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Reintroduction and Status of the River Otter (*Lutra canadensis*) in Illinois

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ABSTRACT

Although river otters (*Lutra canadensis*) were common in Illinois during early European settlement, habitat degradation and unregulated harvests caused populations to decline dramatically by the mid-1800s. Otters were considered rare in the state by the early 1900s, and were listed as a state endangered species in 1989. Recovery strategies developed by the Illinois Department of Natural Resources included reintroducing otters in suitable but unoccupied habitats. Wild otters obtained from Louisiana were released in the Wabash (n = 137), Kaskaskia (n = 72) and Illinois (n = 137) River basins from January 1994 through March 1997. Dead otters recovered from 1994 through 1997 included more males (*n* = 20) than females (n = 9). Losses were attributed to hoop nets (n = 8), vehicles (n = 7), traps (n = 7), stress (n = 6), and domestic dogs (n = 1). Surveys and sightings indicated that otters were persisting and reproducing in release areas. Reports from outside of release areas suggested that native populations along the Mississippi and Cache Rivers were increasing and expanding their ranges. Otters had colonized the Central Mississippi Landscape Management Unit, probably as the result of releases in Missouri during the 1980s. Criteria for changing this species' status from endangered to threatened have been met.

INTRODUCTION

River otters (*Lutra canadensis*) were common and distributed widely in Illinois during early European settlement (Cory 1912, Mohr 1943). Habitat loss and unregulated harvests caused their numbers to decline by the early to mid-1800s (Hoffmeister and Mohr 1957, Thomas 1861), and they were rare or absent in most of northern and central Illinois by the early 1900s (Wood 1910, Cory 1912, Forbes 1912). Although protected from hunting and trapping by continuous closed seasons beginning in 1929 (Mohr 1943),

sightings became uncommon in the state by the mid-1900s (Brown and Yeager 1943, Hoffmeister and Mohr 1957).

A small population existed along the Mississippi River and its tributaries in northwestern Illinois during the 1980s (Thom 1981, Anderson 1982, Anderson and Woolf 1987). Reports from southern Illinois were clustered along the Cache River and suggested the existence of a second population (Anderson 1982). Anderson (1982) estimated that fewer than 100 otters existed in Illinois at that time. Listed as state threatened in 1977, the river otter's status was revised to state endangered in 1989 because its limited distribution and apparent scarcity suggested the population was at risk of extirpation.

A Recovery Team consisting of staff from the Illinois Department of Natural Resources (IDNR) and Illinois Endangered Species Protection Board (IESPB) was organized in 1993. The team recommended goals of re-establishing river otters in suitable habitats, monitoring populations, and conserving key habitats (Bluett et al. 1995). Tasks specified by the team included releasing river otters in the Wabash (n = 110), Kaskaskia (n = 60-70) and Illinois (n = 100-125) Landscape Management Units (LMUs, Fig. 1) (Bluett et al. 1995). We describe the reintroduction phase and status of recovery efforts through 1997.

METHODS

Otters of the same subspecies as occurs in Illinois (*L. c. lataxina*, van Zyll de Jong 1972) were purchased from a supplier in Louisiana (L.R. Sevin, Theriot, LA) who trained local fur trappers to capture wild otters in small leghold traps, then restrain, cage, and transport them to his facility using techniques that minimized injuries. There the otters were examined by a veterinarian, treated for any injuries, vaccinated for canine and feline distemper, and held in captivity in individual cages for 3-15 weeks. They were fed twice daily and provided water ad libitum.

The supplier combined two to three animals of the same sex in each cage two to three days before they were scheduled for transport. Otters were transported by vehicle from Louisiana to the University of Illinois' Dixon Springs Agricultural Experiment Station during a one to two day trip. A device designed by McCullough et al. (1986) was used to separate and restrain otters so that they could be tranquilized, examined, administered an antibiotic, vaccinated, treated for injuries, and marked with metal tags. The protocol for processing otters was developed by staff from the University of Illinois' College of Veterinary Medicine and approved by the University's Laboratory Animal Care Advisory Committee (Bluett 1995). Most otters were released at or near locations specified by the Recovery Plan (Bluett et al. 1995) within 48 hrs of their arrival in Illinois.

