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Massachusetts Fish and Wildlife--
Uses, Values and Needs (Past and Present)

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By

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Massachusetts Fish and Wildlife-- Uses, Values and Needs, Past and Present

Introduction

At first glance it seems unlikely that fish and wildlife could have much significance in an urban state of 5.7 million people with a human density of over 700 people per square mile. And yet in Massachusetts, where two thirds of the people live in the easterly one third of the state, this is so. For Massachusetts still possesses a substantial amount of forested land, coastal wetlands, ponded and flowing waters, and other open space--fish and wildlife habitat upon which a healthy animal resource depends--and Massachusetts citizens continue to value such resources for the contribution they make to the quality of life.

How Fish and Wildlife Are Used

It is difficult to conceive of any Massachusetts citizen whose life is not touched at some point--directly or indirectly--by fish or wildlife, because these resources in our state are indeed used. Users may be conveniently separated into two broad categories: the consumers and the non-consumers.

Consumer interests having direct ties include the licensed and unlicensed hunters, fishermen and trappers (Table 3-1), bait dealers, researchers and shooting preserves. Hunters, fishermen and trappers together number about 3/4 million. Most of them reside and enjoy their recreation in non-urban areas (Table 3-2). Their recreational activities, which are fish and wildlife dependent, involve millions of others who perform administrative, licensing, legislative, enforcement or other functions, or who produce or market sporting goods or provide services of one sort or another.

Bait dealers fulfill the demands of live-bait anglers by supplying small vertebrates and invertebrates such as shiners, frogs and crayfish. Consumptive users of bait in Massachusetts probably number in the tens of thousands.

Shooting preserves often cater to the urban hunter by attempting to provide a high quality hunting opportunity utilizing well-managed, attractive wildlife habitat and artificially propagated game which is released and harvested under state regulation. Such facilities are mostly private but include a few public preserves, serving an estimated 4,000 users annually.

Since scores of useful products are made from fish and wildlife resources, many people find employment in related marketing and manufacturing activities. Massachusetts fish and wildlife are managed as

Table 3-1

Summary of Licenses Issued* 1960-1975 to Massachusetts Fishermen, Hunters and Trappers

Fiscal Year	Resident Hunting	Resident Fishing	Resident Trapping	Non-Resident		Total License Expenditure
				Hunting	Fishing	
1960	135,351	212,639	1,035	1,640	5,202	\$1,197,637.50
1961	127,286	203,682	864	1,527	4,484	\$1,259,031.00
1962	130,034	195,390	670	1,712	4,509	\$1,212,475.25
1963	131,150	205,366	808	1,752	4,566	\$1,248,142.75
1964	122,768	200,616	813	1,685	4,171	\$1,211,543.50
1965	132,861	208,497	852	1,853	4,450	\$1,259,191.75
1966	133,268	207,329	775	1,816	4,172	\$1,426,730.00
1967	130,966	197,773	818	2,065	4,001	\$1,475,768.00
1968	133,474	226,282	664	1,635	4,707	\$1,581,599.75
1969	134,003	238,207	692	1,623	5,218	\$1,616,133.75
1970	135,458	246,539	851	1,821	5,262	\$1,657,054.25
1971	141,929	250,479	799	2,271	5,998	\$1,699,403.75
1972	143,075	259,906	814	2,575	6,392	\$1,756,851.50
1973	126,459	238,924	847	1,863	5,878	\$2,387,985.00
1974	131,050	229,176	1,096	1,533	4,961	\$2,589,174.50
1975	130,604	238,465	1,119	1,385	4,724	\$2,659,840.70

* Equals numbers of licensees who are required to hold a license. Does not include certain farmers who may lawfully hunt, fish and trap on their own land without a license, nor an estimated 1/2 million youngsters below age 15 who may fish without a license, nor an estimated 5,000 youngsters between 12 and 15 who may hunt with a licensed adult but who, themselves, are not licensed.

Table 3-2

Numbers and Counties of Residence of Massachusetts Licensed
Fishermen and Hunters* as a Percentage of the Population

<u>County</u>	<u>Licensed Resident Fishermen</u>	<u>Licensed Resident Hunters</u>	<u>Licensees Combined</u>	<u>Population</u>	<u>Percent of Licensees to Population</u>
Franklin	8,011	5,526	13,537	59,426	.228
Berkshire	16,297	11,372	27,669	149,402	.185
Hampshire	13,373	7,320	20,693	123,981	.167
Dukes	220	713	933	6,117	.152
Nantucket	-	467	467	3,774	.124
Worcester	52,161	25,865	78,026	637,037	.122
Hampden	34,990	15,219	50,209	459,050	.109
Barnstable	5,345	3,981	9,326	107,625	.087
Plymouth	14,142	8,774	22,916	333,314	.069
Norfolk	19,054	10,123	29,177	600,198	.049
Middlesex	44,279	19,636	63,915	1,398,397	.046
Bristol	11,036	9,246	20,282	444,301	.046
Essex	16,353	9,293	25,646	637,897	.040
Suffolk	4,818	2,993	7,811	735,190	.011

* Based on 1971 data. The county of residence is assumed to be the same county as the place where license was obtained.

renewable resources which continue to yield--year after year--protein (Table 3-3) useful as food, and fur (Table 3-4) useful in the manufacture of garments, toys and other products. Many lesser known goods are produced from fish and wildlife including fishing flies and lures, gloves, jackets, rugs, housewares, fertilizers and industrial fats and oils. Researchers and educators sometimes require animal study specimens, the preparation of which provides employment for taxidermists. And zoos and aquariums need fish and wildlife, the acquisition and care of which generates jobs for collectors, brokers, shippers, veterinarians, zoologists and caretakers.

