

# Otter Population Analyses 2015

By Robert E. Rolley, Nathan M. Roberts, and Teresa R. Pearson

## **Abstract**

Suitable survey conditions for the otter aerial survey were limited during the winter of 2014-15 in central and southern Wisconsin, only 26 of 69 transects were completed in 2015. Trends in otter track detections on aerial surveys during 2001-15 suggest decreasing otter populations in northern and central Wisconsin and a stable population in southern Wisconsin. However, uncertainty about otter population status remains. Estimates of Wisconsin's otter population from the furbearer population model declined approximately 35% from about 14,000 animals in 1994 to 8,600 in fall, 2007. Reduced harvest during 2007-10 appeared to allow population growth. The fall 2015 population estimate is approximately 10,800 while the population goal is 13,000. The WDNR Furbearer Advisory Committee recommended a harvest goal of 1,700 otters for the 2015-16 trapping season.

## **Introduction**

Kohn and Ashbrenner (1984) described earlier attempts to obtain age and reproductive data for Wisconsin otters via carcass collections. They also tested an aerial survey to estimate otter population trends, and attempted to estimate the statewide population and allowable harvests. This report summarizes and compares data collected since then.

## **Methods**

Wisconsin trappers are required to register their otters with the DNR. The area of kill (county and game management unit), date of kill, sex of the animal, type of trap used, and the name and address of the trapper were recorded for each animal registered.

Trappers were also required to periodically submit the carcass of harvested otters to the Department. Carcass collections were conducted in 1979-82, 1994-95, 1998-99, 2001-02, 2006-07, 2009-10, and 2012-13. Otter carcasses are scheduled to be collected during the 2015-16 season. Teeth, including the third premolar and a canine, were sent to Matson's Laboratory, Milltown, MT for processing and aging by counting annuli in the cementum. Ovaries were removed from all female carcasses and stored in 10% formalin until they were firm enough to hand section. The sections were then examined for *corpora lutea* to estimate pregnancy rates and litter size.

An aerial survey to estimate regional otter population trends was developed beginning in 2001. The aerial survey involved recording the presence or absence of otter tracks at stream and river crossings along 30-mile transects within each Otter Management Zone (Fig. 1). The transects selected had  $\geq 8$  stream crossings in each to provide adequate sample sizes, and were located to provide an even distribution within each Management Zone. Twenty-three permanent transects were established in each Otter Management Zone. Based on analysis of the data collected during 2001-03 (Kohn and Roth 2003), the aerial survey was adopted as an operational field survey. Wildlife Management personnel have conducted the survey annually since 2004.

Transects were surveyed from Cessna 172 and 182 aircraft using 1-2 observers plus the pilot. Surveys were conducted between 9am and 3pm on bright, sunny days 1-3 days after a significant (>2") snowfall. The date, days since snow, cloud cover, and observers names were recorded when each transect was surveyed. At each stream/river crossing, the pilot circled the plane as low as necessary to thoroughly search for otter tracks. Ice conditions and the presence or absence of otter tracks were recorded at each crossing.

Data on harvest size, sex-specific age-structure of the harvest, and reproductive rates were incorporated into the Minnesota Furbearer Population Model to obtain statewide otter population estimates. Trends in otter track sightings from the aerial survey have been used to calibrate the population model.

## **Results**

### **Age structure and reproductive rates**

Carcasses were obtained from 1,079 otters (646 males, 416 females, 17 unknown) harvested during the 2012-13 season and age at harvest was estimated for 642 males and 414 females. Age data has been obtained from 3,505 male and 2,491 female otters harvested since 1979 (Tables 1 and 2). Age distributions were similar between sexes. The age structure in the harvest has changed over the 7 collection periods for both sexes. The proportion of juveniles was lower and the proportion of yearlings or 2.5 year old otters was higher in the 4 most recent collections than in the 3 prior collections.

Ovaries and uterine horns were collected and examined from 1,290 yearling and adult female otters since 1979 (Table 3). Pregnancy rates (based on *corpora lutea*) averaged 32% for yearling and 73% for adult females. Average litter sizes were 1.7 for yearlings and 2.0 for adults. Mean litter sizes for yearling and adult otters, and adult pregnancy rates have remained relatively stable since otter carcass collections began in 1979. But, it appears that yearling pregnancy rates may have increased since the mid-1990s. Yearling pregnancy rates of otters collected during 1979-95 were about 10% as compared to pregnancy rates of 30-46% during the last 5 carcass collections.

