)	29	29	5	2	17%	7%
Poteau River (PRDB)	21	21	4	4	19%	19%
San Bois River (SBRD)	10	10	5	3[a]	50%	30%

a One bridge crossing contained the tracks of three separate animals.

RESULTS

River otters were detected within all drainage basins during both sampling periods. Detection rates within the LRDB were 17% and 7% during 1993 and 1994, respectively. In the PRDB, detection rates were 19% during both 1993 and 1994. Otter detection rates in the SBRD were 50% in 1993 and 30% in 1994 (Table 1).

River otters were found throughout four of the five counties surveyed during both sampling periods. In 1993, Latimer County was the exception (Figure 2), and in 1994, McCurtain County (Figure 3).

DISCUSSION

Many techniques have been used to census river otter populations (*6,12-14*). Radiotelemetry, mark-recapture, and radioisotope tagging can provide reliable river otter population estimates, but these methods are expensive and time-consuming.

Scent-station and field sign survey techniques have been used to monitor river otter relative abundance and distribution (*9,10,15,16*). Clark et al. (*6*) found sign-surveys to be the most economical and least time-consuming monitoring technique of the two, although both methods produce highly variable results. Sign surveys can accurately reflect river otter distribution when conducted during periods of presumed high river otter activity, and not within three days following high water levels or heavy rainfall. Neither technique, however, was deemed a reliable indicator of changes in river otter population densities (*6*). Results of this study agree with this assessment. Sign surveys were a highly variable yet an economical and rapid means of broadly assessing river otter distribution and relative abundance in southeastern Oklahoma.

River otter detection rates remained constant between the two sampling periods only in the PRDB (Table 1). Although otter detection rates remained high overall in the SBRD, they declined from 50% to 30% between the two sampling period years. Detection rates also declined between years in the LRDB. The decline in detection rates within the SBRD and the LRDB between 1993 and 1994 (Table 1) may relate to weather conditions. Precipitation was on average, 2.7 cm less during January and February 1994 (=6.7 cm) than during the same time frame in 1993 (=9.4 cm) (National Weather Service, Norman, OK, pers. comm.). It is possible that detection rates during 1994 were low because of an absence of trackable substrate. Tracks are obviously more easily identified on a muddy substrate than on dry soil substrates. Because precipitation was lower during the 1994 surveys, otter tracks may not have been identified because of harder, drier substrates.

Sign survey reliability and success depend on the researcher's ability to observe and identify sign. Substrate type can also influence sign survey results. For instance, otter tracks were the most common form of sign observed during this study. Tracks were more easily observed and identified on stream banks that had exposed soft soils. When vegetation or rubble covered the stream banks, track identification was all but precluded and was impossible on bedrock. Stations in the PRDB, particularly in Latimer County, had

a preponderance of stream banks that did not contain exposed soft soils.

River otter breeding season dates in Oklahoma have not been determined and those in the literature sometimes conflict (*6-8*). It is reasonable that the dates used in this study to correspond to otter breeding activity were not optimal. Future sign surveys should include November through February (*6*).

A change in survey methodology would be required to define more accurately river otter distribution in southeastern Oklahoma. Statistical pressures to sample the survey area randomly reduce the effectiveness of a field survey designed to estimate distribution and relative abundance. Instead of choosing random sites, future studies should use sites of, or near, previous river otter observations (Dr. Michael L. Kennedy, Memphis State University, pers. comm.).

Survey stations consisting of bridge crossings over perennial streams may not produce desired results. Boone (*15*) reports that bridge crossings were used for (sign) surveys because of the human and animal accessibility afforded and because animal sign is preserved for extended periods under bridges. Other researchers (*7,8*) generally agree that otters avoid disturbed areas. Because bridge crossings are directly associated with some level of automobile disturbance, it is conceivable that more sign may be observed when surveying areas beyond the 100 m of the bridge crossing.

Anglers who have used stream areas well-removed from surveyed bridge crossings in Haskell County have reported otter sightings. Additionally, in areas removed from bridge crossings within the study area, the authors found piles of fish scales from river otter feeding activity. During both years of the study, only two otter-positive stations were identified from feeding activity, and only two otters were visually observed.

Beginning sign surveys 100 m from bridge crossings in this study area would mean using a watercraft, such as, that used by Dronkert and Washington (*17*). A watercraft would pose many additional field challenges and would be difficult to employ within the survey area. Many streams contained large expanses of shallow water through which a boat would have to be portaged.

