# RIVER OTTER ASSESSMENT

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## NATURAL HISTORY[1]

River Otters range from Alaska and the Northwestern States across the Canadian Provinces, southward through the Atlantic and Gulf States into eastern Texas. Populations are absent or tenuous in the Mississippi drainage above the junction of the Ohio River.

Otters have long rounded bodies, small heads with small ears, short legs, webbed toes, and long, thick and pointed tails. Female otters are smaller than males. Adults range from just under 3 feet to over 3 ½ feet long and weigh from 12 to over 30 pounds. The fur is short and dense; color ranges from dark brown to pale chestnut on the back and light brown to silver gray on the belly. Otter pelts start to become prime in early November, peak in December, and begin to decline in value in January due to changes of the tips of the guard hairs.

Northern river otters normally reach breeding age at 2 years and may not produce young until 3 or older, although some females produce their first litters at 2 years of age. Breeding takes place from mid-winter to early spring. Although the delayed implantation of fertilized ova causes variation in the length of pregnancy, otters probably produce young about 1 year after breeding.

Litter size ranges from 1 to 6, although most litters contain 2 to 4 offspring which are blind and helpless, but fully furred at birth. Young otters begin to eat solid food at 2 months and are weaned at 3 months of age.

[1] Adapted from Chapter 36, River Otter, Loweill, D. E. and J. E. Tabor in Wild Mammals of North America, 1982, Chapman, J. A. and G. A. Feldhamer, eds., The Johns Hopkins University Press.

Otters occur in major river systems, and in the lakes and tributaries that feed them. They are abundant in food-rich coastal areas such as the lower portions of streams and rivers and estuaries. Otters are scarce in heavily settled areas and in food-poor mountain streams.

Water pollution can cause declines in the aquatic life otters eat, and they are not found in heavily polluted waterways.

Studies in Idaho estimated that a 10 mile stretch of stream could support 4 to 7 otters, including a female with 2 or 3 pups, 1 or 2 subadults or nonbreeding adults, and a breeding male. European otter densities have been found to be twice as high along lake shores as along streams.

Otters are active year round, and may use ice-free waters where available during northern winters. They may be active at any time of day, but peak feeding activity occurs from dawn to mid morning.

Although northern river otters do not dig dens, they will use natural shelters or dens dug by other animals. Natural shelters include beaver houses and dens, hollow logs, log jams or drift piles, jumbles of loose rock, abandoned or unused boat houses, and duck blinds.

The bulk of the otter's food consists of fish, with crustaceans (primarily crayfish), amphibians, insects, birds, and mammals comprising lesser portions of the diet. Almost all studies have found that otters prey on fish in direct proportion to their availability, and in inverse proportion to their swimming ability; abundant slow-moving fish species, such as suckers, are fed upon by otters more often than their abundance in the water would

indicate.  Crayfish are important to a balanced diet for otters, and a variety of crabs are also eaten in estuarine areas.

Otters are highly intelligent; their inclination to make a "game" out of almost any activity is almost legendary.

# HISTORY

## Habitat Trends

Maine's geology and climate have produced a large, stable number of lakes, rivers and streams, and estuaries, which have been used by otter. Historical changes in the quantity and quality of Maine's otter habitat have been caused primarily by man's activities. Dam construction and the pollution of waterways in conjunction with lumbering, industrial and municipal activities have substantially influenced the State's otter habitat. Dams have a major impact on waterways by changing the configuration of their underwater areas and their limnological conditions. Dam construction started shortly after the first Europeans settled in the State and peaked in the industrial expansion era, but few dams have been built in recent years as envirorlmental concerns produced restrictive laws. However, by the time these laws were passed, dams and their associated impoundments had been constructed on most rivers and large streams. Although the effect of these dams on the amount of the otter habitat has not been measured, they are presumed to have increased the area available to otters.

Dams can have both positive and negative effects on the quality of otter habitat. Most early use of water stored behind dams resulted in unstable water levels and flows, which were detrimental to the aquatic life used by otters for food. Some impoundments were emptied all at once to drive logs, or to refill lower impoundments, and there usually were no attempts to maintain constant water levels. The physical forces of impoundment emptying must have nearly eliminated otter foods in their outlets, and the water drawdowns had negative effects on the aquatic life within impoundments.

Man's nearly universal habit of disposing both solid and liquid wastes into the State's waterways had the largest impact on the quality of Maine's otter habitat. This practice was widespread in the 1800's when the State became one of the world's larger producers of lumber. The lumbering industry's impacts on otter habitat started in the southwest part of the State in the late 1700's, and moved north and east during the history of the State. Most transportation of logs by waterways ended by the late 1960's. Lumbering operations commonly discharged all their sawdust, bark and edgings into the water. Decaying logs, bark and wood by-products reduced the dissolved oxygen levels in waterways, but this practice was justified and accepted because the cleansing and flushing action of high water runoff apparently improved or restored conditions. The continual flushing and log-driving served to keep aquatic animal populations at low levels until early in the 20th century, when the nation's newly completed railroad network began delivering low cost western lumber to the east coast. This caused a shift in lumbering activity in Maine, and the rivers and streams that had been used to transport logs to sawmills became used to take small logs and bolts to paper mills. However, the same water storage and flushing techniques used to move sawlogs continued to be used to move pulpwood to the mills.