Posters displayed at IDNR offices and report forms printed in IDNR's Digest of Hunting and Trapping Regulations were used to solicit sighting information from the public during 1994 through 1997. Other common sources of reports included IDNR staff and researchers from the Cooperative Wildlife Research Laboratory at Southern Illinois University at Carbondale (Schieler 1995, Farrand 1997). Reports from the public were screened by a follow-up phone call or letter to evaluate their legitimacy and to collect additional information about exact locations of sightings. Sightings deemed reliable were added to IDNR's Natural Heritage Database.

Surveys of licensed fur trappers conducted by IDNR (Anderson et al. 1995, 1996a, 1996b; Anderson and Campbell 1998) included the question, "Have you seen a river otter or observed river otter sign in Illinois during the past three years?" Those responding affirmatively were asked to identify the sighting location(s) by county. We summarized annual results for trapping seasons that occurred during 1993-94 through 1996-97.

RESULTS

IDNR acquired 349 river otters and released 346 from January 1994 through March 1997 (Table 1). Two otters died shortly after they were tranquilized, and one was euthanized because of an injury sustained during restraint. Three otters judged to be in poor health were transported to Brookfield Zoo (Brookfield, IL), rehabilitated, and released near scheduled sites at a later date.

IDNR recovered the carcasses of 29 of the released otters as of 31 December 1997. Known sources of mortality included hoop nets (n = 7), vehicles (n = 7), traps (n = 7) and domestic dogs (n = 1). Six deaths were attributed to stress from transport and handling because the otters were recovered shortly after, and in the immediate vicinity of, release(s) without any signs of physical trauma. Cause of death was unknown for one otter, but lack of injuries and water detected in its lungs during necropsy suggested drowning in a hoop net. Losses were greater in the Wabash (n = 15) than the Illinois (n = 11) or Kaskaskia (n = 3) LMUs, and included more males (n = 20) than females (n = 9).

Recovery of kits from Lake Shelbyville (Kaskaskia LMU), the LaMoine River near Macomb (Illinois LMU), and two locations on the upper Illinois River verified births in release areas. Two kits recovered from Lake Shelbyville were probably from a single litter, as were six found on the LaMoine River. Two kits recovered near Henry, IL and one near Putnam, IL might have been from a single litter because they were about the same size, found three days apart and old enough to have traveled the eight km between locations. Three reports of family groups in the Wabash LMU (North Fork of the Embarras River, Skillet Fork and the Little Wabash River) and one from the Illinois LMU (Sangamon River) provided additional evidence of reproduction, as did the accidental capture of an untagged otter on the Little Wabash River in White County.

IDNR's Natural Heritage Database contained 356 reports of sightings from 1994 through 1997 (Table 2). Three of these occurred before the first release on 22 January 1994. Almost half of the sightings (42%) came from LMUs where releases occurred, including 54 from the Wabash, 38 from the Kaskaskia and 56 from the Illinois. More reports were received from the Wabash, Kaskaskia and Illinois LMUs during 1996 (n = 54) than in 1995 (n = 36) or 1994 (n = 25). Thirty-three sightings occurred in these areas during 1997.

Numbers of counties in which trappers reported seeing river otters or their sign during the past three years increased from 23 in 1993-94 to 36 in 1996-97, and numbers of trappers who reported observations increased from 40 to 70. Observations were reported from 56 different counties located in all seven LMUs during the four years of the survey. Thirty-eight counties had repeated observations (i.e., reports from two or more years). LMUs

with observations during at least three of the four years included the Rock/Mississippi North, Central Mississippi, Wabash, and Shawnee. Sightings from the Natural Heritage Database were more widespread (84 of 102 counties in the state) than those from the trapper survey, but both showed similar geographic patterns. For example, 51 counties had observations from both sources.