Non-consuming users include the hunters, trappers and fishermen since they frequently are not cast in the role of consumer. It is well known that a not inconsiderable number of them deliberately elect not to remove or kill game species which they observe or catch. Then, too, an important part of their outdoor experience includes the viewing for pleasure of other fish and wildlife apart from those which primarily motivate their field activities. In fact, many hunters, trappers and fishermen are thoroughly experienced and persistent field naturalists whose non-consumptive activities dwarf, by comparison, their infrequent game fishing or hunting experiences.

Massachusetts also has several thousand serious birders who are members of organized clubs, and at least one half million who feed birds and other wildlife at backyard feeders.

Annual visitations to state and federal refuges, fish hatcheries and game bird rearing facilities also attest to a substantial non-consumptive interest in fish and wildlife although an accurate estimate of the magnitude of such interest is difficult to obtain and there is certain to be considerable overlapping of activities by the same individuals.

A somewhat different indicator of the extent of non-consumptive, wildlife-related activities can be gleaned from a recent Massachusetts survey of utilization of ten wildlife management areas scattered across the state. Some 38 different non-hunting recreational experiences occurred during a year-round sampling effort. In a related survey on eight wildlife management areas, non-hunting recreational utilization significantly exceeded hunter usage. Many of such visitations are known to directly involve wildlife but others can only be speculated upon. For example, it is believed that the activity involving the highest level of usage (sightseeing), as well as picnicking, bicycling, horseback riding and hiking, were deliberately undertaken on the wildlife management areas with the hope or expectation of viewing wildlife.

A recent Oregon study indicates that about 35 percent of its residents normally engage in some wildlife-oriented activity. This does not include residents having merely a "passive" interest (watching TV programs or movies on wildlife; reading articles or books on wildlife, and so forth). If this percentage is also applicable to Massachusetts,

Table 3-3

Food Values of Fish and Wildlife Harvested* in Massachusetts
Based on Estimated Average Annual Harvests

Species	Number Harvested	Average Weight		Total Pounds		Value/Pound	Total Value
		Usable	Meat (lbs.)	Usable	Meat		
Ringneck pheasant	83,200	.85		70,720		\$.75	\$ 53,040.00
Ruffed grouse	64,300	.75		48,225		\$.75	\$ 36,168.75
Black duck	45,300	1.0		45,300		\$.75	\$ 33,975.00
Mallard	12,255	1.0		12,255		\$.75	\$ 9,191.25
Other ducks	28,595	.75		21,446		\$.75	\$ 16,084.50
Canada goose	9,100	6.0		54,600		\$.85	\$ 46,410.00
Virginia rail	2,000	.15		300		\$.40	\$ 120.00
Woodcock and snipe	33,100	.30		9,930		\$.85	\$ 8,440.50
Bobwhite (quail)	17,700	.35		6,195		\$.85	\$ 5,265.75
Cottontail	148,430	1.25		185,537		\$1.50	\$ 278,305.50
Snowshoe hare	33,770	1.80		60,786		\$1.50	\$ 91,179.00
Gray squirrel	70,400	.60		42,240		\$1.50	\$ 63,360.00
White-tail deer	2,598	95.0		246,810		\$1.50	\$ 370,215.00
Black bear	2	120.0		240		\$1.50	\$ 360.00
Raccoon	19,500	10.0		195,000		\$1.50	\$ 292,500.00
Trout and salmon	500,000	.60		300,000		\$1.90	\$ 570,000.00
All other fish	3,000,000	.25		750,000		\$1.75	\$1,312,500.00
Snapping turtle	500	4.0		2,000		\$1.50	\$ 3,000.00
Bullfrog	5,000	.125		625		\$2.50	\$ 1,562.50
Totals	4,075,750			2,052,209			\$3,244,677.75

* Does not include protein in the form of edible meat which is occasionally utilized for human consumption (such as beaver, opossum, muskrat, woodchuck) nor fish and other animals which may be fed to domestic animals.

Table 3-4

Species and Numbers of Massachusetts Furbearers Harvested from 1958-1974*

<u>Winter of</u>	<u>Muskrat</u>	<u>Mink</u>	<u>Otter</u>	<u>Raccoon</u>	<u>Red Fox</u>	<u>Skunk</u>	<u>Gray Fox</u>	<u>Weasel</u>	<u>Beaver</u>	<u>Opossum</u>	<u>Bobcat</u>	<u>Fisher</u>
1958-59	56,122	961	74	2,071	11	15	9	78	323			
1959-60	71,270	1,081	85	3,156	36	21	31	56	296			
1960-61	68,796	836	92	2,516	13	14	13	107	765			
1961-62	58,750	950	63	2,650	24	4	18	15	669			
1962-63	45,691	1,209	48	1,665	18	11	4	13	589			
1963-64	60,960	1,146	77	1,698	75	12	19	7	1,525			
1964-65	36,828	1,009	34	965	29	14	24	16	1,196			
1965-66	33,960	1,058	59	1,698	75	40	33	65	1,445			
1966-67	29,888	690	82	1,721	353	34	56	-	1,040			
1967-68	32,672	363	41	1,440	117	6	11	9	1,425			
1968-69	32,365	417	47	2,049	110	16	25	21	1,056			
1969-70	57,137	806	104	4,552	254	6	98	11	605	46		
1970-71	51,314	509	76	3,694	154	14	54	30	509	33		
1971-72	42,679	601	53	2,267	225	-	55	-	1,358	47		
1972-73	44,186	523	71	3,450	341	19	157	8	1,674	127		
1973-74	71,930	680	66	5,254	495	55	199	34	1,639	288	9	13
1974-75	66,247	1,172	66	5,278	487	349	285	38	1,441	611	8	6

* Based on reports from Massachusetts licensed fur buyers.

then approximately 2 million Bay State residents utilize fish and wildlife as important recreational resources. That such an estimate may indeed be a reasonable one is suggested by the number of participants known to take part in selected activities that are fish and wildlife dependent (Table 3-5).

Values of Fish and Wildlife Resources

What is the worth of our fish and wildlife? This is impossible to answer unless one asks further: Worth for what? and Worth for whom? Even then, the answers are at best vague. In recognition of the obvious difficulty, no attempt will be made to assess total values.