The discharge of industrial and municipal waste into the water had an equal or greater impact on Maine's otter habitat than lumbering wastes. In towns and cities where local soils were unsuitable for on-site disposal, underground collectors discharged raw sewage from both homes and factories directly into the waterways. During the industrial expansion that followed the Civil War, chemicals were added to the sewage, primarily from the leather-tanning and paper-making industries. Food

processing, textile and other industries also contributed chemical wastes. By the early 1900's most waterways with towns or cities on their banks were probably polluted to the point that they became unsuitable for otters. After World War II, public concern over water pollution resulted in legal requirements, recovery techniques and engineering improvements in sewage treatment that have continued to the present. Consequently, otter habitat quality has improved.

In summary, all of the State's waterways were otter habitat in primitive times. During the 1800's and early 1900's, man's lumbering activities and pollutants destroyed most suitable otter habitat in the developed parts of the State. In the last 40 years, environmental concerns and controls on pollution have resulted in a recovery in water quality, and presently all waterways in the State contain otter habitat. The introduction and use of persistent chemicals during the 20th century may still impact otter habitat quality, but the effects of these chemicals have not been measured.

## Population Trends

Historically, otter populations probably followed the trends in habitat quality described in the previous section. In the past, the density and magnitude of wild animal populations were assessed by opinions based on personal experiences. No reports of this type have survived into existing literature. The original explorers of Maine reported finding otters, and all reports on the occurrence of animals since that time include otters. It is assumed that wherever humans lived or traveled in the State, exploitation kept otter numbers below the capability of the habitat.

In more recent times, although good sampling and survey systems have been developed for many wildlife species, no system is available to assess otter abundance. In a survey of game wardens in 1941, Aldous and Mendall reported that otters were present throughout the State. They were considered abundant in the region around Fort Kent, common in Washington County and in the 5 northern counties, and rare in the rest of the State. My own recollection is that the sighting of an otter was the subject of excited neighborhood talk in southern Somerset County during the late 130s and early 140s. Since then, otter populations have been subjected to considerably lower harvest pressure than in earlier years, and otter numbers have apparently increased.

## Use and Demand Trends

Otter pelts have had some monetary value throughout recorded history, for they possess durable leather and dense high quality hair. They were used by North American natives and adorned the cloaks of European royalty. Colonial fur trade records contain numerous mentions of otter pelts. In recent years, otters have become a symbol of wilderness settings, and are sought after by outdoor enthusiasts wishing to view or photograph them. However, river otters have traditionally been pursued by trappers and hunters because of the value of their pelts.

### *Harvest Regulations*

The methods used to take otter in Maine have changed considerably over the years. Prior to the 1870's, otter were killed by shooting, and with deadfalls or traps fashioned by driving sharp nails into hollow logs to imprison them. After the leghold

steel trap was introduced in the 1870's, otter were most commonly taken by trapping, although they were still shot on occasion. Although trained dogs were commonly used to take otter in southern states, few hunters hunted otter with dogs in Maine. In 1967, the hunting of otter was outlawed. The Conibear killer trap was introduced in the late 1960's, and soon became legal for use underwater. Conibear traps are the most effective devices known for taking otter. Since its legalization, the Conibear trap has probably accounted for most otter taken intentionally in Maine.

The taking of otters in Maine has been regulated through closed seasons since the early 1900's, but the earliest season records are from 1940 (Table 1). Although opening and closing dates have varied since then, the open season on otter has usually run from mid to late October to late November or early December. A winter season, including part of January and February, was added from 1952 through 1975. Although no winter trapping season for otter has existed since 1975, otter taken incidentally during the winter months by beaver trappers may be lawfully possessed. Consequently, the beaver trapping season is another winter trapping season for otters.

The Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) was ratified in July, 1975 by 24 nations, including the United States. This Convention established appendices that categorized the status of plants and animals. Appendix I included animals classified as endangered, and contained no animals native to Maine for which a harvesting season was provided. All otter species (Lutrinae) not in Appendix I were placed in Appendix II. Species in Appendix II are classed as threatened or look like Appendix I species, and are subject to certain rules before they can be exported from the United States. These rules require: 1) proof

Table 1. Otter management history in Maine.