### **Aerial Survey**

Suitable survey conditions for the otter aerial survey were limited during winter of 2014-15 in central and southern portions of the state. As a consequence, only 2 of 23 transects in the central zone, and 1 of 23 transects in the southern zone were completed in 2014-15. All 23 transects in the northern zone were completed in 2014-15. Regression analysis of the percentage of stream and river crossings with otter tracks on aerial surveys during 2001-2015 suggest a non-linear trend in otter populations in northern Wisconsin, declining during the 2000s but then stabilizing ( $P = 0.05$ , Table 4). The percentage of stream crossing in central Wisconsin where otter track were detected declined during 2001-2015 ( $\lambda = 0.90$ ,  $P < 0.01$ ). In southern Wisconsin, aerial survey results suggested a stable population ( $\lambda = 1.00$ ,  $P = 0.96$ ).

### **Population Estimates**

Because of the declining trend in otter tracks observed on the aerial surveys during 2001-08, in 2009 the WDNR Furbearer Advisory Committee decided to reduce the starting population size in the population model to improve the correspondence between the population trend suggested by aerial surveys and the trend simulated by the model. Population estimates calculated by the

model suggested that the statewide otter population increased from approximately 12,000 animals in 1983 to about 14,000 in 1994, and then declined to 8,600 otters in 2007 (Table 5). The model suggests that the population declined when harvest rates exceeded 13% of the preharvest season population. Harvest exceeded that level in most years during 1994-2006. As a result, the estimates of statewide fall otter population have been below the established population goal of 13,000 otters in Wisconsin since the late 1990s. The model suggests that reduced harvests in 2007-11 allowed population growth but higher harvests in 2011-13 slightly reduced population size. Lower harvests in 2013-14 and 2014-15 appeared to have allowed slight population growth.

## **Discussion**

The limited recent data from the otter aerial survey, together with the poor correlation among 1) trends in track sightings on aerial survey, 2) otter harvest success rates (Dhuey and Olson 2014a), and 3) opinions of beaver trappers regarding otter population status (Dhuey and Olson 2014b), results in considerable uncertainty about recent otter population trends in the state. The WDNR Furbearer Advisory Committee considered data from all of these sources and recommended a harvest goal of 1,700 otters for the 2015-16 trapping season distributed among management zones as follows: North 40%, Central 30%, South 30%.

## **Literature Cited**

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- Kohn, B.E., and J.E. Ashbrenner. 1984. Harvest and population status of river otter in Wisconsin. *Wis. Dep. Nat. Resour. Research Report 129. 16pp.*
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**Table 1.** *Percentage of male otters harvested in Wisconsin in age class, 1979-2013.*

Age Class	1979-95	1998-99	2001-02	2006-07	2009-10	2012-13	Pooled
0.5	47%	47%	42%	40%	33%	34%	41%
1.5	21%	23%	27%	25%	25%	26%	24%
2.5	11%	8%	12%	16%	13%	12%	12%
3.5	8%	7%	7%	4%	9%	9%	7%
4.5	6%	3%	3%	4%	6%	5%	4%
5.5	3%	4%	1%	4%	4%	3%	3%
6.5	2%	3%	3%	3%	2%	3%	3%
7.5	1%	2%	1%	1%	0%	3%	1%
8.5	1%	1%	0%	2%	3%	1%	1%
9.5	1%	0%	1%	0%	3%	1%	1%
10.5+	1%	3%	1%	1%	2%	2%	2%
No. Aged	864	599	643	522	235	642	3,505

**Table 2.** *Percentage of female otters harvested in Wisconsin in age class, 1979-2013.*

Age Class	1979-95	1998-99	2001-02	2006-07	2009-10	2012-13	Pooled
0.5	48%	49%	39%	36%	40%	39%	43%
1.5	15%	21%	25%	24%	24%	26%	22%
2.5	15%	9%	11%	11%	12%	10%	12%
3.5	8%	5%	9%	9%	10%	6%	7%
4.5	6%	3%	5%	6%	3%	6%	5%
5.5	2%	2%	4%	3%	3%	4%	3%
6.5	3%	3%	2%	4%	2%	4%	3%
7.5	1%	3%	1%	3%	3%	2%	2%
8.5	2%	2%	1%	1%	1%	1%	1%
9.5	0%	1%	0%	0%	1%	1%	1%
10.5+	1%	2%	2%	2%	1%	1%	2%
No. Aged	610	465	477	353	172	414	2,491