Limited information is available about certain values for a relatively few species which have a utilitarian appeal. Table 3-3 indicates that potential food values of annually harvested game species exceed 3 million dollars. Heading the list are freshwater fish followed by white-tail deer, raccoon, cottontail rabbit and ringneck pheasant.

The winter of 1974-1975 saw the greatest harvest, in terms of value, of Massachusetts furbearers that has occurred in modern times. Over 1/3 million dollars were received at the initial point of sale by resident trappers (Table 3-6). Muskrat, raccoon, beaver, mink and fox (Table 3-7) were the five most valuable furs harvested. Since 1956, the prolific muskrat (Table 3-8) has continued to lead all furbearers in total value of species harvested while beaver (Table 3-9) under careful management, have continued to grow both in numbers and importance. Variety of furs utilized by the fur industry, too, has expanded. Twelve different species (Table 3-4) now are harvested in Massachusetts.

From a purely utilitarian aspect, Massachusetts fish and wildlife have consumptive market values of between 3 and 4 million dollars annually.

Value of Fish and Wildlife Lands and Waters

Another measure of the value which people place upon fish and wildlife is the worth of lands and waters they are willing to acquire and to hold for fish and wildlife purposes. Most lands and waters set aside by private interests are probably done so for multiple reasons--not exclusively for fish or wildlife--and reasonable estimates of value are not readily available. The popular Massachusetts Self-Help program has frequently counted the protection and enhancement of fish and wildlife as a major beneficiary. This program involves substantial investments in real estate having fish and wildlife values and is mainly a community effort involving state matching funds for land purchases. A recent survey of acquisitions by cities and towns of the Commonwealth indicates that over 44,000 acres of lands and waters have been permanently protected for conservation purposes. These acquisitions, however, have not all been accomplished under the Self-Help program and their total cost has not been ascertained.

Table 3-5

Relative Importance of Selected Massachusetts
Activities that are Fish or Wildlife Dependent

<u>Type of Activity</u>	<u>Object Fish or Wildlife</u>	<u>No. Persons Involved</u>
Hunting, trapping, fishing	Game fish, birds, mammals	750,000
Birdwatching, wildlife observation by organized club members	Principally birds	5,000
Feeding birds at backyard feeders	Principally winter birds (passerines, woodpeckers)	500,000
Association of dog owners training sporting dogs for competition and field work:		
Dogs trained for	Snowshoe hare	550
Dogs trained for	Cottontail rabbit	900
Dogs trained for	Fox	450
Dogs trained for	Pheasant, quail, grouse	1,750
Dogs trained for	Raccoon, bobcat	550
Dogs trained for	Waterfowl, upland game birds	400
Annual visitations to state fish hatcheries	Trout, salmon	125,000
Annual visitations to federal fish hatcheries	Trout	48,000
Annual visitations to state game bird rearing stations	Pheasant, quail	10,000
Annual visitations to federal wildlife refuges	Waterfowl, other birds, fish	350,000
Annual visitations to state wildlife manage- ment areas for non-hunting purposes	All resident fish and wildlife	67,500
		<hr/> 1,860,100

Table 3-6

Value of the Annual Massachusetts Fur Harvest, 1956-1974*

Season	Thousands of Dollars					
	50	100	150	200	250	300 350
1956-57	*****	\$99,259				
1957-58	*****	\$74,459				
1958-59	*****	\$64,858				
1959-60	*****	\$80,741				
1960-61	*****	\$83,705				
1961-62	*****	\$70,088				
1962-63	*****	\$75,775				
1963-64	*****	\$142,146				
1964-65	*****	\$89,978				
1965-66	*****	\$100,753				
1966-67	*****	\$65,131				
1967-68	*****	\$56,959				
1968-69	*****	\$83,991				
1969-70	*****	\$117,000				
1970-71	*****	\$85,372				
1971-72	*****	\$107,876				
1972-73	*****	\$179,558				
1973-74	*****	\$312,277				
1974-75	*****	\$335,651				

* Based on average prices paid to trappers for furs sold in Massachusetts.

Table 3-7

Numbers and Values of Furbearers Harvested
in Massachusetts During the 1974-75 Trapping Season

<u>Species</u>	<u>Number</u>	<u>Average Price*</u>	<u>Total Value</u>
Muskrat	66,247	\$ 3.20	\$211,990.40
Mink	1,172	\$11.70	\$ 13,712.40
Otter	66	\$38.30	\$ 2,527.80
Raccoon	5,278	\$10.05	\$ 53,043.90
Red Fox	487	\$27.00	\$ 13,149.00
Skunk	349	\$ 1.00	\$ 349.00
Gray Fox	285	\$13.10	\$ 3,733.50
Weasel	38	\$ 1.25	\$ 47.50
Opossum	611	\$ 1.00	\$ 611.00
Beaver	1,441	\$25.00	\$ 36,025.00
Bobcat	8	\$24.00	\$ 192.00
Fisher	6	\$45.00	\$ 270.00
	75,988		\$335,651.50

* Based on average prices received by trappers for furbearers harvested during the winter of 1974-75.

Table 3-8

Massachusetts Muskrat Harvest, 1956-57 to 1974-75

<u>Year</u>	<u>No. Harvested</u>	<u>Average Price*</u>	<u>Total Value</u>
1956-57	75,725	\$1.00	\$ 75,725.00
1957-58	58,390	\$.85	\$ 46,631.00
1958-59	56,122	\$.85	\$ 47,704.00
1959-60	71,270	\$.85	\$ 60,580.00
1960-61	68,796	\$.85	\$ 58,477.00
1961-62	58,750	\$.85	\$ 47,294.75
1962-63	45,691	\$1.15	\$ 52,545.00
1963-64	60,960	\$1.75	\$106,680.00
1964-65	36,828	\$1.75	\$ 64,449.00
1965-66	33,960	\$1.75	\$ 59,430.00
1966-67	29,888	\$1.30	\$ 39,754.00
1967-68	32,672	\$.85	\$ 27,711.00
1968-69	32,365	\$1.25	\$ 41,275.00
1969-70	57,137	\$1.45	\$ 82,848.65
1970-71	51,314	\$1.25	\$ 64,142.00
1971-72	42,679	\$1.60	\$ 68,286.00
1972-73	44,186	\$2.30	\$101,627.80
1973-74	71,930	\$2.90	\$208,597.00
1974-75	66,247	\$3.20	\$211,990.40

* Based on average price received by trappers.