| Year | Estimated effort | Estimated price | Estimated harvest | Statutes and Regulations |
|---|---|---|---|---|
| 1940-1948 | -- | -- | -- | October 16 to February 15 |
| 1950 | -- | -- | -- | Month of November |
| 1951 | -- | -- | -- | Month of November |
| 1952 | -- | -- | -- | Month of November and |
| 1953 | -- | -- | -- | January 1 to February 7 |
| 1954 | -- | -- | -- | " |
| 1955 | 2,005[1] | 21.00[2] | 347[2] | Month of November and |
| 1956 | 2,011 | 25.00 | 502 | January 1 to February 28 |
| 1957 | 1,656 | 21.00 | 442 | " |
| 1958 | 1,486 | 23.00 | 447 | " |
| 1959 | 1,360 | 26.00 | 408 | " |
| 1960 | 1,381 | 24.00 | 455 | " |
| 1961 | 1,407 | -- | -- | " |
| 1962 | 1,323 | 22.00 | 414 | " |
| 1963 | 1,435 | 21.00 | 456 | " |
| 1964 | 1,698 | 24.00 | 471 | " |
| 1965 | 1,600 | 26.00 | 504 | " |
| 1966 | 1,586 | 23.00 | 391 | " |
| 1967 | 1,507 | 23.00 | 423 | Months of November, December, and |
| 1968 | 1,496 | 20.00 | 318 | January; Unlawful to hunt. |
| 1969 | 1,741 | 27.00 | 444 | " |
| 1970 | 1,648 | 26.00 | 588 | " |
| 1971 | 1,649 | 32.00 | 637 | November 1 to February 29; |
| 1972 | 1,916 | 40.00 | 593 | Unlawful to hunt. |
| 1973 | 2,553 | 36.00 | 908 | November and January |
| 1974 | 3,226 | 32.00 | 1,005[3] | " |
| 1975 | 3,373 | 21.00 | 446 | " |
| 1976 | 1,189[4] | 55.00 | 525 | WMU's 1-2 October 20 to November 30[6] |
| 1977 | 1,363 | 48.00 | 664 | WMU's 3-8 November 1-30 |
| 1978 | 1,258 | 57.00[5] | 694 | WMU's 1-6 October 20 to November 25<br>WMU's 7-8 October 25 to November 15 |
| 1979 | 1,927 | 57.00 | 937 | WMU's 1-3 October 20 to November 25 |
| 1980 | 1,072 | 42.00 | 663 | WMU's 4-8 November 1-30 |
| 1981 | 1,740 | 30.00 | 608 | North and West Zones Oct. 20 - Nov. 30; |
| 1982 | 1,915 | 29.00 | 686 | South Zone October 28 to November 30 |
| 1983 | 1,745 | 28.00 | 684 | North Zone October 20 to December 4;<br>South Zone October 28 to December 4 |
| 1984 | 1,840 | 28.00 | 812 | North Zone October 28 to December 15;<br>South Zone October 28 to December 4 |

[1]Annual trapping license sales.

[2]Trapper questionnaire survey.

[3]Pelt tagging record.

[4]Successful fall and winter water trappers.

[5]New Hampshire and Maine furbuyer surveys.

[6]Closed to hunting to present.

(such as a tamper resistant pelt tag) of the state of origin on each pelt sold, and 2) species data showing that harvests are not detrimental to the population. In 1977-78, Maine's annual harvest quota was set at 600 otter to meet the second requirement.

There were annual changes in the federal agencies and the way that CITES was administered until October 13, 1982, when the U.S. President signed the extension of the Endangered Species Act. This new act removed the requirement of accurate population information. Since then, proper tagging with USFWS tags and a statement concerning the status of the otter population have constituted the requirements for export of otter pelts taken in Maine.

*Harvest Trends*

Palmer (1937) reported the statewide otter catch averaged 151 pelts annually from 1928 to 1935. No harvest records are available from the following 20 years, but otter catches have been monitored continuously since 1955 (Table 1).

Trapper questionnaires were used to estimate harvests from 1955 to 1974; estimated otter harvests ranged from about 300-1,000 annually during this period. Mandatory tagging of otter pelts began in 1975. Since then, reported otter catches have ranged from 446 to 937 per year. In the last 10 years, about half of each year's otter catch has been taken during the winter beaver trapping season.

*Users*

Since 1955, the sale of trapping licenses has provided a source of information on consumptive users of Maine's otter resource (Table 1). License sales were remarkably

constant until 1971, when they increased rapidly, tracking rapid increases in the value of pelts of long-haired land animals. Although otter pelt values increased as well, these increases were not as great as for long-haired animals. Since 1982, the number of successful fall and winter water trappers (trappers that caught one or more mink, otter or beaver in fall or winter trapping seasons) has been monitored as a more accurate measure of the number of trappers who are potential takers of otter. Numbers of water trappers has stayed near 1,800 (1,915, 1,745, and 1,840) for the last three years. The increased water trapping effort in 1979 was partly due to favorable beaver trapping conditions and high beaver pelt prices, which resulted in increased effort on beaver and a high incidental catch of otter.

Past Management Goals

In May, 1975, the first management goal and objective adopted for otter was: to maintain a harvest of 800 otter by 350 trappers. By 1980 the actual 4-year average catch was 740 otter and was showing an upward trend. During this time, as a result of the 1975 objective, 11 strategies were identified and pursued in the form of job objectives. Two of these objectives were not met, including the crucial one to shift harvest and harvest pressure to the more remote and less accessible portions of the State. The other objective which has not been accomplished is the development of a field survey that supplies a good index of otter population levels.