DISCUSSION

The number of otters released during recovery efforts exceeded the Recovery Team's recommendation of 270-305 (Bluett et al. 1995). Fifty otters released in the Patoka River System during 1997 by the Indiana Department of Natural Resources (S. Johnson, Indiana Dep. Nat. Resour., pers. comm.) will likely aid recovery efforts in the Wabash River Basin. Recent (1994-1997) reports verify the persistence of otters in LMUs where releases were made, and outnumber those from the previous decade by more than tenfold. Reports from other parts of the state substantiate observations by Anderson (1995) that (1) otters in northwestern Illinois appeared to be increasing and had expanded their range to include portions of the Rock River System, (2) the Cache River population appeared stable to increasing and had expanded its range to include portions of the Big Muddy River System, and (3) otters had colonized the Middle Mississippi River Tributaries, probably as the result of releases in Missouri during the 1980s.

Sources of mortality were similar to those reported for Missouri (Erickson and McCullough 1987). None of the deaths documented in Indiana were caused by hoop nets (Johnson et al. 1996), but releases occurred in areas where these devices were prohibited. Mortality rates cannot be estimated from data available for Illinois. We assumed first-year mortality rates were similar to those confirmed by radiotelemetry studies in Missouri (19%; Erickson and McCullough 1987) and Indiana (29%; S. Johnson, Indiana Dep. Nat. Resour., pers. comm.) because all three states obtained otters from the same source, used similar methods to process otters, and employed similar release strategies.

Given the reproductive biology of otters (Liers 1951, Wright, 1963), we expected that protocols for capturing and holding them would disrupt normal reproduction for about two years. Seven females had well-developed fetuses when released in the Little Wabash River System and were an exception. All others due to give birth the same year as their release had whelped in captivity and likely completed their estrus cycle unbred because they were held separately from males. These otters wouldn't breed until the spring following their release and would bear young approximately one year later. We attributed litters observed the year after releases (e.g., Skillet Fork and the North Fork of the Embarras) to two-year-old females which had reached sexual maturity, bred before their capture and given birth the next spring. Kits found on the LaMoine and Upper Illinois Rivers in 1997 could not have come from otters released in these areas earlier in the year. We suspect that these kits belonged to females which had dispersed there from the Central Mississippi LMU or from releases on the Spoon and Mackinaw Rivers in 1996.

No simple methods exist for censusing river otters (Melquist and Hornocker 1979), so most investigators (Zackheim 1982, Melquist and Dronkert 1987, Woolf et al. 1997) recommend a combination of indices to monitor population status (e.g., carcass collections, sighting reports, sign surveys, population models, surveys of trappers or agency biolo-

gists). Methods used in Illinois (i.e., sighting reports, trapper surveys) are adequate for immediate management needs (Woolf et al. 1997) and are consistent with the Recovery Team's minimum standards for assessing population status (Bluett et al. 1995). However, receipt of sighting reports can vary with the type and amount of effort to collect them as well as changes in public sentiment (e.g., reporting rates might decline as otters become more abundant and less of a novelty) (Woolf et al. 1997). We believe that one or more of these factors caused a decline in the number of reports received in 1997, and recommend implementation of a more standardized population index using guidelines provided by Woolf et al. (1997).

