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Status of the River Otter (*Lontra canadensis*) in Illinois, 1998–2004

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ABSTRACT

The Illinois river otter (*Lontra canadensis*) recovery plan recommends de–listing this species from its state threatened status when it is widespread and secure [e.g., stable to increasing populations of reproducing individuals occur in ≥5 of 7 landscape management units (LMUs)]. Sign surveys, surveys of licensed trappers, and element occurrence reports confirmed a statewide distribution of river otters during 1998–2004. Necropsies, sightings of family groups, and recoveries of unmarked individuals from the Illinois, Kaskaskia, and Wabash LMUs confirmed reproduction. Modeling predicted 346 otters released in the Illinois, Kaskaskia, and Wabash LMUs during 1994–1997 increased to 1,830 in 2001 and would reach 4,610 in 2005. We conclude that criteria for de–listing the river otter have been satisfied. We recommend modeling and surveys of licensed trappers for monitoring the future status of river otters in Illinois.

INTRODUCTION

During 1999, the river otter's (*Lontra canadensis*) status in Illinois was upgraded from state endangered to state threatened (Title 17, Illinois Administrative Code, Chapter I, Section 1010). This action was supported by growing numbers of reports from the northwestern, west–central, and southern parts of the state as well as the successful translocation of 346 wild river otters from Louisiana to the Illinois, Kaskaskia, and Wabash river basins (Bluett et al. 1999). We review recent data from field surveys, element occurrence records, questionnaires sent to trappers, necropsies, and a population model to determine whether criteria established for de–listing the river otter have been satisfied.

METHODS

Sign Surveys

Sign surveys are conducted at a stratified random sample of Basin Survey Sites established by the Illinois Environmental Protection Agency and Illinois Department of Natu-

ral Resources (IDNR) to monitor surface water quality, diversity and abundance of fishes, and other indicators of the biotic integrity of riverine systems. Trained IDNR biologists visit designated sites once during 1 Feb through 31 Mar in the southern furbearer zone (i.e., south of U.S. Route 36) and 15 Feb through 15 Apr in the northern zone. Using hip chains to determine distances, they travel ≤300 m upstream and downstream from survey starting points, usually road bridges, and search both shorelines for tracks, scats, and other signs of the presence of river otter, beaver (*Castor canadensis*), and mink (*Mustela vison*) (i.e., a total of 1200 m of shoreline unless the presence of all 3 species is documented in a shorter distance). Data collected by staff include the presence of target species, types of evidence encountered, and percentage of shoreline with conditions deemed suitable to detect an animal's presence.

Questionnaires

Each spring, IDNR mails questionnaires to a stratified random sample of licensed fur trappers to monitor harvest levels and efforts, assess attitudes and opinions, and collect other information pertinent to management programs. Survey instruments distributed after trapping seasons that occurred in 1999–2000 through 2002–2003 asked trappers if they had observed river otters or their sign during the past season (Miller et al. 2002*a*, 2002*b,* 2003, 2004).

Element Occurrence Records (EORs)

Beginning in 1994, IDNR's annual Digest of Hunting and Trapping Regulations solicited reports of river otter observations. Reports from hunters, fishermen, and other members of the public were screened by a follow-up phone call or letter to evaluate their legitimacy and determine precise locations of sightings; those deemed reliable were added to IDNR's Biological Conservation Database. EORs submitted by IDNR staff were another important source of data.

Evidence of Reproduction

Staff from the Cooperative Wildlife Research Laboratory at Southern Illinois University (CWRL) necropsied river otters recovered by IDNR. They assigned ages by appearance of dentition and body size (juveniles) or counts of cementum annuli (specimens >1 year of age; Stephenson 1977) and noted the presence of embryos, placental scars, and traits of lactation (Woolf and Nielsen 2001). EORs provided evidence of reproduction if they reported groups of otters comprised of both adults and juveniles. Recovery of unmarked otters from the Illinois, Wabash, and Kaskaskia river basins also indicated reproductive activity because few if any otters existed in these areas before marked individuals were released during 1994–1997 (Bluett et al. 1999).

Population Model

Using a deterministic population model developed by Hamilton (1998), Woolf and Nielsen (2001) estimated the abundance of river otters inhabiting the Illinois, Kaskaskia, and Wabash river basins during 2001 and 2005. Model inputs included natality and survival estimates from Missouri (Hamilton 1998), and numbers of otters released by IDNR from 1994–1997. Specific input data were presented in Woolf and Nielsen's (2001) unpublished report to IDNR.