In 1980 a goal to increase the harvest and maintain otter abundance, and an associated objective of harvesting otter annually with the take adequately distributed

among Wildlife Management Units was adopted. In 1984 the actual 4 year average take was 698 otter.

Actual otter-specific management has been restricted by e philosophies and realities that are applied to trapping rules. These include simplification of trapping laws, and a :statewide approach to rule making, which attempt to minimize both law enforcement problems and political problems caused by non-local trappers. Because of the limited selectivity of trapping, laws and rules are developed for groups of several furbearing species. Wherever a set of laws and rules are used to manage a group of species, they must be tailored to those species most affected by harvests. Consequently, management of the group of species becomes less precise.

The deviation between actual harvests and objective harvests (Table 2) do not reflect accomplishments, for while there are areas where harvest objectives are being met, the Statewide objective harvests have not been met.

Table 2. Comparison of otter harvest and otter plan objective harvest.

| Year | Objective | Harvest | Deviation (%) |
|---|---|---|---|
| 1975 | 800 | 446 | - 44 |
| 1976 | 800 | 525 | - 34 |
| 1977 | 800 | 664 | - 17 |
| 1978 | 800 | 694 | - 13 |
| 1979 | 800 | 937 | + 17 |
| 1980 | 900 | 663 | - 26 |
| 1981 | 900 | 608 | - 32 |
| 1982 | 900 | 686 | - 24 |
| 1983 | 900 | 684 | - 24 |
| 1984 | 900 | 812 | - 10 |

# HABITAT ASSESSMENT

## Statewide

### *Status*

Otter are almost entirely aquatic, and spend most of their time in areas less than 10 feet deep. The amount of area covered by this shallow water habitat in the State was not available for this assessment. Instead, the area of aquatic habitat less than 10 feet deep was assumed to be directly related to shoreline length. Consequently, this linear estimate of otter habitat should be used with caution, as it is imprecise.

Potential otter habitats include 37,648 miles of the 44,874 miles shorelines in the State (Table 3). Shorelines which were not considered otter habitat include those in urban areas, developed nonurban areas, tidal areas on offshore islands, and shores which are not protected from open sea wave action. These habitats are subdivided into several categories: brooks and streams, rivers, lakes and ponds, fresh marshes, and tidal marshes and shoreline. One-half of the total lengths of brook and stream shorelines were used in measuring otter habitat, while the entire shorelines of the remaining habitat categories were used. Individual otters would likely use both shores of brooks and streams, because they are not separated by deep-water areas. The interrelationships between these 5 habitat categories are probably important to otter, but their impact is unknown, and they have not been included in this assessment.

The abundance of aquatic animals that otter use as food determine habitat quality, and were estimated by applying a Habitat Suitability Index to available data (Table 3). Because direct measures of aquatic animals are lacking, the total dissolved

Table 3. Current otter habitat suitability.

| Wildlife Management Unit | Total[1] Shoreline Miles | Total Habitat Miles | Average Food Index | Total Habitat Units |
|---|---|---|---|---|
| 1 | 3,893 | 3,589 | 0.55 | 1,973 |
| 2 | 9,449 | 8,411 | 0.61 | 5,089 |
| 3 | 5,976 | 5,595 | 0.59 | 3,321 |
| 4 | 7,942 | 7,313 | 0.51 | 3,758 |
| 5 | 3,957 | 3,569 | 0.60 | 2,148 |
| 6 | 5,328 | 3,619 | 0.63 | 2,277 |
| 7 | 3,560 | 2,406 | 0.50 | 1,209 |
| 8 | 4,769 | 3,146 | 0.56 | 1,766 |
| Totals | 44,874 | 37,648 | -- | 21,541 |

[1]One mile for each shoreline mile of lakes, ponds, marsh, coastal tide zone plus one mile for each mile of stream plus two miles for each mile of river.

solids in the water are used as an approximate measure of aquatic animal abundance. No surveys of dissolved solids have been undertaken, but they are known to differ among the 5 habitat categories. These differences were categorized and converted to an approximate index value for each otter habitat category. This approach may seem inaccurate, but it is supported by information about relative amounts of otter activity in the various habitat categories. The index indicates that much of Maine's shoreline is good quality otter habitat.

In summary, 37,648 miles (84%) of the State's shoreline is considered otter habitat. Most otter habitat has been assigned quality values greater than 0.6 on a scale of 0.0 to I.O. The number of otter habitat units in Maine was estimated at 21,541 by multiplying the quantity of habitat in various quality values by their index values (Table 3). one habitat unit is considered to be equivalent to a mile-long stretch of shoreline having maximum habitat value.

*Changes*

The amount of Maine's otter habitat is assumed to be decreasing at a constant and small rate due to human developments, although recent improvements in water quality may have increased the amount of water used by otter. Records of approved development applications suggest that about 6 shore miles of otter habitat are lost per year in Maine. Seventy-five percent of the approved development applications have affected shorelines of lakes, ponds, rivers, and streams, while 9% affected fresh marshes and 6% of the applications affected coastal shores. over half of the total development applications were filed by landowners in the coastal portion of the State.