The Recovery Team established an objective of reclassifying river otters from endangered to threatened when "stable or increasing populations of reproducing individuals have been documented in at least 3 landscape management units." (Bluett et al. 1995:35). Given evidence of long-term (> 10 yrs) populations and range expansion in the Shawnee, Rock/Mississippi North and Central Mississippi LMUs, we concur with the IESPB's recent (21 Aug 1998) decision to change the river otter's status from endangered to threatened. The Recovery Team recommended delisting river otters from threatened status upon evidence of stable or increasing populations of reproducing individuals in five LMUs or in four LMUs if, in addition, their presence was documented in at least 60% of population management units therein (Bluett et al. 1995). While river otters were present and reproducing in six of seven LMUs, criteria recommended for delisting from threatened status were not met fully because we could not verify population trends (i.e., stable or increasing) with short-term (< 3 yrs) datasets available for release areas. Therefore, we recommend that the otter's status be reviewed every five years to determine if a change is warranted by data available at the time.

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LITERATURE CITED

Anderson, E.A. 1982. Status and distribution of the river otter (*Lutra canadensis*) in Illinois. M.S. Thesis, Southern Illinois Univ., Carbondale. 77pp.

Anderson, E.A. 1995. Status in the Midwest and Illinois. Pages 23-32 in R. Bluett, ed. Illinois river otter recovery plan. Illinois Dep. Nat. Resour., Springfield.

Anderson, E.A. and A. Woolf. 1987. River otter habitat use in northwestern Illinois. Trans. Ill. Acad. Sci. 80:107-114.

Anderson, W.L., L.K. Campbell and K. Benner. 1995. Illinois furbearer trapping survey, 1993-94. P-R Proj. Rep. W-112-R, Study 1, Job 2. Illinois Dep. Nat. Resour., Springfield. 52pp.

Anderson, W.L., L.K. Campbell and A.E. Zielske. 1996a. Illinois furbearer trapping survey, 1994-95. P-R Proj. Rep. W-112-R, Study 1, Job 2. Illinois Dep. Nat. Resour., Springfield. 55pp.

Anderson, W.L., L.K. Campbell and A.E. Zielske. 1996b. Illinois furbearer trapping survey, 1995-96. P-R Proj Rep. W-112-R, Study 1, Job 2. Illinois Dep. Nat. Resour., Springfield. 55pp.

Anderson, W.L. and L.K. Campbell. 1998. Illinois furbearer trapping survey, 1996-97. P-R Proj. Rep. W-112-R, Study 1, Job 2. Illinois Dep. Nat. Resour., Springfield. 56pp.

Bluett, R., editor. 1995. Illinois river otter recovery plan. Illinois Dep. Nat. Resour., Springfield. 96pp.

Bluett, R., G. Kruse, S. Lauzon, E. Anderson, G. Hubert, Jr. and D. Glosser. 1995. Recovery goal, objectives and criteria. Pages 33-52 in R. Bluett, ed. Illinois river otter recovery plan. Illinois Dep. Nat. Resour., Springfield.

Brown, L.G. and L.E. Yeager. 1943. Survey of Illinois fur resource. Ill. Nat. Hist. Surv. Bull. 22:435-504.

Cory, C.B. 1912. The mammals of Illinois and Wisconsin. Field Mus. Nat. Hist. Pub. 153, Zool. Ser. 11:1-505.

Erickson, D.W. and C.R. McCullough. 1987. Fates of translocated river otters in Missouri. Wildl. Soc. Bull. 15:511-517.

Farrand, D.T. 1997. A GIS-based PATREC model to predict the distribution of river otters(*Lutra canadensis*) in southern Illinois. PhD. Thesis, Southern Illinois Univ., Carbondale. 92pp.

Forbes, S.A. 1912. The native animal resources of the state. Trans. Ill. Acad. Sci. 34:216-217.

Hoffmeister, D.F. and C.O. Mohr. 1957. Field book of Illinois mammals. Illinois Nat. Hist.Surv., Urbana. 233pp.

Illinois Environmental Protection Agency. 1996. Illinois water quality report 1994-1995. Vol. I. Illinois Env. Prot. Agency, Springfield. 240pp.

Johnson, S.A., K.A. Berkley and J.E. Fisher. 1996. Indiana river otter reintroduction program - 1996. Indiana Dep. Nat. Resour., Div. Fish & Wildl., Bloomington. 9pp.

