CHARACTERISTICS OF TRAPPERS IN MAINE, 1976 to 1980

by

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ABSTRACT

Characteristics of Maine trappers were investigated by monitoring license buying behavior from 1976-1980 and by using a mail questionnaire after the trapping season in 1980.

Trapping license sales increased 56% during the 5-year study period. From 37-41% of individuals who first purchased a license during this time period did not purchase one the next year. Most individuals who purchased a second license continued to purchase one.

Through the questionnaire, individuals described attitudes, behaviors, and preferences. A disproportionately large number of individuals who claimed to be professional or semi-professional trappers attended public hearings. Although money received for fur pelts is important, the most common reason given for trapping was the challenge involved. Fall land trapping was the most preferred type of trapping and the one in which most trappers participated. Fox was the most preferred upland species and muskrat was the most preferred aquatic species.

Detailed information was obtained from individuals who trapped in the fall. Effort per day of season was estimated in both

trapper-days and average trap-nights. The problems rated highest by trappers in Maine involved people. Top-rated objectives of trappers were maintaining animal populations in proper balance with carrying capacity and maximizing pelt primeness. When presented with regulation options, respondents rated a species bag limit per trapper as the most acceptable option even though this regulation has been opposed consistently at public hearings.

Information on trappers, animals, and harvests is combined into a management system.

ACKNOWLEDGEMENTS

the time to complete interviews and questionnaires and discussing results with me at chapter meetings throughout the state.

I wish to express my sincere appreciation to

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Finally, I am especially grateful to my wife,   , for her love and encouragement and willingness to sacrifice family needs in order to complete this project. I would not have begun or finished without her support.

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INTRODUCTION

This is a thesis about trappers and trapping in Maine. There
are many terms that need to be defined so the descriptions and
discussions can proceed with clarity and brevity.

A fur pelt consists of the skin, guard hairs, and fur fibers of
one individual animal. A fur is an animal skin or portion thereof
with all or part of the guard hair and/or fur fibers intact and one
that is used as an item of apparel for warmth or adornment (Deems
and Pursley, 1978). Fur is all or any part of a fur pelt. A
furbearer is defined in a very utilitarian way as any animal
producing or capable of producing a fur. Fur pelts from at least
100 species have been utilized in the fur trade (Deems and Pursley,
1978). Furbearers include terrestrial and aquatic species which may
be herbivores, carnivores, or omnivores. All furbearer species are
used commercially unless protected by certain laws or regulations.

Various classifications have been proposed to group furbearers.
The fur industry and fur buyers have traditionally separated species
by fur type (long-hair or short-hair) to match fashion trends. This
distinction between long-haired and short-haired fur types no longer
holds, due to the recently developed technique of shearing (Kaplan,
1974). Miller and Powell (1942) divided furbearers into five groups
based on their optimum or preferred habitat: farm, forest and
range, land and water, wilderness, and marine. Another grouping is

based on use. Individuals have different perspectives on the use of furbearers. Furbearers are viewed as predators and pests, hunting and trapping sport animals, sources of income, and ecological and aesthetic components of the outdoors. Some animals once viewed as furbearers are no longer, due to extinction or low numbers (e.g., sea mink [Mustela vison macradon], black-footed ferret [Mustela nigripes], and sea otter [Enhydra lutris]), appropriation for other uses (black bear [Ursus americanus] and grizzly bear [Ursus arctos]), or temporary lack of market (weasels [Mustela sp.]). The great variety of animals, with a variety of uses and perceptions by the public, makes management complicated.

During this century, significant changes have occurred in the location of the fur industry. After World War I, the primary market for distributing furs moved from Leipzig, Germany to London. During World War II, the market again changed, this time to New York (MacLeod, 1946). Many firms and auctions moved at this time as well. MacLeod (1946) noted at the time that the United States had become the largest fur consuming nation in the world. Trippensee (1953) reported the U.S. as a world center of the fur trade with New York and St. Louis leading the fur processing business. Many raw furs were then being imported into the U.S. to be processed. This seems to be the present situation. At the same time that these shifts in the market centers have occurred, cyclic changes have occurred in species and fur type preferences. The first major

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business in North America was Governor and Company of Adventurers of

England Trading in Hudson Bay (later the Hudson Bay Company) and the

beaver was the preferred furbearer. Many changes occurred before

the 1900's in fur preference, due to both exploitation of furbearer

populations and changes in fashion. During the 1920's, long-haired

furs (including skunks [Mephitis sp., Spilogale sp., and Conepatus

sp.], raccoons [Procyon lotor], and foxes [Urocyon sp. and Vulpes

sp.]) were the style favorites and brought high prices. These

prices declined with the crash of the stock market in 1929. By the

1950's, long-haired furs had decreased in importance due to change

in style and brought low prices. At the same time, the short-haired

furs (including mink [Mustela vison], muskrat [Ondatra zibethicus],

and seals [Phoca sp., Pusa sp., Histriophoca sp., Cystophora sp.,

and Callorhinus sp.]) increased in favor and value. Since that

time, another reversal has occurred. Long-haired furs are presently

very valuable and the short-haired furs, including muskrat and

beaver, are less so. In addition to style and market value, the

general value of a fur depends on pelage and skin. Primeness

depends upon length, color, density, and sheen of pelage, and also

on pigmentation of skin. Timing of primeness varies by species and

fur type group, as well as latitude.

As in no other time in the past, the 1970's proved to be a

turning period in the management of furbearers. The monetary

returns on pelts of furbearers have reached high levels, while the

numbers of hunters and trappers pursuing these animals have reached
unprecedented levels. Wildlife managers, frustrated in their
inability to deal with these problems in traditional ways, and
seeing the need for sound management programs, are adopting
procedures unimagined by most in the 1960's. Examples are tagging
of individual skins to obtain detailed harvest information and
restricting season length and limit on animals previously bountied
(i.e., bobcat [Felis rufus]). Program changes are occurring on
federal, state, and university levels within the United States as
well as on an international level.

Some of the problems facing wildlife managers today are due to a
lack of knowledge of furbearers. This lack has been recognized for
years. Ashbrook (1938) pointed out that members of the Biological
Survey, as long ago as 1921, were aware that existing methods for
determining harvest levels were not dependable and open seasons were
established with "by-guess and by-gosh" methods. He noted that
information still was not available at the time of his writing.
Mills (1928) also reported on a lack of information about what is
taking place among the furbearing animals in the U.S. He stated,
"We do not know how many there were or how many there are."
Trippensee (1953) noted that progress in furbearer management was
being made only in isolated cases. The areas of progress cited were
controlling harvest to protect adequate breeding stock in the case
of the beaver [Castor canadensis] and fur seal [Callorhinus

ursinus], and improving natural habitats in the case of the muskrat. Gabrielson (1959) stated, "We know less about the life histories of these [fur] animals and of proper methods of regulating the take than almost any other kind of wildlife of economic importance." He identified three basic needs for a national program for the conservation of fur animals: (1) scientific knowledge of life histories, food and shelter requirements, and breeding habits; (2) knowledge of prime fur periods; and (3) scientific knowledge of the extent of harvest allowable from an area which would still leave an ample residual population.

Only recently have researchers and managers begun to attack these difficult information needs. From 1949 to 1970, the Bureau of Biological Survey and the Fish and Wildlife Service kept harvest estimates for the U.S. This was discontinued in 1971. Pursley (1978) contacted the 49 states with furbearers (Hawaii has none) to obtain harvest estimates and research information for 1970 through 1977. For the 1970-71 trapping season, 11 states kept only local or partial harvest figures, and 9 states kept no records at all. By the 1976-77 trapping season, the recording of fur harvests improved so that only 6 states kept partial harvest records and the number of states with no records had dropped to one. During this same period, the reported value of wild furs harvested in North America increased from 29 to 252.5 million dollars. A mail questionnaire was sent to 159 universities during 1976 as well as states, provinces, and

territories in North America, requesting information on
organizations doing furbearer research and management (Deems and
Pursley, 1978). All states (except Hawaii), provinces, and
territories were conducting management programs, and 87 of 115
universities that responded reported conducting some type of
furbearer research.