Otter habitat quality probably increased in the past decade due to environmental laws and rules, but there are no data available to quantify this. Persistent chemicals were introduced to Maine's waterways rather recently, and while they may have long-term detrimental impacts on otter habitat, their effects have not been measured.

The 1980 otter species assessment contained an estimate of 50,830 miles of otter habitat. Although the current estimate of habitat (37,648 miles) is considerably lower than the 1980 estimate, the methods and criteria used to estimate habitat have changed considerably, and no comparisons can be made.

*Projections*

The small decreases in otter habitat due to developments are expected to continue at a constant rate, and should result in a loss of about 29 shoreline miles by the year 1990 (Table 4). The quality of Maine's otter habitat is expected to remain near present levels. Acidification from atmospheric pollutants is suspected, but the present and future extent and impact of this problem is not known (Fred Kircheis, personal comm., March, 1986).

Wildlife Management Units

*Status*

Habitat values in this plan are treated equally statewide (Table 3). Habitat differences between WMU's are only caused by the amount of habitat in each category and the amount of human developments. These developments account for varying amounts of each habitat category, ranging from 73% of the coastal shoreline in WMU 8

Table 4. Future otter habitat suitability.

| Wildlife Management Unit | Total[1] Shoreline Miles | Total Habitat Miles | Average Food Index | Total Habitat Units |
|---|---|---|---|---|
| 1 | 3,893 | 3,589 | 0.55 | 1,973 |
| 2 | 9,449 | 8,409 | 0.61 | 5,088 |
| 3 | 5,976 | 5,591 | 0.59 | 3,319 |
| 4 | 7,942 | 7,310 | 0.51 | 3,755 |
| 5 | 3,957 | 3,567 | 0.60 | 2,147 |
| 6 | 5,328 | 3,615 | 0.63 | 2,274 |
| 7 | 3,560 | 2,402 | 0.50 | 1,207 |
| 8 | 4,769 | 3,136 | 0.56 | 1,760 |
| Totals | 44,874 | 37,619 | -- | 21,523 |

[1]One mile for each shoreline mile of lakes, ponds, marsh, coastal tide zone plus one mile for each mile of stream plus two miles for each mile of river.

to 1% of pond, river, and stream shoreline in WMU 2. The variation in food index values between WMU's is a direct result of the proportion of otter habitat within each habitat category in each Unit.

*Changes*

Because different criteria were used to assess otter habitat in the 1980 species assessment, no comparisons can be made with the current habitat assessment. Development of shoreline, as identified by approved permits, indicate the greatest loss of habitat is occurring in WMU 8, where 27% of the State's approved permits were filed. WMU's 3, 4, 6, and 7 each had 13% to 15% of the approved permits, while WMU's 1 and 2 had 4% and 8% of the approved permits respectively. Nearly half of all approved permits filed in WMU 6 affected marsh habitat.

*Projections*

Current trends in otter habitat are expected to continue (Table 4). By 1990 the amount of shoreline for use by otter is expected to decline 10 miles in WMU 8, 4 miles in each of WMU's 3, 6, and 7, and 2 miles or less in the remaining WMU'S. No change in habitat quality is expected in any WMU through 1990.

## POPULATION ASSESSMENT - CARRYING CAPACITY

### Statewide

*Status*

The State's carrying capacity for otter, or the aximum number of otter the habitat can sustain, was estimated by applying maximum otter density estimates to the number of habitat units calculated in the habitat section of this assessment. A density of 5 otter per habitat unit is estimated as the carrying capacity of all habitat types. Multiplication of these densities by the number of habitat units in each habitat category resulted in a statewide carrying capacity of about 20,000 otters (Table 5).

*Changes*

Because the criteria and methods used to asses carrying capacity for otter with 1980 species plan update are considerably different than those used during this assessment, no changes can be discussed.

*Projections*

Carrying capacity is expected to decline very l@ightly by 1990 (Table 5).

### Wildlife Management Units

*Status*

Carrying capacity differs considerably between WMU's Table 5). WMU 2 has the highest carrying capacity, and could support nearly one quarter of the statewide

Table 5. Current (1985) and projected (1990) maximum supportable otter populations by Wildlife Management Unit.

| Wildlife Management Unit | 1985 maximum supportable population | | 1990 maximum supportable population | |
|---|---|---|---|---|
| | Range | Midpoint | Range | Midpoint |
| 1 | 1,700- 2,240 | 1,970 | 1,700- 2,240 | 1,970 |
| 2 | 4,600- 5,570 | 5,090 | 4,600- 5,570 | 5,090 |
| 3 | 2,950- 3,690 | 3,320 | 2,950- 3,690 | 3,320 |
| 4 | 3,180- 4,340 | 3,760 | 3,180- 4,340 | 3,760 |
| 5 | 1,860- 2,440 | 2,150 | 1,860- 2,440 | 2,150 |
| 6 | 2,010- 2,550 | 2,280 | 2,000- 2,540 | 2,270 |
| 7 | 1,010- 1,410 | 1,210 | 1,010- 1,410 | 1,210 |
| 8 | 1,530- 2,010 | 1,770 | 1,520- 2,000 | 1,760 |
| Total | 18,840-24,250 | 21,550 | 18,820-24,230 | 21,530 |

carrying capacity, while WMU 1 could support one tenth of the statewide population of otter.