Liers, E.E. 1951. Notes on the river otter (*Lutra canadensis*). J. Mammal. 32:1-9.

McCullough, C.R., L.D. Haggermann and C.H. Caldwell. 1986. A device to restrain river otters in Missouri. Wildl. Soc. Bull. 14:177-180.

Melquist, W.E., and M.G. Hornocker. 1979. Methods and techniques for studying and censusing river otter populations. Univ. Idaho For., Wildl. and Range Exp. Stn., Tech. Rep. 8. 17pp.

Melquist, W.E. and A.E. Dronkert. 1987. River otter. Pages 625-641 in M. Novak, J. A. Baker, M. E. Obbard and B. Malloch, eds. Wild furbearer management and conservation in North America. Ontario Trappers Assoc., North Bay.

Mohr, C.O. 1943. Illinois furbearer distribution and income. Ill. Nat. Hist. Surv. Bull. 22:505-537.

Page, L.M., K.S. Cummings, C.A. Mayer, S.L. Post and R.E. Retzer. 1992. Biologically significant Illinois streams. Proj. Completion Rep. F-110-R. Ill. Nat. Hist. Surv., Cent. for Biodiversity, Champaign. 485pp.

Schieler, C.T. 1995. Habitat characterization of an otter release area in southcentral Illinois. M.S. Thesis, Southern Illinois Univ., Carbondale. 55pp.

Thom, R. 1981. Endangered and threatened mammals. Pages 59-69 in Natural Land Institute. Endangered and threatened species of Illinois. Illinois Dep. Conserv., Springfield.

Thomas, C. 1861. Mammals of Illinois. Trans. Ill. State Agric. Soc. 4:651-661.

van Zyll de Jong, C.G. 1972. A systematic review of the Nearctic and Neotropical river otters (Genus *Lutra*, Mustelidae, Carnivora). R. Ontario Mus., Life Sci. Contrib. 80. 104pp.

Wood, F.E. 1910. A study of the mammals of Champaign County, Illinois. Ill. State Nat. Hist. Surv. Bull. 8(5):501-613.

Woolf, A., R.S. Halbrook, D.T. Farrand, C. Schieler and T. Weber. 1997. Survey of habitat and otter population status. Final Rep., Fed. Aid in Wildl. Rest. Proj. W-122-R-3, Illinois Dep. Nat. Resour., Springfield. 163pp.

Wright, P.L. 1963. Variations in reproductive cycles in North American mustelids. Pages 77-98 in A.C. Enders, ed. Delayed implantation. Univ. Chicago Press, Chicago.

Zackheim, H. 1982. Ecology and population status of the river otter in southwestern Manitoba. M.S. Thesis, Univ. Montana, Missoula. 100pp.

Table 1. River otter releases in Illinois, 1994-97.

LMU[a]	Body of water	County	Township, range	Month/year	No. otters released
Wabash	Little Wabash River	Jasper	T5N, R8E	1/94	25 (15 M, 10 F)
Wabash	Little Wabash River	Wayne	T1S, R9E	1/94	25 (15 M, 10 F)
Wabash	Embarras River	Coles	T11N, R9E	3/95	18 (10 M, 8 F)
Wabash	North Fork Embarras River	Clark	T9N, R14W	4/95	19 (9 M, 10 F)
Wabash	Skillet Fork	Wayne	T1N, R5E	3/95	20 (10 M, 10 F)
Wabash	Vermilion River	Vermilion	T20N, R12W	4/96; 3/97	30 (18 M, 12 F)
Wabash	Combined				137 (77 M, 60 F)
Kaskaskia	Lake Shelbyville	Moultrie	T13N, R5E	3/95; 4/95	24 (12 M, 12 F)
Kaskaskia	Carlyle Lake	Bond	T4N, R2W	2/96	25 (15 M, 10 F)
Kaskaskia	Shoal Creek	Montgomery	T8N, R4W	2/96	23 (14 M, 9 F)
Kaskaskia	Combined				72 (41 M, 31 F)
Illinois	Spoon River	Fulton	T8N, R2E	4/96	24 (12 M, 12 F)
Illinois	Mackinaw River	McLean[b]	T25N, R2E	4/96	28 (13 M, 15 F)
Illinois	LaMoine River	Schuyler	T3N, R3W	3/97	24 (15 M, 9 F)
Illinois	Illinois River	Mason[c]	T19N, R11W	3/97	26 (14 M, 12 F)
Illinois	Illinois River	Bureau	T16N, R10E	3/97	25 (14 M, 11 F)
Illinois	Quiver Creek	Mason	T22N, R7W	3/97	10 (6 M, 4 F)
Illinois	Combined				137 (74 M, 63 F)
Statewide	Combined				346 (192 M, 154 F)