Typical of the change in state furbearer programs is that
reported by Elicker (1978) for New Jersey. Early furbearer
management schemes consisted entirely of collecting data on numbers
harvested. He reported that fox and weasel were classified as
vermin until 1956 and raccoons were not considered to be furbearers
until 1958. Trapping seasons before the 1960's fluctuated as the
role and value of furbearers were debated by wildlife managers. The
development in furbearer management from the turn of the century
until the early 1960's can best be described as moving from
nonexistent to embryonic. The importance of furbearer management
was not recognized until the early 1970's when pelt prices increased
dramatically and humane groups pressed for a ban on trapping. A New
Jersey program now exists, for example, that includes active
research, management, and a mandatory trapper education program.

There are many factors operating on the international, national,
and state levels to influence fur demand and furbearer harvest.
Pelt prices at an international level appear to be controlled by
demand. Demand is determined by the availability, durability, and

fashion of pelts. Fashion plays a great part in year-to-year
differences in demand and hence fur prices. MacLeod (1945)
described a cyclical pattern that occurs in fur prices. A fur which
is out of fashion can be brought back into demand if the price is
low enough to encourage retail buying. With an increase in demand,
price goes up until the price reaches a level where the public
resists and begins buying another fur. In recent years, certain
events have altered the traditional cycle. With inflation rates and
international monetary exchanges fluctuating, furs are now being
used as an international medium of exchange outside the fur industry
(Pursley, 1978). Because the fur industry is an international
industry, economics and social factors in several countries can
alter the demand. In the U.S., the fur industry is a craft industry
with small firms and highly skilled workers. The retailing of fur
garments is done by consignment selling (a retailer sells garments
owned by a manufacturer in return for a fee) or leased department (a
garment manufacturer leases and runs a fur department in a large
store) (Troxell, 1976). Troxell noted that recent fashion demands
have been for a variety of furs. The organization of the industry
in other countries is centralized, unlike that in the U.S., and this
centralization has had dramatic effects on pelt prices in the U.S.
The majority of beaver pelts world-wide are processed in Milan,
Italy. During the early 1970's, temporary closing of the beaver
processing plants due to labor-management problems slowed the

movement of pelts and lowered prices even though demand for beaver fur garments remained high. The plants closed entirely in the mid-1970's, resulting in a drop of beaver pelt prices in this country to a low for the decade. Beaver pelt prices escalated to normal levels in 1977 as the processing plants returned to full production (Pursley, 1978).

The final important international effect on furbearer demand was the signing of the CITES (Convention for International Trade in Endangered Species) Treaty in 1973. This treaty used a principle displayed in early wildlife legislation in the U.S. such as the Lacey and Black Bass Acts. This principle advocates controlling or closing markets to eliminate illegal wildlife trade rather than concentrating on the producer to control the trade (King, 1978). The goals of the CITES Treaty is to end trade in endangered species. Appendix I of the treaty bans all commerce in endangered species and Appendix II assures that trade will not endanger other species. To implement the treaty, Congress passed the 1973 Endangered Species Act (ESA) to replace the 1969 Act. The 1969 ESA banned imports of species listed in the law except by special permit. The 1973 ESA included both an Endangered List and a Threatened List, corresponding to the CITES Appendices I and II. Animals in Appendix I of the CITES automatically went on the Endangered List. The ESA eliminated commercial trade of wild endangered species in the U.S. and contained regulations for

threatened species which varied from total prohibition on trade to
no trade restrictions, depending on species needs as set by the
Secretary of the Interior.

By 1976, 30 nations had signed the CITES Treaty. This law had
several dramatic effects on furbearers and the fur industry in this
country. Endangered furbearers such as the black-footed ferret and
threatened species such as the eastern timber wolf [Canis lupus]
were afforded protection from habitat destruction. The Secretary of
the Interior can prohibit federal agencies from funding projects
adverse to endangered species (Gottschalk, 1978). The U.S. Fish and
Wildlife Service has prepared recovery plans for several endangered
or threatened species, including the eastern timber wolf. The legal
trade in endangered furbearers has reduced dramatically. The U.S.
spotted cat fur imports in 1968 included four species that are now
considered endangered or threatened. The imports of these species
(1,300 cheetahs [Acinonyx jubatus], 9,600 leopards [Panthera
pardus], 13,500 jaguars [Panthera onca], and 129,000 ocelots [Felis
pardalis]) in 1968 accounted for only 1% of total imports in numbers
but 8.5% of the 100 million dollar fur import business (King,
1978). CITES and The ESA protected these species by banning
imports, despite this great economic pressure, without seriously
affecting the fur industry (King, 1978).

Not all effects of the ESA, however, were positive. Appendix II
of CITES was included with the knowledge that banning trade on some

species might increase pressure on other species. As predicted,
there were unprecedented increases in North American fur prices. A
1976 article in Fur Age Weekly proclaimed the resulting 100 to 150%
rise in raw fur prices (cited by King, 1978). The fur harvest in
North America increased from 29 million in 1970 to 252.5 million
dollars in 1977 (Pursley, 1978). There is fear now that some
species will be decimated, particularly outside North America,
before they can even by added to Appendix II of CITES (King, 1978).
The river otter [Lutra canadensis] and bobcat have been included for
this reason in the U.S. Other problems have resulted as species on
Appendix I (American alligator [Alligator mississipiensis]) and
Appendix II (eastern timber wolf) have dramatically increased in
numbers but cannot be controlled by a legal harvest (Gottschalk,
1978). A third problem has arisen in that the law has provided a
vehicle for anti-trapping and animal rights groups to attack
trapping by attempting to place furbearing animals on the endangered
list through all or part of their range (e.g., bobcat, otter, and
fisher [Martes pennanti]). Court litigation against the U.S. Fish
and Wildlife Service has been used to challenge regulations made
under the ESA.

Attacks on trapping have not been limited to the law, but have
included the use of education, news media, and legislation, as well
as court action (Penkala, 1978). In 1977, Charles Kelley,
International Association of Fish and Wildlife Agencies President

identified the consumptive use of furbearing animals, controls for nuisance animals, and the prudence of managing furbearing populations as the focus of current major resource conflicts (Deems and Pursley, 1978). This conflict is between the philosophies of the consumptive users and the nonconsumptive protectionists. With this confusion over and pressure upon furbearers, it is not surprising that all wildlife agencies in 1977 reported plans to initiate or intensify furbearer research and inventory procedures in North America (Deems and Pursley, 1978).

These many factors have resulted in much confusion within the states where many management regulations must be made. The Maine Department of Inland Fisheries and Wildlife has a broad objective "to insure that furbearers are maintained and perpetuated for their intrinsic and ecological values, for their economic contribution, and for their recreational, scientific, and educational use by the people of the State" (Fred Hurley, 1980, Personal Communication). For example, beaver management is composed of (1) season regulations by management unit and (2) openings and closing of townships. Both are based upon analyses of habitat availability (stream length and water area), previous harvest (number and age class distribution), nuisance complaints, and harvest objectives. Analyses are performed by computer. Computer-generated recommendations are reviewed by district wardens and regional biologists before they are implemented. Special closings are utilized on individual streams

when other management considerations take precedence (such as water level maintenance in a pond for fisheries management). Management of other furbearers in the state has not progressed as far as that for beaver.