*Changes*

Methods and criteria for assessing otter habitat and carrying capacity were considerably different in the 1980 species plan update. Consequently, no change can be discussed.

*Projections*

The carrying capacities of WMU's 1-6 are expected to remain unchanged through 1990, with very marginal declines in carrying capacity are expected in WMU's 6 and 8 (Table 5).

## POPULATION ASSESSMENT - CURRENT ESTIMATED POPULATION

Statewide

*Status*

The otter population has not been subjected to any survey or measure anywhere in the State, and population estimates in this assessment are based on the capability of the habitat (Table 6). Factors other than harvests could keep populations below maximum, including: accidents, diseases and parasites, and climate. Otter densities are assumed to be at carrying capacity statewide. Catch-effort analyses for the last 9 years (1976 to 1984) do not reveal any indication of overharvests, and current otter numbers were conservatively estimated as the mid point of the range of carrying capacity based on habitat conditions. As a result, the current fall statewide otter population is estimated at between 19,000 and 24,000.

*Changes*

Because different methods and criteria were used to assess otter habitat and population status in 1980, no comparisons can be made.

*Proiections*

Otter populations are expected to remain stable through the year 1990 (Table 6).

Table 6. Current (1985) and projected (1990) otter population estimates.

| Wildlife Management Unit | 1985 estimated population | | 1990 estimated population | |
|---|---|---|---|---|
| | Range | Midpoint | Range | Midpoint |
| 1 | 1,700- 2,240 | 1,970 | 1,700- 2,240 | 1,970 |
| 2 | 4,600- 5,570 | 5,090 | 4,600- 5,570 | 5,090 |
| 3 | 2,950- 3,690 | 3,320 | 2,950- 3,690 | 3,320 |
| 4 | 3,180- 4,340 | 3,760 | 3,180- 4,340 | 3,760 |
| 5 | 1,860- 2,440 | 2,150 | 1,860- 2,440 | 2,150 |
| 6 | 2,010- 2,550 | 2,280 | 2,000- 2,540 | 2,270 |
| 7 | 1,010- 1,410 | 1,210 | 1,010- 1,410 | 1,210 |
| 8 | 1,530- 2,010 | 1,770 | 1,520- 2,000 | 1,760 |
| Total | 18,840-24,250 | 21,550 | 18,820-24,230 | 21,530 |

## Wildlife Management Units

### *Status*

The statewide otter population estimate resulted from combining population estimates calculated for individual WMU'S.

### *Changes*

Differences in methods and criteria used to assess the otter population status in the 1980 assessment prevent any comparisons with current estimates.

### *Projections*

Otter population estimates in all WMU's are largely determined by the amount and quality of habitat. Both habitat conditions and otter population levels are expected to remain rather stable in all Units through 1990 (Table 6).

## POPULATION ASSESSMENT - RELATIONSHIP OF CURRENT ESTIMATED POPULATION TO MAXIMUM SUPPORTABLE POPULATION

The current estimated otter population is the same level as the State's estimated maximum supportable population. Although this population is based on limited information, harvest levels in all WMU's do not contradict this conclusion.

## USE AND DEMAND ASSESSMENT - HARVEST

Statewide

*Status*

The recent 4-year (1981-1984) average annual reported take Of otter is about 700 animals (Table 7). Harvests have ranged from 608 to 812 during this period (Table 1).

*Changes*

Four-year average harvests ending in 1980 and 1984 were 740 and 698 otter respectively. Unusually favorable beaver trapping conditions in 1979, combined with high beaver pelt prices, resulted in heavy beaver trapping pressure and a high incidental otter catch. As a result, the 1979 harvest of 937 otter was the largest annual take ever recorded in Maine. This high harvest inflated the 4-year average harvest ending in 1980, and if it is disregarded, the State's take of otter seems to be remaining rather stable. About half of each year's catch is recorded during the winter beaver season.

*Projections*

The trend of decreasing otter harvest is expected to continue to 1990 (Table 8). Although the statewide harvest is expected to decrease by 30-35 otter per year, this forecast does not account for any impacts on trapping pressure by: fur garment fashions, international monetary exchange rates, and anti-wild fur campaigns. In

Table 7. Current otter harvest, effort and success rates.

| Wildlife Management Unit | Allowable average harvest | Current average harvest | Total winter trappers | Successful otter trappers | Percent successful | Otter trappers per 100 habitat units |
|---|---|---|---|---|---|---|
| 1 | 290-380 | 63 | 117 | 39 | 33 | 12 |
| 2 | 780-950 | 70 | 95 | 38 | 40 | 4 |
| 3 | 500-630 | 48 | 69 | 27 | 39 | 4 |
| 4 | 540-740 | 182 | 157 | 113 | 72 | 13 |
| 5 | 320-410 | 71 | 74 | 42 | 57 | 8 |
| 6 | 340-430 | 84 | 81 | 45 | 56 | 7 |
| 7 | 170-240 | 93 | 127 | 52 | 41 | 20 |
| 8 | 260-340 | 87 | 146 | 56 | 38 | 13 |
| Statewide | 3,200-4,120 | 698 | 956 | 412 | 43 | 8 |