Bridge crossing sign surveys were successful in estimating river otter distribution in the three drainage basins sampled in southeastern Oklahoma. The surveys also provided an easily conducted, albeit crude, estimate of relative abundance in river otter distributions among the drainage basins and between years. Although other variables such as weather and substrate condition may have contributed to changes in detection rates between years, only long-term use of standardized survey stations and survey protocol would be able to determine adequately the effectiveness of this survey in estimating river otter relative abundance in southeastern Oklahoma.

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Figure 2. Northern river otter distribution throughout all drainage basins in 1993.

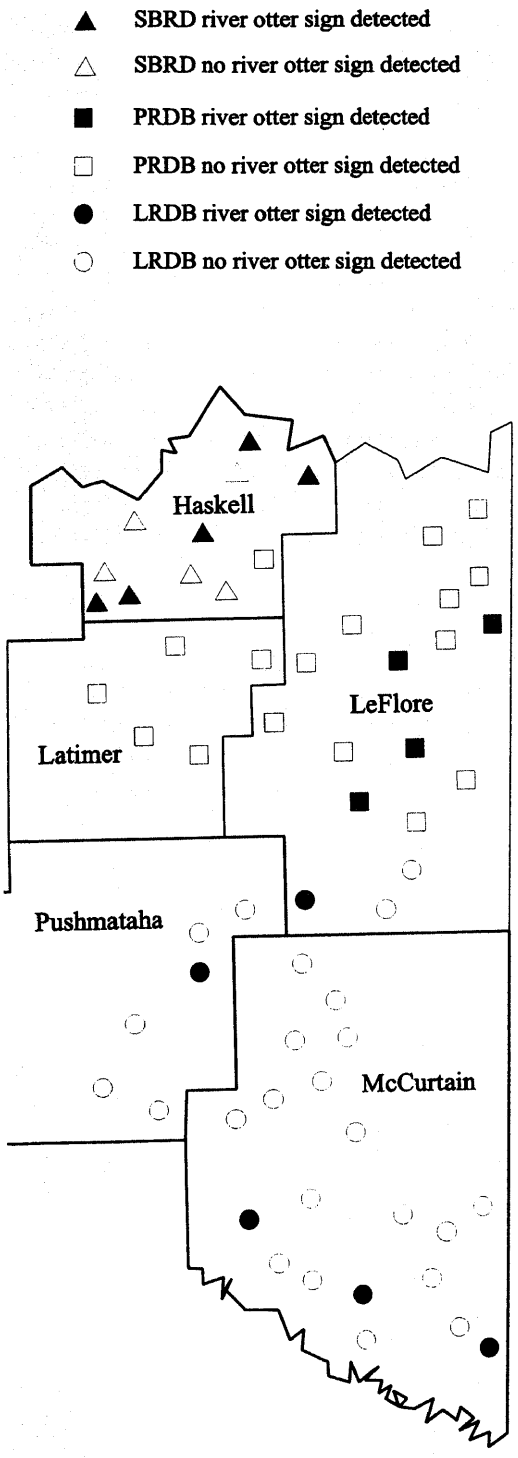
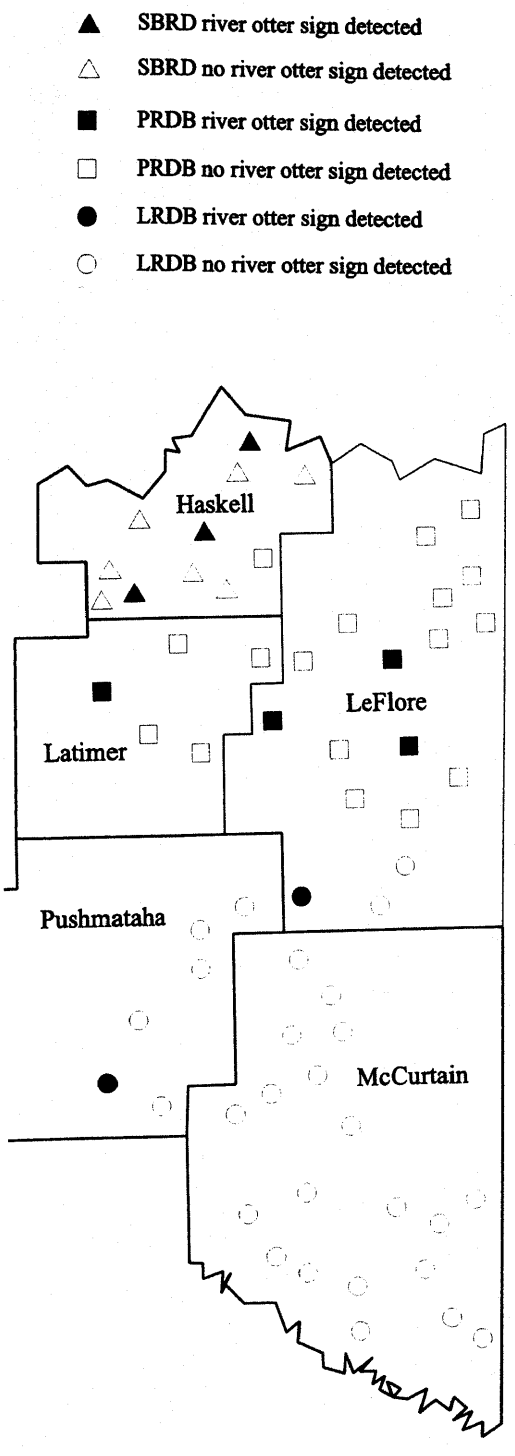