After the CITES Treaty and the 1973 ESA were implemented, a shift in demand occurred to other species, resulting in increased prices for pelts. The price trappers reported receiving increased from the 1970-71 season until the 1977-78 season. The most drastic price increase occurred from 1972-73 to 1973-74 when CITES and ESA were initiated (Table 1). In apparent response to this price increase, the numbers of furbearers harvested increased (Table 2), as did the number of trappers (Fig. 1 and Appendix 1) despite efforts to control harvest levels through regulations. As Elicker (1978) reported for New Jersey, trapping regulations for furbearers (other than beaver) fluctuated annually in Maine as biologists guessed at proper harvest levels and argued among themselves and with trappers and administrators. Several changes occurred in the 1970's which began to suggest a solution and to provide necessary options to manage furbearers soundly. In 1972 the legislature empowered the Commissioner to set all rules and regulations for the management of game species in the state. This removed some of the political maneuvering in setting the trapping seasons. In 1975, the Wildlife Division of the Maine Department prepared Species Plans which carefully evaluated the wildlife resource and set management

Table 1. Estimated average price (in dollars) paid to Maine trappers for furs by species and year (from Maine Trapper Questionnaire, Furbuyer Reports, and New Hampshire Trapper Questionnaire).

Species	Seasons										
	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
Muskrat	1.33	1.45	1.96	2.55	2.69	2.96	4.11	4.78	5.07	5.12	6.62
Beaver	18.12	22.77	---	20.80	16.30	22.10	27.80	20.30	22.55	32.92	23.08
Mink	6.60	6.96	13.01	16.00	15.00	14.50	18.10	17.70	21.58	24.90	31.52
Otter	25.78	32.48	39.89	35.90	31.50	20.80	55.10	48.40	57.22	56.91	42.13
Fisher	25.93	31.84	39.15	46.50	48.00	60.80	88.80	97.80	99.23	115.55	131.63
Marten	---	---	---	7.37	8.02	---	10.20	10.20	20.40	25.10	15.40
Fox	9.03	9.65	16.35	32.50	26.30	39.30	55.20	50.10	61.99	62.03	55.97
Racoon	2.65	3.66	5.48	9.70	10.40	13.30	19.50	17.00	22.25	24.05	31.50
Bobcat	9.88	11.78	17.58	36.00	26.10	55.90	82.10	54.50	---	86.30	103.50
Coyote	---	---	---	16.93	15.73	18.72	33.60	32.90	39.17	40.89	24.70
Skunk	---	1.23	1.25	4.37	2.60	3.50	2.50	2.40	2.84	3.37	2.66
Weasel	0.40	000	000	0.60	0.50	0.50	0.50	1.10	1.00	0.99	1.00

Table 2. Maine furbearer harvest by species (from estimates based on annual trapper questionnaire, pelt tagging records, and bounty records).

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Species	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
						Seasons					
Muskrat	28,189	26,967	29,460	65,167	76,110	49,628	34,749	42,192	---	---	75,000
Beaver	6,288	10,895	11,054	12,941	11,295	6,797	9,632	11,182	10,539	19,209	6,927
Mink	4,977	1,992	2,529	2,440	4,369	4,455	2,791	3,496	---	---	---
Otter	588	637	539	980	1,005	446	531	676	718	967	671
Fisher	1,864	1,532	2,044	2,138	2,075	1,807	1,407	2,022	1,565	2,235	1,941
Marten	---	---	152	158	256	---	481	,402	1,118	2,718	3,387
Fox	1,306	1,695	2,295	5,685	6,408	6,863	4,845	6,529	5,467	6,372	4,382
Racoon	7,944	4,568	6,818	15,042	18,776	14,602	15,398	24,142	21,542	31,421	23,737
Bobcat	654	641	519	652	554	373	436	386	278	318	381
Coyote	---	---	---	77	190	209	320	379	746	938	779
Skunk	---	311	167	735	1,033	1,018	1,004	1,691	---	---	---
Weasel	1,210	887	293	634	743	739	365	763	---	---	---
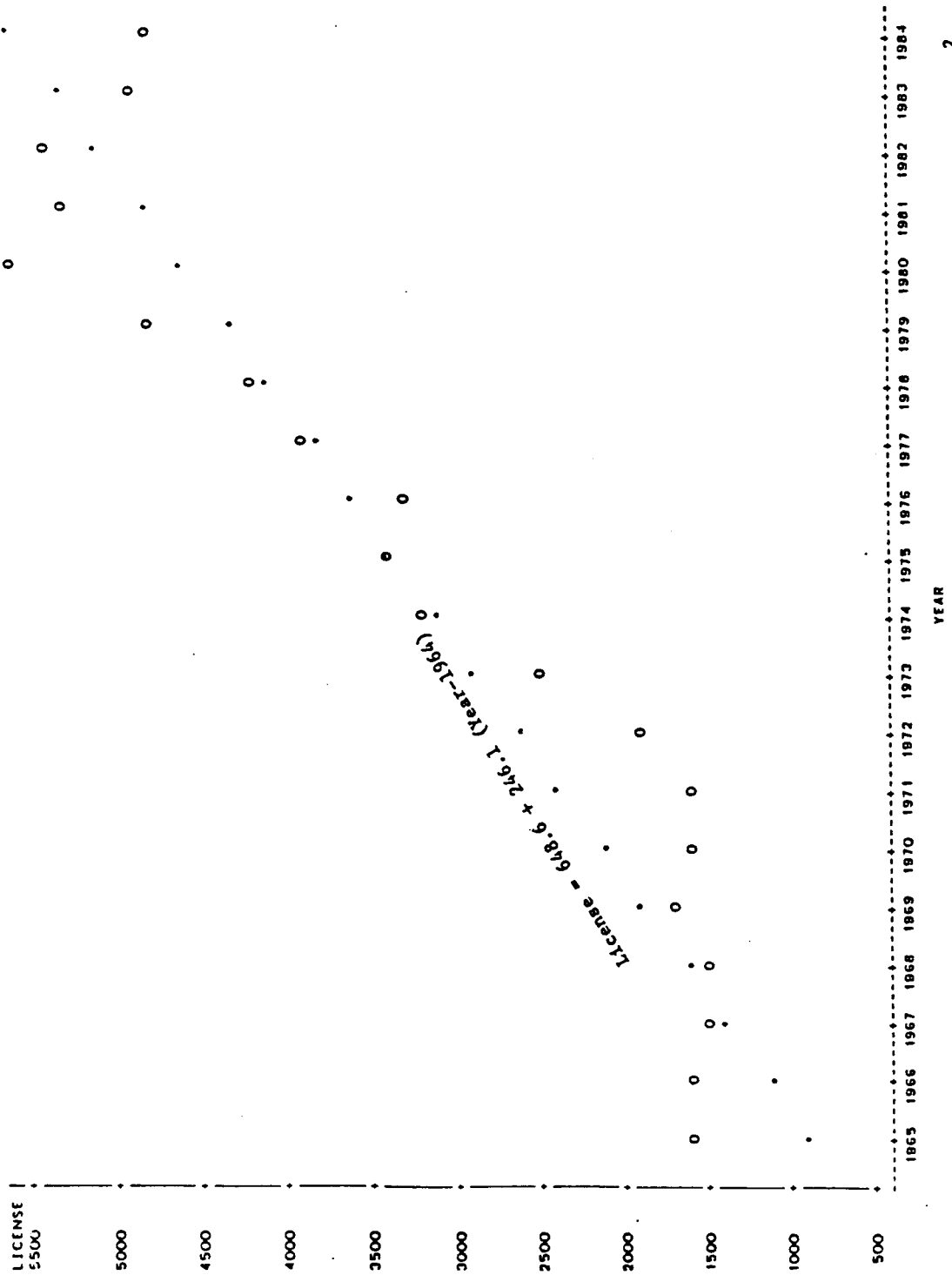
Fig. 1. Plot of Maine trapper license sales (0) and linear regression of license sales (*), 1965-84 (P=.0001, r²=.90).

objectives (Table 3). These plans were reviewed and approved by both public and political groups and became the cornerstone of management. All programs were geared to needs identified in the species plans. Plans also identified the needs for research on the species or users. Management plans were prepared for 15-year periods with 5-year updates. Several programs previously considered important were greatly de-emphasized, such as pheasant stocking. Neglected species, such as furbearers, were recognized as needing much attention. Among the needs recognized for furbearer management were information on the status of furbearer populations, the habitat needs of furbearers, furbearer biological and harvest data, and information on trappers and factors influencing their behavior.