RESULTS

Distribution

IDNR biologists conducted Sign Surveys at 41–75 sites annually from 1999–2004 (Table 1). During this period, observations of river otters or their sign originated from 45 sites (Fig. 1) located in all 7 landscape management units (LMUs) and 20 of 21 population management units (PMUs). Otters were detected during multiple (range 2–6) years at most (76%) of the 45 sites.

Numbers of licensed trappers who responded to questionnaires varied from 551–688 per year. Widespread and numerous observations of river otters or their sign were reported during 2002–2003 (118 reports from 56 counties), 2001–2002 (150 reports from 61 counties), 2000–2001 (118 reports from 56 counties), and 1999–2000 (96 reports from 51 counties). Combined reports for 1999–2000 through 2002–2003 originated from 81 counties located in all LMUs and PMUs.

IDNR processed 805 EORs from 1994 through 2003 (Table 2). Those documenting occurrences from 1998 through 2003 (n = 449) originated from 84 counties located in all LMUs and PMUs.

During 1998 through 2004, 9 of 102 counties (DeWitt, Douglas, Edgar, Hamilton, Macoupin, Monroe, Piatt, Putnam, and Stark) lacked records of river otters when data from all sources (i.e., EORs, sign surveys, and trapper reports) were combined. Occurrences were documented by >1 source of data in most (n = 83) counties.

Reproduction

Seventeen of 101 otters assigned ages by CWRL were juveniles. Five females contained embryos, 9 had placental scars, and 22 were lactating. We documented recoveries of 42 untagged river otters and observations of 14 family groups in the Illinois, Wabash, and Kaskaskia LMUs.

Population estimate in release areas

Modeling provided an estimate of 1,830 otters in the Illinois, Kaskaskia, and Wabash LMUs during 2001. The projected estimate increased to 4,610 in 2005.

DISCUSSION

Illinois' recovery plan (Bluett et al. 1995) recommends de–listing the river otter when it is widespread and secure (i.e., stable to increasing populations of reproducing individuals occur in ≥5 of 7 LMUs *or* in 4 LMUs if, in addition, their presence is documented in ≥60% of PMUs). Multiple, independent sources of information indicate criteria for de–listing this species have been satisfied.

Quantitative methods for determining the density of river otters (i.e., mark–recapture studies) are impractical for large spatial scales (Melquist and Hornocker 1979) because of high costs, low recovery rates, strict statistical assumptions, and sampling protocols that are difficult to execute, especially in areas dominated by small, privately held tracts. Alternatives include life table analyses, sighting reports, sign surveys, population models,

and surveys of trappers or agency biologists (Macdonald 1990, Woolf et al. 1997, Melquist et al. 2003). Many of these techniques are affordable but tend to be biased and insensitive to small or moderate changes in densities of wildlife populations (Clark and Andrews 1979). Therefore, experts recommend using ≥2 methods and relying on concordance among results as reasonable assurance they are detecting changes in relative abundance despite their respective limitations (Woolf et al. 1997, Melquist et al. 2003).

Sign Surveys proved useful for monitoring distribution at the LMU and PMU scales. As in Missouri (Gallagher 1999), this method appeared to be a poor indicator of relative abundance. For example, otters were detected at fewer sites in the Illinois, Kaskaskia and Wabash LMUs during 2003 (22.7%) than 2000 (28.9%) yet modeling indicated the population nearly doubled during this 3–year period.

EORs and trapper surveys provided similar information about distribution at the LMU, PMU, and county scales. Without a means of comparing known densities to frequencies of reports, we are unable to evaluate trapper surveys and EORs as indices of abundance beyond noting that both appeared capable of detecting large (e.g., >7–fold increase predicted by modeling for the Illinois, Kaskaskia, and Wabash LMUs) changes during the past decade.

Modeling the statewide abundance of otters is problematic because an estimate of the initial population is required. Numbers of otters released by IDNR from 1994–1997 suffice for 4 LMUs (we include the Fox/DesPlaines/Kankakee LMU, which, based on the timing and number of reports, was colonized by populations originating from releases in the Illinois river basin). We recommend a conservative approach to estimating initial populations in remaining LMUs.

Anderson (1982) estimated <100 otters inhabited the Rock/Mississippi North and Shawnee LMUs during the late 1970s. Aided by immigration from Iowa and Wisconsin, the Rock/Mississippi North population increased and expanded its range by the early 1990s (Anderson 1995). Similar trends in distribution and relative abundance appeared to occur in the Shawnee LMU (Anderson 1995). Allowing for immigration, we believe an initial population estimate of 100 otters is conservative but reasonable for modeling abundance in these 2 LMUs since 1980.