[a] Landscape Management Units (LMUs) follow the Illinois Environmental Protection Agency's classification of major river basins (Illinois Environmental Protection Agency, 1996), with some modifications (e.g., grouping of smaller river basins to form a single unit).

[b] Includes secondary release sites on the Mackinaw River in McLean County (4 M, 3 F; T25N, R3E), Tazewell County (3 M, 1 F; T24N, R2W) and Woodford County (4 M; T25N, R1E).

[c] Includes a secondary release site on the Sangamon River in Menard County (2 M; T18N, R7W).

Table 2. Distribution of river otter reports for population management units and corresponding portions of the Mississippi, Ohio, and Wabash Rivers which adjoin Illinois, 1900 through 1997[a].

		Years of Reports				
Landscape management unit	Population management unit[b]	1900-50	1951-82	1983-93	1994-97[c]	Total
Rock/Mississippi North	Galena, Apple, and Plum River Systems	--	44	60	46	150
Rock/Mississippi North	Rock River System	--	18	28	74	120
Central Mississippi	Middle Mississippi River Tributaries	--	6	17	28	51
Fox/Des Plaines/Kankakee	Des Plaines River and Lake Michigan Tributaries	--	2	1	5	8
Fox/Des Plaines/Kankakee	Fox River System	--	3	1	6	10
Fox/Des Plaines/Kankakee	Kankakee - Iroquois River System	--	3	--	2	5
Illinois	Little Vermilion River, Big Bureau and Kickapoo Creek Systems	2	3	2	3	10
Illinois	Vermilion and Mazon River Systems	1	2	--	2	5
Illinois	Spoon River System	1	2	1	16	20
Illinois	La Moine River System	--	--	--	3	3
Illinois	Mackinaw River System	2	1	2	11	16
Illinois	Sangamon River System	2	3	--	13	18
Illinois	Lower Illinois River Tributaries and American Bottoms	6	3	--	8	17
Kaskaskia	Kaskaskia River System	3	5	2	38	48
Shawnee	Big Muddy River System	8	3	10	15	36
Shawnee	Cache River System	9	8	15	15	47
Shawnee	Massac, Bay, Lusk, Big Grand Pierre and Big Creek Systems	4	5	5	12	26
Shawnee	Saline River System	7	1	1	5	14
Wabash	Little Wabash River and Bonpas Creek Systems	7	1	3	32	43
Wabash	Embarras River and Wabash River Tributaries	2	--	2	18	22
Wabash	Vermilion and Little Vermilion River Systems	--	--	--	4	4
All units combined		54	113	150	356	673

[a] Data for 1900 through 1993 are from Anderson (1995).

[b] Population management units follow the delineation of Illinois stream systems by Page et al. (1992) with some modifications. Bluett et al. (1995) provided a more detailed description.

[c] Three observations occurred from 1 January through 21 January 1994, one from the Rock River System and two from the Galena, Apple and Plum River Systems.

Figure 1. River otter Landscape Management Units (LMUs) in Illinois as defined by Bluett et al. (1995).