Several of these needs are already being met. Research is under way to determine furbearer populations in the various management units within the state by both Department and university research efforts. Management of all species is now being done based on wildlife management units (Fig. 2). These units were established based on similar geography, land-use patterns, animal occurrence, and human population. Beginning with the 1976-77 trapping season, mandatory tagging of furs by trappers, which had included only fisher, marten [Martes americana], and beaver, was extended to otter, bobcat, and fox, and a year later to coyote [Canis latrans] and raccoon. Beginning with the 1978-79 trapping seacon, biological

Table 3. Species management plan optimum harvest objectives for furbearers in Maine by wildlife management units for 5-year segments beginning in 1978 and 1982.

Species	Year	Wildlife Management Unit								Total
		1	2	3	4	5	6	7	8	
Beaver	1978	1,340	2,823	1,412	1,895	1,221	659	464	349	10,223
	1982	2,648	5,158	2,908	3,685	2,442	1,399	1,016	905	20,161
Otter	1978	126	355	148	214	130	107	69	62	1,212
	1982	126	355	148	214	130	107	69	62	1,212
Mink	1978	1,904	2,701	1,374	1,898	1,455	941	642	360	11,275
	1982	1,904	2,701	1,374	1,898	1,455	941	642	360	11,275
Muskrat	1978	4,330	6,070	2,130	46,070	19,930	17,130	25,270	32,400	153,300
	1982	2,470	7,200	3,000	35,800	8,000	5,400	21,270	16,930	110,500
Fisher	1978	136	283	119	518	34	29	326	303	1,748
	1982	175	373	160	268	49	52	131	202	1,175
Red Fox	1978	817	1,036	511	1,920	411	901	803	857	7,256
	1982	817	1,036	511	1,920	411	901	803	857	7,256
Bobcat	1978	57	127	54	142	100	158	0	0	638
	1982	57	127	54	142	100	158	0	0	638
Coyote	1978	495	2,145	1,174	1,181	456	559	269	407	7,641
	1982	700	2,582	1,086	1,588	783	711	590	759	8,798
Marten	1978	200	1,200	400	---	---	---	---	---	1,800
	1982	200	1,200	400	---	---	---	---	---	1,800
Raccoon	1978	2,700	700	500	4,200	1,900	1,800	3,000	4,600	19,350
	1982	2,700	700	500	4,200	1,900	1,800	3,000	4,600	19,350

WILDLIFE MANAGEMENT UNITS
JULY 1976

The management units shown have been formed on the basis of land-use. human population distribution. climatic conditions. soil type. forest type. physiography, and present political boundaries. Where possible, without compromising the original purpose of the zoning. county lines have been used as boundary lines.

2

NORTHERN WILDERNESS
This unit includes Maine's largest undeveloped tract and sustains a very small human population. It, too, lies in the northern climatic zone: but the basic soils are shallow, stony, sandy loams, as opposed to the predominant chanmery loam soils in most of Unit I.

3

WESTERN RECREATION
While much of this unit is similar topographically and climatologically to Unit 2, it differs in its developing intensive recreational use. Population density is low (fewer than 10 persons/sq. mile). Most of the region is woodland and includes the transitional zone between the spruce-fur forests of Unit 2 and the white pine-hardwood forests of Units 7 and 8.

KEY TO STARRED AREAS ★
Numbered stars appear in some places on the map where there is not room enough to print the name. The table here will provide the name for each number.

1

AROOSTOOK AGRICULTURAL
This unit is made up of a mixture of intensive agriculture (primarily the potato industry) and woodlands. It lies in the northern climatic zone but has a relatively dense human population (about 25 persons/sq. mile).

5 EASTERN WOODLAND
This unit is almost completely forested and h a very small human population. Lyir in the intermedia climatic zone. supports main spruce-fir growt The soil types a similar to those Unit

6 EASTERN COAST
The coastal climatic zone subdivides this unit. Population density is about 10/sq. mile. and land use patterns are quite variable.

MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

7 CENTRAL COASTAL
This unit is the second most densely populated in the state (about 30/sq. mile) and supports a mixed agricultural, semi-urban population. A transition of forest types similar to that described for Unit 3 occurs here.

4 CENTRAL
This unit is characterized by the diversity of its land-use, which varies from intensive agriculture to woodlands both productive and recreational. Population density is moderate (25-30/sq. mile), and much of the area falls in the intermediate climatic zone.

8 WESTERN COASTAL
The most dense human population (40/sq. mile) in Maine occurs here. The unit supports much white pine growth, with hardwoods being well distributed. Climatic conditions are probably the most moderate of any unit. Much of the unit is a coastal plain but the soils are similar to those in Unit 7 (stony, sandy loams, low in silt and clay).

This zonation divides the State of Maine into units with distinct similarities of factors used in considering the biological significance of the area. By breaking wildlife data accumulated on a state-wide basis into these units, interpretation should be eased considerably. It is to be expected that as land use practices change in the future, revision or refinement of this unit regionalization will prove necessary. It is anticipated that the present division should meet the requirements for at least a decade.
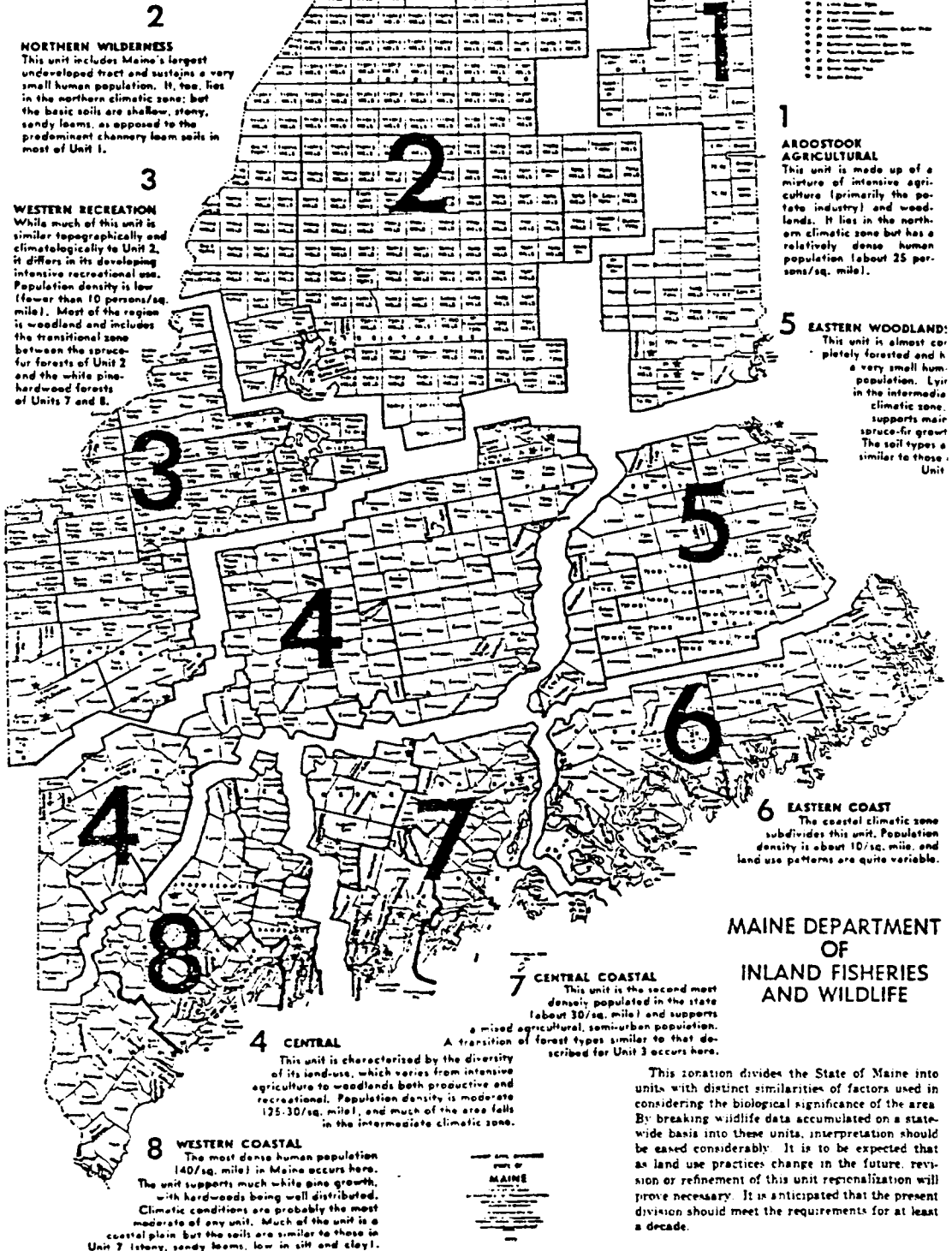
MAINE