Resource agencies released 1,107 river otters in Missouri and Iowa from 1982–1992 (Raesly 2001). Colonization of Illinois' Middle Mississippi River Tributaries LMU was evident by the early 1990s (Anderson 1995). Assuming ≤5% of otters occupying a LMU are observed and reported to IDNR during a given year, we recommend an initial population estimate of 80 individuals during 1991 (i.e., reports of 4 live otters originated from the Middle Mississippi River Tributaries LMU in 1991). Initial population estimates for western and southern Illinois should be re-evaluated if studies determine densities of river otters for these or similar areas. For example, information about densities and available habitat could be used to derive a population estimate and compare it to results of modeling.

Recognizing that management goals, technologies, and availability of adequate data would probably vary over time, Woolf et al. (1997) recommended a flexible approach to

monitoring that allowed for adoption and phasing out of individual methods as needs and opportunities changed. Sign Surveys provide reliable data that can be collected systematically at different geographic scales and linked to existing information about site characteristics. However, they are more expensive to conduct and less precise for determining distribution than other methods already employed by IDNR. Increasing sample size to improve precision seems unnecessary, so we recommend phasing out Sign Surveys. Numbers of EORs submitted voluntarily by the public probably vary over time with the amount and effectiveness of efforts to solicit this information as well as peoples' perceptions of the rarity of river otters (Woolf et al. 1997). Therefore, standardized surveys of trappers provide a better long–term tool than EORs for monitoring distribution and large changes in relative abundance.

We believe IDNR should continue to collect and cooperatively analyze data (e.g., age structure, no. young produced by various age classes of females) from carcasses recovered as road–kills and accidental captures. These efforts will provide reliable inputs for modeling, a method we recommend as a primary means of estimating abundance. Efforts to collect carcasses can be curtailed as variances of estimates diminish with increasing sample sizes. Afterward, periodic (e.g., 5–10 yrs) evaluations of model inputs are warranted.

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Table 1. Numbers of sites, landscape management units, and population management units where biologists detected the presence of river otters during Furbearer Sign Surveys conducted in Illinois, 1999–2004.

Year	No. sites sampled	No. sites with evidence of otters	No. population management units with evidence of otters	No. landscape management units with evidence of otters
1999	41	11	9[a]	5[a]
2000	74	22	15	7
2001	75	22	13	6
2002	74	25	16	7
2003	73	25	16	7
2004	70	25	15	7

[a] During 1999, Furbearer Sign Surveys were conducted in only 6 of 7 landscape management units and 14 of 21 population management units.

Table 2. Geographic and temporal distribution of Element Occurrence Records for river otters, 1983–2003[a].

Landscape management unit	Population management unit[b]	Years of reports		
		1983-1993	1994-2004	Total
Rock/Mississippi North	Galena, Apple, and Plum River Systems	60	60	120
Rock/Mississippi North	Rock River System	28	132	160
Central Mississippi	Middle Mississippi River Tributaries	17	81	98
Fox/Des Plaines/Kankakee	Des Plaines River and Lake Michigan Tributaries	1	12	13
Fox/Des Plaines/Kankakee	Fox River System	1	18	19
Fox/Des Plaines/Kankakee	Kankakee - Iroquois River System	0	5	5
Illinois	Little Vermilion River, Big Bureau and Kickapoo Creek Systems	2	9	11
Illinois	Vermilion and Mazon River Systems	0	9	9
Illinois	Spoon River System	1	56	57
Illinois	La Moine River System	0	17	17
Illinois	Mackinaw River System	2	55	57
Illinois	Sangamon River System	0	26	26
Illinois	Lower Illinois River Tributaries and American Bottoms	0	13	13
Kaskaskia	Kaskaskia River System	2	98	100
Shawnee	Big Muddy River System	10	26	36
Shawnee	Cache River System	15	28	43
Shawnee	Massac, Bay, Lusk, Big Grand Pierre and Big Creek Systems	5	28	33
Shawnee	Saline River System	1	10	11
Wabash	Little Wabash River and Bonpas Creek Systems	3	65	68
Wabash	Embarras River and Wabash River Tributaries	2	39	41
Wabash	Vermilion and Little Vermilion River Systems	0	18	18
All units combined		150	805	955

[a] Data for 1983–1993 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.

Figure 1. Sites where biologists from the Illinois Department of Natural Resources detected evidence of the presence of river otters (i.e., tracks, scats, or prey remains), 1999–2004.