Table 8. Future (1990) otter harvest, effort and success rates.

| Wildlife Management Unit | Allowable average harvest | Future average harvest | Future winter trappers | Future Successful trappers | Percent successful | Otter trappers per 100 habitat units |
|---|---|---|---|---|---|---|
| 1 | 290-380 | 70 | 140 | 40 | 29 | 12 |
| 2 | 780-950 | 60 | 170 | 30 | 18 | 3 |
| 3 | 500-630 | 50 | 110 | 20 | 18 | 4 |
| 4 | 540-740 | 200 | 450 | 60 | 13 | 16 |
| 5 | 320-410 | 80 | 130 | 40 | 31 | 9 |
| 6 | 340-430 | 80 | 130 | 40 | 31 | 8 |
| 7 | 170-240 | 130 | 150 | 20 | 13 | 10 |
| 8 | 260-340 | 150 | 280 | 40 | 14 | 7 |
| Statewide | 3,200-4,120 | 820 | 1,560 | 290 | 19 | 11 |

addition, trapping opportunities are impacted by relative access, land posting, climate, and statutes and rules. These additional factors have not been measured or included in this forecast.

## Wildlife Management Units

### *Status*

The largest average annual take (182) comes from WMU 4, double WMU 7's average take of 93 otter, which is the second highest Unit (Table 7). The take per unit of area is highest in WMU 7 at well over 4 otter/100 mi of habitat. Harvest densities in WMU's 4, 6, and 8 average a little over 3/100 mi ', with the harvest densities in the remaining WMU's averaging less than 3/100 mi.

Since 1980, most otter were taken by fall otter trappers in WMU 3, while winter beaver trappers usually reported taking the most otter in WMU's 1, 2, 5, 6, and 7; the catch was nearly equally distributed between fall and winter seasons in WMU's 4 and 8.

### *Changes*

Since 1976, harvest trends have varied greatly between WMU'S. Harvests have decreased in WMU's 2, 3, and 6, with WMU 2's harvest declining most rapidly at 3% per year. The largest increases in harvests have occurred in WMU's 7 and 8, where harvests have increased by 7% and 12% per year, respectively. Harvests in the remaining WMU's have been increasing at 5% or less each year.

In 1981, winter beaver trappers took considerably fewer otter than in the years since then; this harvest pattern is apparent in all WMU's except Unit 1.

*Projections*

Harvests are expected to increase in WMU's 4, , an 8, decrease in WMU 2, and remain rather stable in WMU's 1, 3 and 6 (Table 8). While these projections are based on limited information, they assume that current trends in harvest levels will continue.

# USE AND DEMAND ASSESSMENT - TYPES OF USERS

## Statewide

*Status*

Appropriative users of the otter resource are, by legal constraint, those trappers making their sets in or near the water. All trappers catching mink, beaver, or otter during the fall and winter are considered successful water trappers, and are potential otter trappers. No records of successful muskrat trappers exist, so these potential users of otter are currently unidentified. Statewide, an average of slightly over 1,800 individuals were successful water trappers during the 1981-1984 period, including 956 successful fall trappers and 412 individuals who were successful during the winter beaver season. Otter were taken by 23% of these trappers.

Nonappropriative users of otter are not readily quantified or described. Because otter are shy and unobtrusive, are probably observed, or photographed incidental to other outdoor pursuits. However, there are large organized and unorganized groups of people that are potentially influential concerning the welfare and abundance of otter.

Otter are welcomed by people essentially everywhere, except where game, food, or bait fish are being held or raised. Although otter are usually too shy to make use of the areas where these fish are located, they occasionally cause damage problems and must be removed.

*Changes*

The number of successful otter trappers averaged just over 725 from 1977-80, while 1981-84 4-year average was 593, indicating a significant decrease in otter trappers.

*Projections*

Projections of trapper numbers are subject to the same limitations and problems encountered with harvest projections. Since half of the otter harvested are taken during the winter beaver season and account for most of the variation in the catch, their numbers are shown in the tables. The current trend of increasing numbers of winter trappers is assumed to continue until 1990, when there should be over 1,500 winter trappers.

Wildlife Management Units

*Status*

The distribution of otter trappers is closely related to the distribution of Maine's human population within WMU's (Table 7). Trapper density relative to otter habitat follows the same pattern, with densities of over 10 trappers/100 habitat units in WMU's 1, 4, 7, and 8, and under 5 trappers/100 habitat units in WMU's 2 and 3.

*Changes*

Since 1980, the number of winter trappers has fluctuated in all WMU'S, but has averaged close to levels experienced in the late 1970's.