Fig. 2. Location and description of Wildlife Management Units in Maine.

data including age, sex, and reproductive condition were obtained from a sample of tagged furbearers in 3 of the 8 management units.

The research reported herein is part of a larger study carried out by this author and the Maine Department of Inland Fisheries and Wildlife. The overall objective of the general study was to determine the effects of trapping and trappers on the fur resource. From the results, a furbearer management system is to be developed to aid biologists in managing the fur resource. Not only wildlife managers in Maine, but others in the wildlife field have identified this need. Sanderson, et al. (1979) identified several needs in the field of wildlife management, including characterizing types and groups of users (hunters) and how to influence the attitudes of these users and the general public. Giles (1978), in discussing muskrat management, stated that achievement of optimum management will depend on increasingly more sophisticated decision aids such as automated data bases, computer simulations, and optimization programs. Fig. 3 contains a flow chart outlining a portion of the furbearer data analysis and information system which is currently in place in Maine. Table 4 gives a brief description of inputs, outputs, and users of all computer programs in the furbearer system. This system, as is true with any system actually used, is continually being revised to meet further needs as they are identified. The study reported herein is part of that system and is described in Table 4.

Fig. 3. Furbearer data analysis and information system for Maine.

Table 4. Description of furbearer data analysis and information system.

Program	Input Data	Outputs	Users
TRAPLIST SAS	License data (tape)	Alphabetical listing by county of trapping license holders.	Requests from outside sources.
LISTTRAP SAS	License data (tape)	Numerical listing by license and alphabetical listing by name of trapping license holders.	1) Furbearer Project 2) Warden Service
LICSUM SAS	License data (tape) Township data (disk)	Summary of licenses by type by by region and WMU.	1) Furbearer Project 2) Regions 3) Administration
PRELIMHV SAS	Harvest data (tape)	Summary of harvest by WMU for each species.	1) Furbearer Project 2) Regions 3) Administration 4) Public
COUNTYHV SAS	Harvest data (tape)	Summary of harvest by county for each species.	Requests from outside sources.
TAPEFIX1 SAS	Harvest data (tape) License data (tape)	Correct license type in harvest file and create disk file.	
TAPEFIX2 SAS	Harvest data (tape)	Write corrected harvest file back onto tape.	

Table 4. Continued

Program	Input Data	Outputs	Users
FURTAG SAS	Harvest data (tape) Township data (disk)	Harvest data are summarized by township in data set on disk (FURBEAR. TWNHRVnn). Harvest and harvest/mi^2 listing is produced by township, WMU, region, WMU within region, and statewide.	1) Furbearer Project 2) Regions 3) Public
TOWNSUM SAS	FURBEAR. TWNHRVnn data sets (disk) Township data (disk)	Harvest and harvest/mi^2 listing is produced for all years since 1976. Long term and short term averages are computed for all groupings. Summary data set is produced (FURBEAR. TOWNSUM).	1) Project 2) Regions 3) Administration
TOWNSUM2 SAS	FURBEAR. TWNHRVnn data sets (disk)	Harvest listing is produced for last 2 years by township within region.	Lists are used by regional biologists and public in providing information to Wardens.
LICTAG SASNEW	Harvest data (tape) License data (tape) Township (disk)	Harvest by WMU by harvester (trapper, hunter and combined) data set is created (FURBEAR. TRPHRVnn). Trapper listing by WMU is produced. Summary of harvest in WMU by region of residence (carpetbagger) is produced to monitor trapper movement.	1) Regions 2) Project

Table 4. Continued

Program	Input Data	Outputs	Users
TYPETAG SASNEW	FURBEAR. TRPHRVnn data set (disk)	Listing of harvest, catch/success-ful harvester, and successful harvesters by license type and general category by WMU and statewide is produced. Summary data set is created (FURBEAR. TYPHRVnn).	Project
HARUSUM SAS	FURBEAR. TRPHRVnn data sets (disk)	Tables of historical harvest and success rate by general category and produced by WMU and statewide and plots of harvest, successful users, and success rate statewide.	1) Region 2) Project 3) Administration
WARDNTAG SAS	Harvest data (tape) License data (tape) Township data (disk)	Summary of harvest by individual within each warden district is produced. A summary of pelts tagged by warden district and division is produced.	Warden Service
TGSEARCH SAS	Harvest data (tape)	Search for all information on specific tag number.	Warden Service
TRSEARCH SAS	Harvest data (tape)	Search for all information on specific trapper.	Warden Service
BIOLIST SAS	Biological data (tape) Township data (disk)	Biological data file for all years is created on tape (FURBEAR. BIODATA). A listing by ID number within township is produced.	1) Project 2) Regions 3) Public (age requests)

Table 4. Continued

Program	Input Data	Outputs	Users
BIODATA SAS	FURBEAR.BIODATA (disk)	Complete tables of sex and age data are produced. Reproductive data are summarized.	Project
HRVWEEK SAS	FURBEAR.BIODATA (disk)	Tables of frequency of juvenile harvest by sex by date are produced. Tables of sex and age breakdown by week of fall season are produced.	Project
HRVCHRON SAS	FURBEAR.BIODATA (disk)	Bar graphs of chronology of harvest and produced by WMU and statewide.	1) Project 2) Regions
MCIRMOD SAS FCIRMOD SAS MCIRJUV SAS FCIRJUV SAS	Biological data output Warden data output License data output (data form)	Change-in-ratio model to estimate exploitation rate for males and females of juvenile and older age classes	Project
POPMODEL SAS	Biological data output Harvest data output Exploitation rate output (data form).	Life equation type population model used to evaluate management options.	Project
TRAPLONG SAS	Trapper Longevity File	Updates longevity file with current year's license sales.	Project

Table 4. Continued

Program	Input Data	Outputs	Users
TRAPLONG PRINT	Trapper Longevity File Trapper Listings	Update longevity file when license number is unknown.	Project
TRAPLONG MODEL	Trapper Longevity File	Life equation type population model of trappers.	Project
QUESTnn SAS	Trapper Questionnaire File	Analysis of trapper questionnaire data.	1) Project 2) Administration

The specific objective of this research was to document the behaviors and attitudes (feelings, values, and beliefs) of fall furbearer trappers in Maine. Rather than rely entirely on descriptive statistics of the average individual, attempts were made to find characteristics which would allow trappers to be placed in distinctive groups. While results demonstrate the importance of understanding the components which make up a population of trappers, or any other user group, the research reported on here gains full significance only when viewed within the context of the overall furbearer management system of Fig. 3.