Table 3-9

Massachusetts Beaver Harvest, 1956-57 to 1974-75

<u>Year</u>	<u>No. Harvested</u>	<u>Average Price</u>	<u>Total Value</u>
1956-57	261	\$ 9.00	\$ 2,350.00
1957-58	252	\$12.00	\$ 3,300.00
1958-59	323	\$12.00	\$ 3,900.00
1959-60	296	\$15.00	\$ 4,395.00
1960-61	765	\$15.00	\$ 12,375.00
1961-62	669	\$12.00	\$ 8,028.00
1962-63	589	\$13.00	\$ 7,660.00
1963-64	1,525	\$13.00	\$ 19,825.00
1964-65	1,196	\$11.00	\$ 13,156.00
1965-66	1,445	\$17.00	\$ 24,599.00
1966-67	1,040	\$11.00	\$ 11,440.00
1967-68	1,425	\$16.00	\$ 22,800.00
1968-69	1,056	\$20.00	\$ 21,140.00
1969-70	605	\$18.00	\$ 10,890.00
1970-71	509	\$10.00	\$ 6,108.00
1971-72	1,358	\$17.00	\$ 23,086.00
1972-73	1,674	\$22.00	\$ 36,828.00
1973-74	1,639	\$18.00	\$ 29,502.00
1974-75	1,441	\$25.00	\$ 36,025.00

Perhaps the most accurate indicator of values of real estate for fish and wildlife purposes is the Division of Fisheries and Wildlife land bank. In this instance it is realistic to assert that the entire worth of the Division's real estate constitutes its value to fish and wildlife. Table 3-10 lists the lands and waters currently under the control of the Division. Approximately 32,000 acres are directly owned, most of them having been acquired within the past 20 years. Funded almost entirely by license revenues, acquisition of these lands and waters purposely included wildlife sanctuaries, propagating facilities and management areas. Their locations are scattered statewide and their habitat types are varied. At this time, the Realty Section of the Division conservatively estimates that the 32,000 acres owned and controlled by the Division have a current market value of at least \$700 per acre, or a total worth to fish and wildlife of at least \$22,400,000. Acquisition is continuing with a current objective of adding at least 1,000 acres additionally per year.

Value of Fish and Wildlife as Measured by Expenditures of Resident Sportsmen

A 1966 study of Massachusetts resident hunters and freshwater fishermen analyzed sportsman expenditures for fishing and hunting equipment, auxiliary equipment, bait and guides, lodging and food, transportation, licenses and various privilege fees. These categories are identical to those analyzed in the National Survey of Fishing and Hunting. Results indicate that Massachusetts hunters and fishermen spent, in 1966, some 83-1/2 million dollars in pursuit of their sport. The estimated amount spent by resident trappers and non-resident hunters and fishermen is an additional \$600,000.

Massachusetts estimates are rather similar to federal estimates. Assuming a Massachusetts resident fished in freshwater, hunted small game, waterfowl and deer within the state, his average annual expenditure for 1966, according to state figures, amounted to \$270 while the federal estimate nationally was \$264 for the year 1965.

The expenditures estimated for 1966 were 53 percent greater than for similar estimated expenditures fifteen years earlier--or at an annual rate of increase of 3.5 percent per year. If this annual rate of increase has persisted since 1966, then Massachusetts sportsmen in 1975 have spent approximately \$110,000,000.

Non-Resident Sportsmen

Between six and eight thousand non-residents annually fish or hunt in Massachusetts (Table 3-11). Out-of-state license buyers contribute nearly \$100,000 each year to the Massachusetts economy in license fees alone. It is likely that other expenditures for food, lodging, sporting equipment and various services would substantially exceed licensing revenue.

Table 3-10

Lands Under the Control of the Division of Fisheries and Wildlife
26 November 1975

<u>Name</u>	<u>Location</u>	<u>Acreage</u>
<u>Division Installations:</u>		
Ayer Game Farm	Ayer	96.9
Sandwich Game Farm	Sandwich	133.0
Wilbraham Game Farm	Wilbraham	144.0
Sandwich Fish Hatchery	Sandwich	60.0
Bitzer Fish Hatchery	Montague	72.3
Palmer Experimental Hatchery	Palmer	301.9
Sunderland Fish Hatchery	Sunderland	103.3
Merrill Pond System	Sutton	215.9
Northeast District Headquarters	Acton	1.9
Southeast District Headquarters	Bourne	35.0
Western District Headquarters	Dalton	.9
Western District Headquarters	Pittsfield	1.2
Rochester Pond System	Rochester	70.0
	Total	1,236.3

Wildlife Management Areas:

Crane Wildlife Management Area	Falmouth	1,615.2
Pantry Brook Wildlife Management Area	Concord	1.5
Pantry Brook Wildlife Management Area	Sudbury	399.1
Peru Wildlife Management Area	Peru	2,525.0
Phillipston Wildlife Management Area	Barre	72.0
Phillipston Wildlife Management Area	Phillipston	1,272.7
Phillipston Wildlife Management Area	Petersham	521.0
Townsend Wildlife Management Area	Townsend	60.0
Westmeadows Wildlife Management Area	West Bridgewater	224.7
Westboro Wildlife Management Area and	Northboro	21.0
Westboro Field Trial Area	Westboro	312.0
Mill Creek Wildlife Management Area	Newbury	496.0
Mill Creek Wildlife Management Area	Rowley	249.0
Downfall Wildlife Management Area	Newbury	1,442.4
Crane Pond Wildlife Management Area	Georgetown	331.0
Crane Pond Wildlife Management Area	Groveland	1,347.1
Crane Pond Wildlife Management Area	Newbury	173.5
Crane Pond Wildlife Management Area	West Newbury	243.3
Spring Hill Lot	Sandwich	7.0
Dillingham Lots	Sandwich	37.0
Fisk Forestdale	Sandwich	117.0
McDowell Area	Rowley	13.0
Canada Hill Wildlife Management Area	Chester	950.0
Canada Hill Wildlife Management Area	Chesterfield	234.0
Canada Hill Wildlife Management Area	Huntington	541.0
Canada Hill Wildlife Management Area	Worthington	224.0