**Table 3.** *Reproductive data from female otters collected in Wisconsin.*

<u>Age Class</u>	1979-95	1998-99	2001-02	2006-07	2009-10 <sup>a</sup>	2012-13 <sup>a</sup>	All Seasons
Yearlings (Age Class 1.5)							
Number examined	103	82	113	67	38	101	504
Number pregnant	10	38	48	22	14	30	162
Percent pregnant	9.7	46	42	33	37	30	32
Mean number of corpora lutea	1.7	2.0	1.7	1.6	2.1	1.7	1.7
Number with embryos	0	0	2	2			4
Mean number of embryos			2.0	2.0			2.0
Adults (Age Class 2.5+)							
Number examined	211	117	158	111	57	132	786
Number pregnant	143	102	120	71	44	97	577
Percent pregnant	68	87	76	64	77	73	73
Mean number of corpora lutea	2.2	2.3	2.0	2.0	2.2	2.2	2.1
Number with embryos	14	16	10	6			46
Mean number of embryos	2.4	2.4	2.5	2.0			2.4

<sup>a</sup> Embryo counts were not made in 2009-10 or 2012-13.

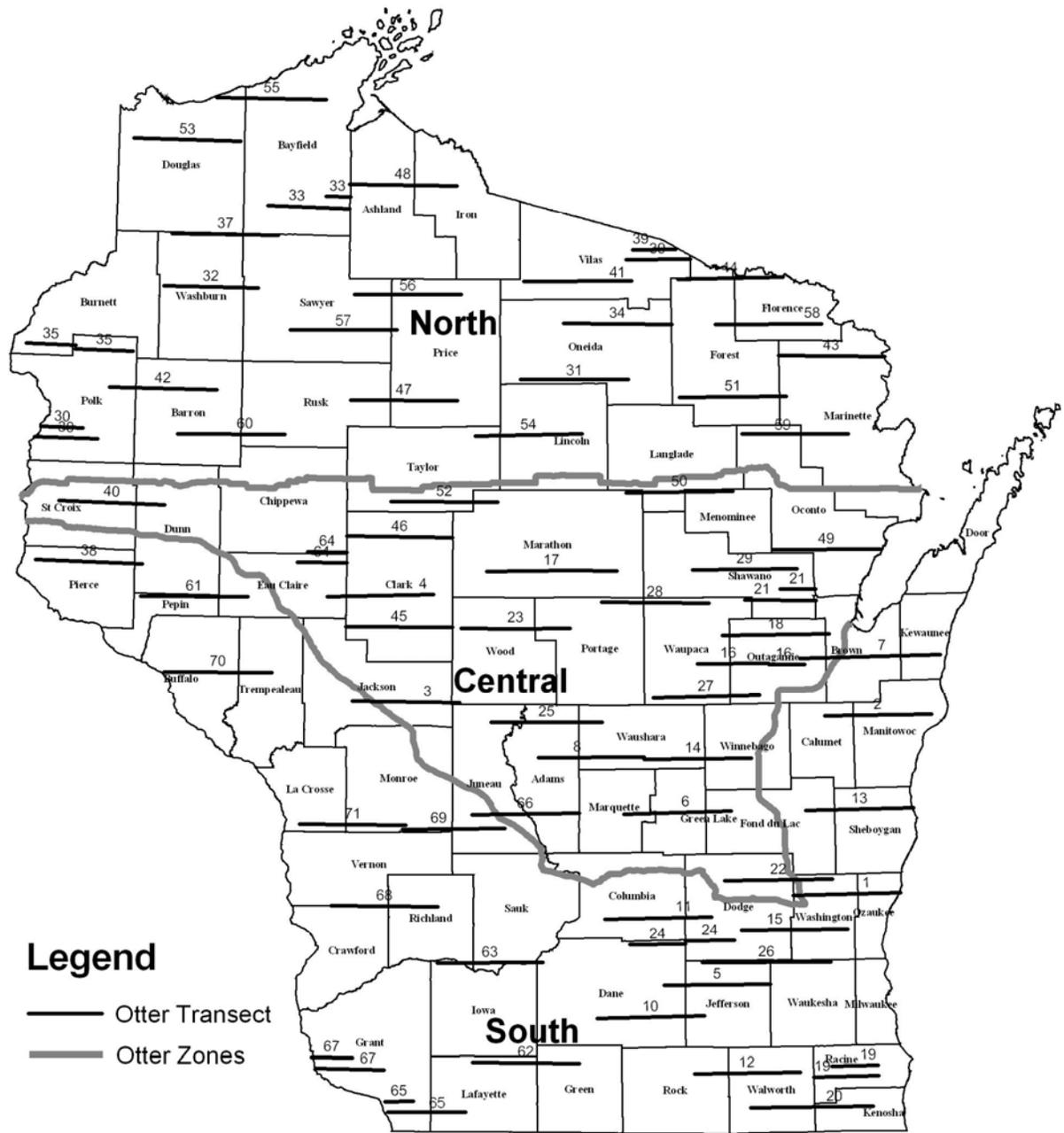
**Table 4.** Results from aerial otter surveys conducted in 2001-2015.