LITERATURE REVIEW

Surveys of wildlife resource users have been used for over 35 years within wildlife management for a variety of reasons. The majority of these surveys, until recently, have dealt with hunters. Applegate (1977) citing Schole et al.'s (1973) literature review on the characteristics of hunters, stated that 110 articles are listed, 28 of which present original research. The general format of these articles is to describe hunters with respect to a particular area (state, region, or nation) or type of game. The results are usually a tabulation of conventional socio-economic and demographic parameters and a discussion of attitudes, motivations, and behaviors. Examples of these types are McKean's (1967) study on Oregon deer hunters, Croft's (1963) survey of bow hunters, Moncrief's (1971) survey of Michigan deer hunters, Bevin et al.'s (1968) study of hunter characteristics in the Northeast U.S., and the 1975 National Survey of Hunting (U.S. Fish and Wildlife, 1977). Very few of these studies have been objective-oriented beyond finding out about hunters.

Hendee and Potter (1971) identified the need for different types of studies of humans for resource management purposes. They cited the need to identify "the relative dimensions of hunting satisfaction, and how they vary among different types of hunters (e.g., experienced vs inexperienced) and different kinds of hunters

(e.g., elk hunters vs duck hunters)". An additional problem is to
determine how managers can provide diverse opportunities so that
hunters can seek their individually preferred mix of values from the
experience. Following this, several innovative studies were
undertaken to expand the use of user surveys with hunters. These
studies are characterized by a specific objective guiding the
study. More (1973) found the factors motivating Massachusetts
hunters to be display, aesthetics, affiliation, pioneering, kill,
exploration, and challenge. He reported that the pleasure of
hunting comes more from the process than the product. Stankey, et
al., (1973) interviewed big game hunters and found that although
other aspects of hunting are important, success is a major component
of quality. Schole, et al., (1973) used an interview format in a
study designed to be an analytical investigation of hunters'
behavior, attitudes, and rewards. Among the reported results is a
list of 11 reasons why hunters take part in hunting. A significant
majority of these reasons do not concern hunting itself but
involvement with friends and nature. Klessig and Hunt (1973)
examined the question of whether waterfowl hunters would attend
training sessions in duck identification in order to identify
individual species of ducks under a species-management approach and
to refrain from shooting illegal ducks once identified. Unique to
their study was an attempt to identify types of hunters by
dichotomizing the variables of age, education, residence,

consistency, experience, and success. Two findings were that some groups (young and rural hunters) had different attitudes, and that a few hunters shoot most of the ducks. Decker and Brown (1982) used a mail questionnaire to examine socio-demographic, behavioral, and attitudinal characteristics of participants in New York's 1978 hunter training course. Participants were placed into 5 types (continuous hunters, sporadic hunters, potential hunters, deserters, and nonhunters) based on license-buying behavior. Differences in hunting related attitudes were found between groups. Reasons for involvement in hunting were examined by comparing continuous and sporadic hunters to potential hunters, deserters and nonhunters.

Different types of studies were conducted by Kennedy (1970) and Eisele (1973) to evaluate attitude differences between hunters. Kennedy (1970) evaluated how deer hunters in a Maryland state forest perceived and evaluated the presence of other hunters. The presence of other hunters was considered to be advantageous in moving deer and disadvantageous due to crowding effects (competition, safety, etc.). The threshold of crowdedness (willingness to accept crowding) was much higher for hunters than for either state personnel or local residents. Eisele (1973) conducted a study in Wisconsin to determine the co-orientation between two groups of duck hunters (ardent and average) and Department of Natural Resource biologists. The methodology of the study was to identify each group's attitudes and knowledge of the other group's attitudes.

Overall, hunters and DNR biologists thought their views were closer to each other than they actually were. There was large disagreement between hunters and biologists.

Leenhouts (1976) formulated an optimal deer resource policy for Michigan to maximize present and future resource utility to the user. A model was developed to process public input in the form of questionnaire data. First, he determined the motivational factors which influence deer hunter behavior and incorporated them into the model. In tabular form, he summarized seven studies identifying the motivations for hunting and values attached to each (Table 5). He identified 18 significant motivational factors for Michigan deer hunters. Next, seven performance criteria were incorporated into the model to evaluate the human benefits or utility derived from the wildlife resource. These criteria were scored for: (1) total benefit, (2) consumptive benefit, (3) nonconsumptive benefit, (4) days-afield, (5) drop-out rate, (6) benefit-days, and (7) motivational factor. Finally, the optimal resource policy was determined for the period 1972 to 1990. Changes in mean participation rates, human benefits, and motivational factors as a function of 17 hunter population and/or resource management policy changes were evaluated. Projections were performed on a priori defined hunter residence-age categories (sub-groups) and summed for the entire population by year. Encouraging hunters to invite more friends to go hunting was the major action among four which were selected as most beneficial. Generally, management policies in the

Table 5. Synthesis of research identifying the motivations for hunting. (Values are given as percentages; ** indicates the research study identified the motivation as important to hunting but no index of that importance was obtained or available.) (from Leenhouts, 1976)

| Motivation | Research Study* | | | | | | |
	1	2	3	4	5	6	7
Gaining health, exercise, relaxation	**	4	2		10	23	
Escaping from daily routine		8	7				
Experiencing change	**	6					**
Finding solitude		3					
Enjoying nature	**	16	32		11	13	
Pioneering			**				**
Experiencing outdoor recreation	**	10	9		37	41	
Challenging environment		6	4		**		
Having companionship with friends		13	9	**	14	11	**
Having companionship with family		6		**			
Hunting challenge		11	11	**			**
Gaining prestige from success	**		10	**			**
Having economic dependency	**		1		15	5	
Harvesting for food	**	7	3				
Killing an animal		4	6	**			**
Working with dogs		2					
Intellectual stimulation					10	5	
Building character			1		2	2	
Having religious experience					1	2	

*Research Study Numbers are:
1 = Kirkpatrick (1965:61)
2 = Schole et al. (1973:88)
3 = Klessig and Hale (1973:14)
4 = Bond and Whittaker (1971:133)
5 = Davis (1967) results of 1965 study
6 = Davis (1967) results of 1960 study
7 = More (1973)

category of public relations and educational activities can best

maximize human benefits and hunter participation rates. Resource

management policies presently employed by the Department of Natural

Resources were found to have little influence on performance

criteria.

Shaw (1975), after stating that certain characteristics of

hunters have been "studied to the point of redundancy", attempted to

gain insight into the relative importance of selected social and

psychological determinants of an individual's attitude toward

hunting. Questionnaires were sent to 200 individuals in each of

three groups. The groups were believed to represent the spectrum of

apparent attitudes toward hunting. The groups were hunters,

anti-hunters (Fund for the Animals), and neutral in affiliation

(Audubon Society). Background variables, general attitudes, and

wildlife-related activities (independent variables), and attitude

toward hunting (dependent variable) were included in an analytical

model. Shaw found that attitudes toward hunting are supported by a

broad range of background experiences, beliefs, and attitudes.