Table 3-10 (Continued)

<u>Name</u>	<u>Location</u>	<u>Acreage</u>
Westfield River Wildlife Management Area	Cummington	80.0
Swift River Wildlife Management Area	Belchertown	1,074.5
Swift River Wildlife Management Area	Ware	334.0
Birch Hill Wildlife Management Area	Winchendon	466.0
Birch Hill Wildlife Management Area	Templeton	19.0
Northboro Wildlife Management Area	Northboro	88.0
Squannacook Wildlife Management Area	Townsend	275.9
Squannacook Wildlife Management Area	Groton	138.4
Squannacook Wildlife Management Area	Shirley	296.5
Quaboag Wildlife Management Area	Brookfield	568.4
Quaboag Wildlife Management Area	West Brookfield	297.9
Quaboag Wildlife Management Area	Warren	4.0
Quaboag Wildlife Management Area	Sturbridge	20.0
Stafford Hill Wildlife Management Area	Cheshire	565.0
Moose Hill Wildlife Management Area	Paxton	250.0
Moose Hill Wildlife Management Area	Leicester	131.0
Moose Hill Wildlife Management Area	Spencer	286.0
Becket Wildlife Management Area	Becket	234.0
Winimusset Wildlife Management Area	New Braintree	416.0
Millers River Wildlife Management Area	Athol	880.0
Millers River Wildlife Management Area	Royalston	635.0
Millers River Wildlife Management Area	Phillipston	38.0
Millers River Wildlife Management Area	Winchendon	.3
Savoy Wildlife Management Area	Savoy	420.0
Housatonic Valley Wildlife Management Area	Lenox	396.7
Housatonic Valley Wildlife Management Area	Lee	63.6
Housatonic Valley Wildlife Management Area	Pittsfield	25.4
Rocky Gutter Wildlife Management Area	Middleboro	1,558.9
Poland Brook Wildlife Management Area	Conway	454.0
Poland Brook Wildlife Management Area	Ashfield	71.0
Pauchaug Brook Wildlife Management Area	Northfield	161.3
Chalet Wildlife Management Area	Windsor	465.0
Chalet Wildlife Management Area	Dalton	50.0
Charlton Wildlife Management Area	Charlton	287.0
Four Chimneys Wildlife Management Area	Spencer	200.0
Hockamock Swamp Management Area	Bridgewater	205.0
Hockamock Swamp Management Area	Easton	479.0
Hockamock Swamp Management Area	Raynham	666.4
Hockamock Swamp Management Area	Taunton	473.2
Hockamock Swamp Management Area	West Bridgewater	272.5
Kelly Wildlife Management Area	Chester	267.0
Nissitissit River Wildlife Management Area	Pepperell	245.8
North Shore Wildlife Management Area	Ipswich	115.2
North Shore Wildlife Management Area	Essex	40.0
North Shore Wildlife Management Area	Newbury	38.0
North Shore Wildlife Management Area	Rowley	20.0
North Shore Wildlife Management Area	Salisbury	97.0
Parker River Wildlife Management Area	Newbury	703.0
Peterson Swamp Wildlife Management Area	Halifax	250.0

Table 3-10 (Continued)

<u>Name</u>	<u>Location</u>	<u>Acreage</u>
Provincetown Wildlife Management Area	Provincetown	68.4
Shepard's Island Wildlife Management Area	Northampton	15.0
E. Kent Swift Wildlife Management Area	Mendon	.5
E. Kent Swift Wildlife Management Area	Northbridge	151.5
E. Kent Swift Wildlife Management Area	Uxbridge	5.0
	Total	28,792.8

Wildlife Sanctuaries:

Billingsgate Island Sanctuary	Eastham	.5
Boxford Game Reservation	Boxford	335.1
Forbush Hancock Wildlife Sanctuary	Hancock	268.0
Egg Rock Wildlife Sanctuary (Isaac Sprague)	Nahant	2.0
Carr Island Wildlife Sanctuary (Knight)	Salisbury	110.0
Milk Island Wildlife Sanctuary	Rockport	29.0
Minns Wildlife Sanctuary	Princeton	137.1
Penikese Island Wildlife Sanctuary	Gosnold	60.0
Ram Island Wildlife Sanctuary	Mattapoisett	2.0
Ram Island Wildlife Sanctuary	Salisbury	20.0
Grace Robinson Wildlife Sanctuary	Montgomery	67.0
Grace Robinson Wildlife Sanctuary	Westfield	2.5
Watatic Mountain Wildlife Sanctuary	Ashburnham	139.0
	Total	1,172.2

Access Sites to Recreational Waters:

Flint Pond	Tyngsboro	81.9
Quashnet River Area	Falmouth	9.0
Quashnet River Area	Mashpee	22.0
Little River Area	Huntington	171.8
Little River Area	Worthington	10.0
Mashpee Pond Lot	Mashpee	25.0
Poponessett Beach Lot	Mashpee	2.0
Hog Pond Lot	Sandwich	26.2
Lawrence Pond Lot	Sandwich	10.0
Knops Pond Lot	Groton	.6
Sandy Pond Lot	Plymouth	.2
East Branch Ware River Area	Rutland	80.0
Mascopic Lake Access	Dracut	.3
Quinapoxet River Area	Holden	31.8
Salt Marsh Area	Fairhaven	22.4
Bearse's Pond Lot	Barnstable	5.8
Cook Pond	Fall River	3.0
Marcus Area	Uxbridge	28.0
Mashpee River Area	Mashpee	32.0
	Total	562.0