*Projections*

Projection of trapper numbers by WMU is difficult, because of the inability to forecast a variety of factors impacting trapper effort and use opportunity. If current trends in trapper numbers continue, increases are expected in all WMU's (Table 8). Trapper densities per unit of habitat should be high in all WMU's except WMU's 2 and 3.

## SUMMARY AND CONCLUSIONS

The river otter is a native North American member of the weasel family that occurs in aquatic habitats from the Pacific to the Atlantic oceans. Except for urban areas, it is present throughout Maine. The otter is almost completely dependent on the aquatic setting for its life requirements, and Maine's abundance of waters and waterways makes it highly suited for this forbearer. The State has an otter population and otter habitat capable of supporting an annual take estimated at over 3,000 animals. Since 1976, the actual take has exceeded 800 otters twice, but usually ranges between 600 and 700 annually (Table 9).

Because of conflicting use and misuse of the waters in the settled part of the State, suitable otter habitat was restricted to the northern and eastern areas of Maine starting in the 1800's with the era of industrial expansion, and ending as a result of recent environmental awareness and associated clean water laws and rules. Presently, almost 85% of the State's waters are thought to support an otter population of 20,000.

Although otter have been pursued by trappers and hunters since Maine was settled, the number of individuals pursuing otter was not monitored until 1955. Total trapping license sales remained below 1,700 from 1955 to the mid-1970's, when increasing values of upland forbearer pelts apparently caused an increase in the number of trappers. Since 1976, the number of successful winter trappers has been monitored, ranging from 158 to 1,000 per year.

In the last 10 years, management plans have called for 2 objective harvests (Table 9). The State's harvest objective from 1975-1980, was an annual average take

Table 9. Past, present, and estimated future otter harvests and users.

| | Harvest | | | Users | |
|---|---|---|---|---|---|
| Year | Actual | Allowable | Objective | Total | Successful |
| 1976 | 525 | 870 | 800 | 1,189 | 319 |
| 1977 | 664 | 870 | 800 | 1,363 | 418 |
| 1978 | 694 | 870 | 800 | 1,258 | 475 |
| 1979 | 937 | 870 | 800 | 1,927 | 574 |
| 1980 | 663 | 870 | 900 | 1,072 | 460 |
| 1981 | 608 | 870 | 900 | 1,740 | 360 |
| 1982 | 686 | 870 | 900 | 1,915 | 418 |
| 1983 | 684 | 870 | 900 | 1,745 | 416 |
| 1984 | 812 | 870 | 900 | 1,840 | 435 |
| 1990 | 530 | 3,600 | - | 2,200 | 420 |

of 800 animals. The actual average annual take was considerably less than this objective, and the harvest exceeded 800 otter in the final year only. The objective harvest level was raised to 900 in 1980, but this level has not been met in any year. The 1980 management objective also specified an adequate distribution of the harvest between WMU'S. This objective has not been achieved (Table 9).

Currently, the actual harvest is less than one third of the lower estimate of the allowable harvest. The harvest is not expected to increase in the future.

## LITERATURE CITED

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**River Otter Goal and Objectives**
**1985-1990**

**Goal:** Maintain otter population at current level.

## OBJECTIVES

**Abundance:** Maintain otter population at the 1985 level (estimated at 21,000) through 1990.

**Harvest:** Maintain opportunity (season length and timing) and average harvest (currently 700 otter) at 1985 levels through 1990.

Capability of Habitat: Otter habitat throughout the State is capabl of supporting otter populations at 1985 levels.

Feasibility: These objectives can be accomplished under current harvest regulations, provided trapping effort remains at current levels.

Desirability: These objectives may be desirable to trappers, as they provide for continued opportunity to pursue otters. Nonconsumptive users of otters should also find the goal and objectives desirable, as opportunities to view otter will be maintained.

Possible Consequences: Current harvests are not limiting otter populations, which may increase in some WMU'S. Under most circumstances, an increase in otter numbers would have little consequence, but conflict with fish cultural activities may occur on a local basis. Changes in federal regulations concerning export of otter pelts may affect trapping effort. Fluctuations in the market value of otter and/or beaver pelts may also impact the effort placed on trapping otter.

Summary of Working Group Concerns

# OTTER

## Habitat

1. water pollution eliminated otter from some areas - populations have recovered as rivers have been cleaned up.

## Population

1. Otter are abundant throughout the State.

## Harvest

1. Trapping regulations discourage otter trapping - trapping near beaver dams.

2. CITES Treaty, caused pelt value decrease which results in less effort.

## River Otter Problems and Strategies in Order of Priority

**Problem 1:** Lack of information on the status of the otter population on a WMU basis.

**Strategy 1:** Develop a system to monitor the status of the otter population by WMU.

**Problem** 2: Lack of information on whether the HSI model adequately measures habitat quantity and quality and carrying capacity on a WMU basis.

**Strategy 1:** Evaluate the existing model for measuring habitat and estimating carrying capacity.

**Problem 3:** Opposition to consumptive use of otter by non-consumptive users.

**Strategy 1:** Develop programs to minimize the conflicts and concerns of nonconsumptive users and maintain use opportunity.