Twelve areas were found where anti-hunters differed from hunting

supporters. Hunting opposition was found to be based more on

philosophical differences than ignorance of biological facts. He

concluded that people's attitudes toward hunting are very stable and

not subject to change.

Kellert (1977), using a two-phase study, identified typologies

of nine basic attitudes that people have toward animals. These

typologies are summarized in Table 6. Using these typologies, the
views of various groups were compared (hunters and anti-hunters). A
suggestion is made that these typologies may provide a means to
place individuals into subgroups within major groupings. There
appear to be some weaknesses with the definitions in interchanging
the constructs of "interest", "concern", and "curiosity" in the
description of attitudes. For example, they raise the question of
whether the "interest" of the naturalistic typology is comparable
with the "concern" of the utilitarian typology. If these are
intended to be interchangeable, the same word should be used.
Concern transmits a stronger feeling than interest, which may not be
intended.

Applegate (1977) used questionnaire data uniquely to gain
insight into the dynamic nature of hunter populations. He stated
that studies of hunters have been static, rather than taking the
dynamic approach called for by Hendee and Potter (1971) and Allen
(1973). To meet the purpose of his study, which was to provide a
descriptive account of the dynamics of a sport population, he
employed a classical analysis of a wildlife population. Included in
the analysis were life tables, age structure tables, and
survivorship curves, as well as the calculation of natality and
age-specific mortality rates. In this analysis, age was the number
of years of active participation in hunting, birth was initiation or
recruitment into hunting, and death occurred when a person ceased to

Table 6. Typologies and definitions of individual's attitudes
toward animals (Kellert, 1977).

Typology	Definition
Naturalistic	Primary interest and affection are for wildlife and the outdoors.
Ecologistic	Primary concern is for the environment as a system, for wildlife species, and for natural habitats.
Humanistic	Primary interest and strong affections are for individual animals, principally pets.
Moralistic	Primary concern is for the right and wrong treatment of animals, with strong opposition to exploitation and cruelty toward animals.
Scientistic	Primary curiosity is for the physical attributes and functioning of animals.
Aesthetic	Primary interest is in the artistic and symbolic characteristics of animals.
Utilitarian	Primary concern is with the practical and material value of animals.
Dominristic	Primary concern is with mastering and controlling of animals.
Negativistic	Primary interest is in avoiding animals, due either to indifference, fear, dislike, or superstition.

hunt. Hunters that were either active or inactive were identified from a random poll of New Jersey residents. A high turnover rate was found with 41% of hunters deserting within 10 years of initiation, but recruitment rates from hunter-safety programs approximately equalled the desertion rate, yielding a stable population. He found that 8.9% of the active hunters had stopped and started again, but he did not view this as a serious problem. These reentries are a category not found in a normal population analysis but are closely akin to immigration phenomena. He found that factors relating strongly to deserting hunting were age, sex, occupation, income, age at initiation of hunting, and age of hunting companions at initiation. A deficiency of this as well as other studies was identified as the concentration on the "average" hunter. A recommendation was made to look at the demographic attributes, behaviors, and attitudes of discrete subsets of the general hunting population.

Studies of trappers are fewer and less extensive than for hunters and anglers. Barnes (1946) sampled hunters and trappers with the same questionnaire in Indiana in an attempt to estimate game kill. A trapper survey was used from the early 1950's through 1975 in Maine, but consisted of a postcard mail survey to estimate harvest (prior to mandatory tagging for most fur species), price estimates by species, and a few questions limited to where trapping effort was expended. Nichols and Chabreck (1973) intensively

interviewed 53 trappers in Louisiana. The area used by trappers was mapped and trappers were divided into marsh and swamp types. From these studies, expenses differed significantly between trapper types. To evaluate harvest, catch was expressed based on every variable that could be quantified (animals caught/trap-night/square mile/trapper). Warren (1975), as part of a study to survey and analyze the economic impact of the fur animal trapping industry in Tennessee, surveyed a sample of trappers to determine the number and value of pelts harvested and status of fur animal populations. The mail questionnaire which he employed contained additional questions on age, occupation, equipment used, length of trapline, membership in organizations, magazines read, and marketing of pelts. Very little data analysis was done beyond computing frequency and percentages of responses.

Day (1976) reported on a trapper survey which was part of a larger study of furbearer resources in Oklahoma. A mail questionnaire was used to develop a profile of socio-economic characteristics, target species, success rate, persistence, attitudes towards alternative management strategies, and other characteristics. Results of the survey were believed to be biased due to a faulty sampling procedure. Response rate was also low (19%). An attempt was made to check for response bias by using a follow-up telephone interview but sufficient numbers could not be obtained using license receipts. Trappers in two counties were

interviewed in person using the questionnaire as the survey instrument to supplement questionnaire returns. Little information on results beyond means and ranges was provided. The most common recommendations for change made by trappers, in decreasing order, were: (1) control the taking of raccoons with dogs; (2) restock or re-populate areas with furbearers; and (3) enforce (better than at present) trapping laws and restriction on illegal activities. Although 78% of the respondents wanted more emphasis and funding on furbearer management, 55% were not willing to pay for an improved program.

Trego and Kruckenberg (1975a, b) reported in a popular article the results of a study using a questionnaire to characterize and determine participation patterns of red fox hunters and trappers in South Dakota. Individuals were divided into three groups based on participation: fox trapper only, fox hunter only, and fox hunter and trapper. Differences between groups were found in age, human population density past and present, occupation, education, and how a decline in pelt price might effect participation. The most commonly selected reason why an individual participated in hunting and/or trapping for all groups was to enjoy the challenge. The authors warned that assumptions drawn from this study should be considered as preliminary and that resampling should be done when the high pelt prices (which existed at the time of the study) declined.

Tully (1973) reported on a survey of trappers carried out in Colorado during 1973 to determine the size and value of the fur harvest, current harvest methods, and trapper attitudes toward the furbearer resource. Questionnaires were sent to 1,119 license holders. A return rate of 48.5% was obtained. The species trapped most intensively were tabulated. The majority of trapping was for beaver and muskrat. The greatest number of trap-nights was expended for bobcats, which reflects the extreme high prices received for pelts. The area where trapping activity was concentrated had changed little since surveys in 1949-54. The three most frequent reasons given for why individuals trapped were: having fun (35.6%), making money (32%), and controlling nuisance animals (28.5%). Other reasons given included: to teach children about the wilderness, to make clothes and rugs, to do taxidermy, to help in scientific research, and to outwit animals. Most trappers who were concerned about a shortage of furbearers felt that the cause was habitat loss to housing developments, road construction, and dam building. Another major change was high prices for pelts resulting in overharvest.

Penkala (1978) surveyed trappers in New Jersey to obtain detailed information about their attributes, behavior, and economics. These were needed, he claimed, to design management programs to maximize the benefit derived from the furbearer resource. Penkala, in justifying the study, cited Schole et al.'s

(1973) review that many studies have been done on hunters but relatively few on trappers. A mail questionnaire was sent to 1,000 New Jersey trappers, of which 44.7% responded. The data collected included trapper characteristics (age, occupation, income, etc.) and behavior (number of days trapped, number and type of traps used, etc.). Results indicated a high drop-out and re-entry rate by trappers. The number of days trapped was found to be influenced primarily by factors other than the official season length. Penkala concluded that the average trapper does not exist. Rather, the trapper population consists of subgroups which share a multiplicity of common characteristics. Identifying and describing of these subgroups is cited as most needed in management decision making.