Table 3-10 (Concluded)

<u>Name</u>	<u>Location</u>	<u>Acreage</u>
<u>Lands Owned by Other Agencies and Managed by Fisheries and Wildlife Under Licenses or other Agreement:</u>		
<u>Army Corps of Engineers</u>		
Birch Hill Wildlife Management Area	Winchendon	4,395.0
	Templeton	
	Royalston	
Knightville Wildlife Management Area	Huntington	2,430.0
	Chesterfield	
Barre Falls Wildlife Management Area	Barre	577.0
	Hubbardston	
	Rutland	
	Oakham	
Westville Wildlife Management Area	Sturbridge	578.0
West Hill Wildlife Management Area	Northbridge	614.0
	Upton	
	Mendon	
	Uxbridge	
Hodges Village Wildlife Management Area	Oxford	873.0
	Total	9,467.0
<u>Metropolitan District Commission:</u>		
Miscellaneous areas within the Ware River Watershed used by agreement.		20,000.0
<u>Division of Forests and Parks:</u>		
Land in Fall River (Freetown State Forest)		2,000.00
<u>Massachusetts Water Resources Commission:</u>		
Delaney Flood Control Project and Wildlife Management Area	Harvard	545.0
	Bolton	
	Stow	
	Total Used by Agreement	32,012.0
<u>Summary</u>		
Division Installations		1,236.3
Division-owned Wildlife Management Areas		28,792.8
Wildlife Sanctuaries		1,172.2
Access Sites to Recreational Waters		562.0
Areas Used by Agreement		32,012.0
Total area under control of the Division of Fisheries and Wildlife		63,775.3

Table 3-11

Non-Resident Hunting and Fishing Licenses Issued 1960-1975

<u>Year</u>	<u>7-Day Fishing</u>		<u>Season Fishing</u>		<u>Season Hunting</u>	
1960	2,596*	\$ 7,685.00	2,606	\$20,709.50	1,631	\$24,923.00
1961	2,185	\$ 9,284.75	2,299	\$20,114.25	1,527	\$25,147.25
1962	2,173	\$ 9,235.25	2,336	\$20,439.00	1,712	\$26,123.25
1963	2,229	\$ 9,473.25	2,337	\$20,448.75	1,752	\$26,718.00
1964	2,103	\$ 8,937.75	2,068	\$18,095.00	1,685	\$25,696.25
1965	2,105	\$ 8,946.25	2,345	\$20,518.75	1,853	\$28,258.25
1966	1,898	\$ 8,377.50	2,274	\$21,480.50	1,816	\$27,950.75
1967	1,787	\$ 9,380.75	2,214	\$21,594.25	2,065	\$30,032.75
1968	1,957	\$10,278.75	2,750	\$26,829.00	1,635	\$26,605.50
1969	2,269	\$11,912.25	2,949	\$28,752.75	1,623	\$26,373.75
1970	2,184	\$11,466.00	3,078	\$30,010.50	1,821	\$29,591.25
1971	2,323	\$12,195.75	3,675	\$35,831.25	2,271	\$36,903.75
1972	2,393	\$12,563.25	3,999	\$38,990.25	2,575	\$41,843.75
1973	2,289	\$13,397.25	3,589	\$46,593.75	1,863	\$38,774.75
1974	1,908	\$15,741.00	3,053	\$43,505.25	1,533	\$41,985.25
1975	1,857	\$15,320.25	2,867	\$40,854.75	1,385	\$38,151.25

* Also 3-day fishing licenses included in this total.

Numbers of licenses issued to non-residents have exhibited steady increases since 1966 until a significantly large license fee increase in the fall of 1973, inflation, and a depressed economy began to reduce license sales.

Non-resident sportsmen include those out-of-staters who maintain a second home or cottage in the Commonwealth, and the short-term vacationers or daily transients who enter the state for strictly temporary recreation.

Non-Resident Fishing

Barnstable County appears to attract the short-term vacationing anglers who remain only a few days and find a seven-day angling license adequate for their needs (Table 3-13). The abundance of clear, well-managed ponded waters on Cape Cod, many of which offer excellent trout fishing, undoubtedly accounts for this popularity. Cape Cod's traditional appeal as a summer playground, of course, brings multitudes of campers and swimming enthusiasts into the region and provides recreational diversity for visitors, of which fishing is a part.

In Berkshire County--another important recreation and vacation area--sales of seven-day fishing licenses are also important, but they are exceeded by the number of licenses valid for an entire season. The preponderance of seasonal licenses is believed due to the substantial number of New York and Connecticut residents who maintain homes here and remain longer than the average vacationer.

Most fishing by non-residents in Massachusetts waters occurs in border communities where exceptionally good angling opportunities attract anglers from adjacent states. A notable exception occurs in the Waltham-Route 128 area of Middlesex County where substantial numbers of New Hampshire commuters apparently enjoy local fishing in and around Middlesex County. Some seasonal agricultural workers also enter Connecticut River Valley communities to work on tobacco and truck farms and contribute to the non-resident fishing license sales in Hampden and Hampshire Counties. Elsewhere, it is known that Quabbin Reservoir in central Massachusetts, an important fishery for lake trout, salmon and bass, attracts a number of Connecticut anglers.

In terms of total fishing licenses issued, Berkshire County leads, followed in order by Hampden, Middlesex, Worcester and Barnstable Counties (Table 3-12). Hampden County issues the greatest number of seasonal fishing licenses. Barnstable County issues the largest number of seven-day licenses. These statistics have some implications for the state's tourism program and its economy.