Figure 3. Northern river otter distribution throughout all drainage basins in 1994.



REFERENCES

1. Hatcher, R.T., River otters in Oklahoma. *Proc. Okla. Acad. Sci.* **64**, 17-19 (1984).

2. Caire, W., Tyler, J.D., Glass, B.P., and Mares, M.A., *Mammals of Oklahoma.* Univ. Oklahoma Press, Norman (1989) 567 pp.

3. Tumlison, C. R., and King, A.W., The river otter in Arkansas: distribution and harvest trends. *Proc. Ark. Acad. Sci.* **35**, 74-77 (1981).

4. Base, D.L., *Evaluation of Experimental Reintroduction of River Otters in Oklahoma.* Okla. Dept. Wildl. Conserv., Okla. City (1986) 47 pp.

5. Clark, J.D., Hon, T., Ware, K., and Jenkins, J. Methods for evaluating abundance and distribution of river otters in Georgia. *Proc. Ann. Conf. Southeast. Assoc. Fish & Wildl. Agencies*. **41**, 358-364 (1987).

6. Melquist, W.E., and Hornocker, M.G., *Methods and Techniques for Studying and Censusing River Otter Populations.* Forest, Wildl. and Range Exp. Stat. Univ. Idaho, Contrib. No. 154 (1979) 17 pp.

7. Toweill, D.E., and Tabor, J.E., The northern river otter *Lutra canadensis,* in *Wild Mammals of North America.* Johns Hopkins Univ. Press, Baltimore (1982) 1147 pp.

8. Melquist, W.E., and Dronkert, A., River otters, in *Wildl Furbearer Management and Conservation in North America.* Ontario Trappers Assoc. (1987) 1150 pp.

9. Urben, G., *Methods for Evaluating Abundance and Distribution of River Otters in the Land Between The Lakes.* Tennessee Valley Authority. Golden Pond (1987) 16 pp.

10. Mowbray, E.E., Pursley, D., and Chapman, J.A., *The Status, Population Characteristics and Harvest of the River Otter in Maryland.* Maryland Dept. Nat. Resour., Wildl. Admin. Publ. Wildl. Ecol. No. 2 (1979) 16 pp.

11. Murie, O.J., *A Field Guide to Animal Tracks.* Houghton Mifflin Co., Boston (1982) 375 pp.

12. Mason, C.F., and MacDonald, A.M., The use of spraints for surveying otter *(Lutra lutra)* populations: an evaluation. *Biol. Conserv.* **41**, 167-177 (1987).

13. Reid, D.G., Bayer, M., Code, T.E., and McLean, B., A possible method for estimating river otter, *Lutra canadensis,* populations using snow tracks. *Can. Field-Nat.* **101**, 576-580 (1987).

14. Shirley, M.G., Linscombe, R., Kinler, N., Knaus, R., and Wright, V., Population estimates of river otters in a Louisiana coastal marshland. *J. Wildl. Manage.* **52**(3), 512-515 (1988).

15. Boone, D.B., *River Otter Survey.* Fed. Aid Proj. No. W103-R-10 (1981) 5 pp.

16. Prigioni, C., Bogliani, G., and Barbieri, F. The otter *(Lutra lutra)* in Albania. *Biol. Conserv.* **36**, 375-383 (1986).

17. Dronkert, A., and Washington, T., *River Otter Restoration.* Colorado Div. of Wildlife, Ft. Collins, 25 pp.

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