Otter Management Zone	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
North															
No. Transects Surveyed	18	23	23	23	23	23	23	23	18	7	18	0	0	14	23
No. Stream/River Crossings	180	257	241	280	241	302	258	285	181	89	193			142	196
% of Crossings With Otter Tracks	17	25	19	19	23	14	17	12	12	15	14			16.2	16.8
SE (%)	4.2	4.1	3.2	2.7	3.2	2.5	3.7	2.2	1.8	5.4	2.6			3.0	10.2
Central															
No. Transects Surveyed	0	14	23	11	23	19	23	23	17	21	23	0	13	15	2
No. Stream/River Crossings		152	224	115	210	220	196	198	149	188	203		118	108	16
% of Crossings With Otter Tracks		29	14	15	15	7	14	8	10	5	6		9	5.6	0
SE (%)		4.0	2.5	4.3	3.3	2.2	2.8	2.0	1.8	2	1.7		3.1	3.7	0
South															
No. Transects Surveyed	0	5	23	21	23	13	23	23	10	22	23	0	3	23	1
No. Stream/River Crossings		73	245	262	267	171	211	214	127	220	258		34	234	9
% of Crossings With Otter Tracks		4	7	4	5	2	8	6	7	10	8		12	2.6	0
SE (%)		2.1	2.1	3.1	2.0	1	3.2	1.5	1.8	3.3	3.0		2.8	2.8	0

**Table 5.** Wisconsin otter population estimates<sup>a</sup> and harvests, 1983-2015.

Year	Preharvest population	Harvest	Harvest rate (%)
1983-84	11,800	995	8
1984-85	12,100	1,213	10
1985-86	12,100	960	8
1986-87	12,500	1,588	13
1987-88	12,200	1,724	14
1988-89	11,700	1,140	10
1989-90	11,900	1,294	11
1990-91	12,000	818	7
1991-92	12,600	883	7
1992-93	13,200	1,060	8
1993-94	13,700	1,212	9
1994-95	14,100	1,900	13
1995-96	13,700	1,599	12
1996-97	13,700	2,521	18
1997-98	12,900	2,809	22
1998-99	11,800	1,631	14
1999-00	11,900	2,278	19
2000-01	11,300	1,945	17
2001-02	11,100	2,701	24
2002-03	9,900	2,096	21
2003-04	9,300	1,544	17
2004-05	9,000	1,275	14
2005-06	9,100	1,511	17
2006-07	8,800	1,458	17
2007-08	8,600	990	12
2008-09	8,800	709	8
2009-10	9,400	752	8
2010-11	10,000	913	9
2011-12	10,400	1,487	14
2012-13	10,200	1,445	14
2013-14	10,100	907	9
2014-15	10,700	1,202	11
2015-16	10,800	---	---
Goal	13,000		

<sup>a</sup> Population estimates are from the furbearer population model.



**Figure 1.** Location of aerial otter transects and boundaries of Otter Management Zones in Wisconsin.