Table 3-12

Analysis of Massachusetts Non-Resident Fishing and Hunting License Purchases*

County of License Purchase	Type of License			County Ranking			
	Fishing (Season)	Fishing (7-day)	Total Fishing	Hunting (Season)	All Fishing	Hunting Combined	
Berkshire	659	434	1,093	426	1	2	1
Hampden	708	273	981	273	2	3	2
Middlesex	676	219	895	92	3	7	3
Worcester	506	329	835	148	4	4	4
Bristol	231	53	284	543	9	1	5
Barnstable	190	525	715	47	5	9	6
Franklin	197	132	329	94	7	6	7
Essex	242	48	290	120	8	5	8
Hampshire	169	160	329	47	6	10	9
Norfolk	157	58	215	71	10	8	10
Plymouth	53	95	148	32	11	11	11
Suffolk	51	5	56	7	12	14	12
Dukes	3	4	7	29	13	12	13
Nantucket	-	-	-	13	14	13	14

* Based on 1971 license data.

Table 3-13

Massachusetts Cities and Towns Issuing More than 25 Seasonal
or Seven-Day Fishing Licenses to Non-Residents*

<u>County</u>	<u>City or Town</u>	<u>Seasonal</u>	<u>Seven- Day</u>
Barnstable	Barnstable		51
	Brewster		63
	Chatham		32
	Dennis		29
	Eastham	27	65
	Falmouth		40
	Mashpee		31
	Orleans		58
	Sandwich		50
	Wellfleet		46
	Yarmouth		25
Bristol	Attleboro	50	
	North Attleboro	39	
	Seekonk	78	
Essex	Haverhill	70	
	Lawrence	31	
	Methuen	44	
Franklin	Greenfield	23	30
	Northfield	40	
Berkshire	Great Barrington	92	61
	Lee	25	30
	New Marlborough	27	
	Otis	201	84
	Pittsfield	72	60
	Sheffield	25	
	Williamstown	28	
Hampden	Agawam	56	
	Chicopee	33	37
	East Longmeadow	61	
	Holland	35	
	Longmeadow	90	
	Monson	29	
	Southwick	99	
	Springfield	56	33
	Tolland	35	
	West Springfield	28	
	Westfield	34	

* Based on 1971 license data.

Table 3-13 (Continued)

<u>County</u>	<u>City or Town</u>	<u>Seasonal</u>	<u>Seven- Day</u>
Hampshire County	Amherst	39	33
	Northampton	27	
Middlesex	Chelmsford	32	
	Framingham	28	
	Lowell	31	
	Pepperell	51	
	Townsend	42	
	Tyngsboro	36	
	Waltham	167	
Norfolk	Bellingham	68	
Suffolk	Boston	48	
Worcester	Blackstone	69	
	Dudley	45	
	Southbridge	31	
	Sturbridge	30	
	Webster	44	

Non-Resident Hunting

According to 1974 data, 49 percent of all non-resident hunters (754 of 1,533 hunters) are big game hunters. Nearly all of these are hunters seeking white-tail deer. A few may also hunt for black bear. The other 51 percent are divided among those who primarily seek Massachusetts waterfowl, ringneck pheasant and small game mammals. Massachusetts hunting areas attracting the most non-residents generally are located in Berkshire County (good deer range) and Bristol County (waterfowl, pheasant, small game mammal habitat).

Surprisingly, the greatest number of hunting license sales to non-residents occurs in Bristol County, notably at Seekonk. These sales are made to Rhode Island hunters at border community licensing offices (Table 3-14).

Most non-resident hunters originate in Connecticut and Rhode Island (a few from New Hampshire), and as in the case of fishing license sales, most license purchases are made in Massachusetts border communities. Hampden, Worcester and Essex Counties follow Bristol and Berkshire in total number of hunting licenses issued.

Fish and Wildlife Needs, Past and Present

Habitat

Inadequate protection of suitable fish and wildlife habitat has characterized the situation in Massachusetts over the last 25 years. In a recent study, land uses and vegetative cover in Massachusetts were compared for the years 1951 and 1971. Implications for wildlife were both dramatic and worrisome since the study documented significant habitat losses over the 20-year interval showing increases in the amount of urban land (residential, commercial and industrial) primarily at the expense of open space and agricultural lands.

Another report by the Department of Food and Resource Economics of the University of Massachusetts pegs the average loss of farms in Massachusetts during recent years at 200-per-year (20,000 acres per year) and a net loss since 1960 of 7,300 Massachusetts farms totalling 500,000 acres. Wildlife, which is associated with agricultural lands, has understandably also declined.

With inland waters the situation is much the same. Eutrophication and other changes, especially in the quality of ponded waters, have caused a reduction in suitable available habitat for some species of fish.

The overall result of such habitat changes clearly is a net reduction in total fish and wildlife habitat. However, this is partially offset by some improvements in quality of rivers and streams and by more effective management of what habitat remains. Unfortunately, most of the reduction is at the expense of game species, desirable songbirds and others which man finds attractive. To some extent, wildlife resources

Table 3-14

Massachusetts Cities and Towns Issuing More Than
25 Hunting Licenses to Non-Residents*

<u>County</u>	<u>City or Town</u>	<u>Number Licenses</u>
Berkshire	Egremont	32
	Great Barrington	32
	Mount Washington	30
	New Marlborough	31
	Otis	49
	Sandisfield	47
	Sheffield	88
	Williamstown	30
Bristol	Attleboro	73
	Fall River	27
	North Attleboro	39
	Rehoboth	46
	Seekonk	279
	Swansea	39
Hampden	Granville	32
	Southwick	38
	Tolland	32
Norfolk	Bellingham	29
Worcester	Blackstone	54

* Based on 1971 license data.

have persisted under habitat deterioration but most often those which have learned to adapt are those least desirable--the starlings, house sparrows, skunks, rats, feral pigeons and the like.

Greatest losses in fish and wildlife habitat are occurring in privately-owned lands. Public acquisitions of suitable lands are accelerating but these are not sufficient to equal the decline. Community Conservation Commissions have, over the last ten to fifteen years, protected over 40,000 acres and such lands--principally forested--will offset some habitat losses. Yet, since their usage is sometimes intensive--and likely to become increasingly so--their long-term value to many species of wildlife will diminish.

The Division of Fisheries and Wildlife similarly notes increasingly heavy usage of its lands. Included in its managed lands are 51 wildlife management areas totalling over 40,000 acres, 12 wildlife sanctuaries totalling 1,172 acres, 3 game farms and 5 fish hatcheries--all of which provide desirable fish and wildlife habitat (Table 3-10). Although the Division carries out an aggressive land acquisition program, this effort is inadequate. It is obvious that needs for protection of fish and wildlife habitat in Massachusetts are growing faster than ways are being found to compensate for declines.

Recreational Opportunities

Fish and wildlife-related recreation is big in Massachusetts. Hunters, fishermen and trappers together number about 3/4 million. Non-consuming users of fish and wildlife on a year-around basis outnumber sportsmen as users of state-owned wildlife management areas but their use of private lands is even greater. Consumptive and non-consumptive users of fish and wildlife combined may number about 2 million--including about 1/2 million who regularly feed birds and all categories of fish and wildlife users appear to be increasing.

Developing public interest in fish and wildlife together with habitat losses have stimulated increased efforts to expand opportunities for fish and wildlife-associated recreation. In addition to acquisition of lands by public and private interests, efforts have included the stepping up by the Division of Fisheries and Wildlife of artificial rearing and stocking programs (trout, pheasant); introduction of new or additional species of fish and wildlife (landlocked salmon, northern pike, coho salmon, kokanee salmon, wild turkey); more intensive management of some species; habitat improvements; development of new access facilities; regulatory changes and public education. These efforts have helped to meet human needs but in the future more intensive management of fish and wildlife--including innovative programs and the utilization of species previously overlooked--will have to be undertaken.

The public has traditionally utilized comparatively few species. The most recent inventory has identified 377 native species which are considered non-game animals. Most of these are not readily identified by the public which has, instead, consistently favored our common game species. A 1975 survey of the non-consumptive demand for wildlife has

suggested that if new recreational opportunities are to be developed involving fish and wildlife that are of little current interest, then a strong educational effort will first be required.

Educational Needs

Educational efforts on behalf of fish and wildlife management have principally served two functions: bringing together the resource users and the resource supplies, and informing resource users regarding controlling laws and regulations. As resources have dwindled and user demands have grown, efforts have shifted to show how fish and wildlife resources may be better conserved and used more efficiently and how users may locate previously underutilized species. New recreational opportunities were developed too which needed to be publicized, and more recently there has developed a need to explain the justifications for resource use to a public becoming increasingly separated from the traditional man-animal contacts inherent in rural living. The public must be made aware that regular harvests of naturally-produced fish and wildlife are ecologically and environmentally sound and that artificial substitutes are inevitably environmentally damaging or require exploitation of limited, non-renewable resources. Thus educational programs must present scientific evidence in easily understood language in order that legitimate uses of renewable fish and wildlife resources be maximized and the reliance upon synthesized products requiring finite resources be minimized.

Urban Needs

Although it is desirable to provide more recreational opportunities for urban people and to offer a choice of outdoor activities, traditional fish and wildlife-related programs are exceptionally costly and of only limited value in such areas. Poor fish and wildlife habitat and high human populations make them so. The Division of Fisheries and Wildlife can assist by offering public educational programs which incorporate technical advice relating to habitat improvement potentials, identification of existing fish and wildlife resources and which suggest innovative methods leading to human enjoyment of available resources.

Selected References

- Aney, W.W. and C.D. Cowan. 1975. Survey shows wildlife important recreational resource. Oregon Wildlife 30(2):8-9.
- Braunhardt, D.A. 1976. Massachusetts conservation commissions, land, and wildlife. M.S. Thesis. Univ. of Massachusetts, Amherst, 50 pp.
- Bridges, C.H. and P.E. Sendak. 1968. Fish and wildlife \$110,000,000 a year in Massachusetts. Final report Federal Aid in Fish and Wildlife Restoration. FW-1-R-1. Mass. Division of Fisheries and Game, Westboro, 10 pp.
- Driver, B.L., ed. 1970. Elements of outdoor recreation planning. Univ. of Michigan Press, Ann Arbor. 316 pp.
- Engel, N.E. 1975. Transferable development rights versus outright purchases. Cooperative Extension Service, Univ. of Massachusetts, Amherst. The Massachusetts Heritage 12(1). 4 pp.
- Gray, G.G. 1975. Nonconsumptive demand for wildlife by municipal conservation commissioners in Massachusetts. M.S. Thesis. Univ. of Massachusetts, Amherst. 94 pp.
- Kingsley, N.P. 1974. The timber resources of southern New England. USDA Forest Serv. Bull. NE36. Northeastern Forest Exp. Sta., Upper Darby, Pa. 50 pp.
- Pollack, E.M. 1962. Forest game management plans for the major state forests of the commonwealth administered by the Department of Natural Resources. Mass. Division of Fisheries and Game, Westboro. 44 pp. mimeo.
- Pollack, E.M. and G.F. Pushee, Jr. 1964. Wildlife section long range planning. Mass. Division of Fisheries and Game, Westboro. 82 pp.
- Thomas, J.W. and R.M. DeGraaf. 1973. Non-game wildlife research in megalopolis: the Forest Service program. USDA Forest Serv. Gen. Tech. Rep. NE-4. Northeastern Forest Exp. Sta., Upper Darby, Pa. 12 pp.
- Tompkins, W.A. and P.S. Mugford. 1964. Inland fisheries planning program. Mass. Division of Fisheries and Game, current programs and future needs. Vol. 1. Mass. Division of Fisheries and Game, Westboro, 159 pp.
- U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife. 1972. National survey of hunting and fishing 1970. Resource publication 95. 108 pp.

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