Erickson and Sampson (1978) examined characteristics of Missouri trappers from mail surveys (1972-73 and 1977-78) and trapping permits (1956 and 1976). The mail survey obtained estimates of effort in the form of percent license holders actually trapping, number of days traps set, and average number of traps per day. Information was also obtained on total expenses, harvest, and years of trapping. Over 20% of license holders did not trap in both years of the mail survey. Trappers in 1977-78 averaged fewer traps set, days trapped, average animals caught, and years of experience than in 1972-73. Permit sales and mean pelt price more than doubled over this time. The permit sales examination revealed a much older mean age in 1956 (low fur prices) than 1976 with the greatest frequency of

individuals in the three 10-year age classes from 30-60. The age distribution of 1976 permit holders during high fur prices was skewed heavily to the younger age classes with 25% of trappers in the 14-21 category.

Gagnon and Lacasse (1979) studied Quebec trappers with four objectives: (1) establish a socio-economic profile; (2) determine trapping habits; (3) measure degree of satisfaction; and (4) evaluate the economic benefits of fur trapping. Increasing popularity of trapping, growth in the value of furs, positive contribution of fur trapping to the provincial economy, and lack of basic information were cited as reasons for the study. Although average years of experience was high (16), this disguised the actual experience of the population which was bimodal with highs in less than 5 years (33%) and over 35 years (17%) of experience. Two-thirds of trappers wanted to take a trapping course. The majority of trappers (72%) considered trapping to be a recreational activity but this percentage varied greatly by geographic region (27-92%). Although recreation was reported as the main motivation, income in excess of expenses was also important (38%) along with consumption of edible meat (range: 26-83% by regions). Trappers reported (on a scale of very satisfied to very dissatisfied) a high degree of satisfaction with both their harvests and the regulations employed by the province. During the 1978-79 season, Quebec

trappers were estimated to have spent $10 million in order to harvest pelts valued at $12 million.

Bailey (1981) used a questionnaire to obtain information on the experience, trapping techniques, and views of individuals trapping on the Kenai National Moose Range Wildlife Refuge in Alaska during the 1977-78 season. All trappers obtaining a free permit to trap on the refuge were surveyed using an instrument containing 19 multiple-choice and fill-in-the-blank questions. The majority of trappers (67%) reported that they trapped for the outdoor experience and personal enjoyment while less than half trapped to supplement their income. Trappers were considered to be opportunists in that very few specialized on a species or species group (aquatic or land) and over 80% reported trapping for all furbearers present. Differences in trapping technique and views were found between groups based on years of experience (less than 5 years, 5-10 years, and over 10 years experience). A majority of trappers (71%) identified negative experiences but few wished to change regulations. Factors negatively affecting enjoyment or success were interference from nontrappers (19%), limited access (16%), excessive regulations (11%), and too many trappers (5%). The author concluded that trapping was not economically feasible on the refuge but rather was pursued as part of the "Alaska experience or Alaska image."

Samuel and Bammel (1981) compared socio-economic, demographic, behavioral, and attitudinal measures of independent trappers and

National Trappers Association members in West Virginia.
Significance between group differences were found in annual income,
education, expenditure for equipment, and explanations of why people
trap. Information on trapper characteristics and attitudes was said
to be needed prior to implementing any education of management
program.

Kellert (1981), in a study of attitudes of people toward
wildlife, examined a group of people who identified themselves as
trappers. Nineteen percent of his sample of 550 Americans indicated
that they had trapped an animal at least once, but only 3% trapped
frequently. In the typology developed in this study (see Table 5),
trappers were found to be the animal-activity group with the most
pragmatic, authoritarian, and non-affectionate attitude toward
animals. In addition, trappers were found to have the highest
utilitarian attitude score and among the highest dominionistic and
negativistic scores, while having the lowest humanistic scores.
Other groups evaluated were hunters, backpackers, bird watchers, zoo
enthusiasts, animal raisers, financial contributors to animal
welfare causes, pet owners, and rodeo enthusiasts. The group of
trappers included more persons of lower socio-economic status and
older age than other groups. Kellert concluded that trappers are
obviously one of the strongest advocates of the pragmatic
utilization of wildlife and wilderness resources.

Payne (1980), in discussing furbearer management and trapping, suggested two overall principles which management measures and regulations for furbearers must accomplish: (1) to ensure existence of furbearer populations and (2) to optimize public (consumptive and nonconsumptive users) benefits. He then discussed seven management objectives (maintain maximum sustained yield, reduce wide-scale nuisance problems, protect livestock and crops from individual furbearers, reduce the spread of infectious diseases and parasites, establish and maintain populations of selected wildlife species, maintain furbearers for nonconsumptive use or a natural ecosystem, and reintroduce furbearers) in light of regulation needs, but did not present a system to accomplish optimization of user benefit.

Berg (1979), in discussing furbearer management, lists three major goals: (1) perpetuate the resource, (2) allow for its best utilization, and (3) manage furbearers for the maximum benefit of the people. Although recognizing a need to identify the people for whom to manage, no attempt was made to delineate what benefits they may desire or obtain. He also saw the need to educate the public as a secondary goal.

Morache (1976) claimed that fish and game departments have historically managed fisheries resources subjectively without involving the "publics." The plural of public is used to signify the variety of groups making up the general public. He advocated involving this collection of groups in the decision-making process,

particularly as more specialized fisheries management programs are implemented. Giles and Lee (1982) demonstrated a procedure to select a season to optimize user benefits using the gray squirrel hunting season. The procedure involves delineating a set of objectives, obtaining objective weights, developing efficiency curves for all objectives over the possible season, and finally calculating the percent of maximum social satisfaction obtainable from successively longer seasons. Regional differences in objectives can be handled. The political problems in implementing the system are discussed.

In summary, there has been much done to document the characteristics of both trappers and particularly hunters; but there has been only limited application of such knowledge. Many studies were unplanned and uncoordinated. No attempt has been made to hypothesize a model which relates the interaction of the variables measured. These studies provided useful ideas and guidance but the work reported herein is unique in providing a trapper model which attempts to relate the variables measured. Also, the approach is unique in that the trapper characterization study is a part of a larger, interactive furbearer management system.

METHODS AND PROCEDURES

Trapper Questionnaire

The procedure for conducting a questionnaire survey recommended by Christiansen (1975) generally was followed with modifications suggested by Warwick and Lininger (1975), Kerlinger (1973), and S. Paulsen (personal communication). An interview was prepared during the spring and summer of 1980 to pretest questionnaires for a mail questionnaire. Questions and topics were solicited from administrators, planners, and regional biologists in Maine for inclusion in the interview.

The interview was held with 16 trappers selected by regional wildlife biologists to represent different types of trappers in Maine. As well as answering the prepared questions, the interviewees were asked to comment on question clarity, likelihood of honest response, and willingness to respond. Completion of the interview required from 2-3 hours. From this pool of interview questions and topics, a mail questionnaire was constructed (Appendix 2). Input on topics and questions included was obtained again from Department administrators, wildlife planners, and the Furbearer Project Leader. Questions were restricted to those which seemed likely to provide information to meet specific objectives of these individuals. The questions could be categorized into three reasons for asking them: 1) demographic information (age, occupation, etc.), 2) information needed to evaluate current data and

regulations, and 3) information for species planning purposes.
Questions not relevant to one of these areas were excluded.
Questions which were poorly understood or for which there was a
likelihood of inaccurate response were deleted or rewritten.
Questions which were open-ended on the interview were rewritten as
questions with expected limited responses.

Question order was arranged to achieve maximum response.
Initial questions dealt with biographical information about trapping
and opinions on controversial topics (sections A & B). Section C
sought demographic information (low interest). Section D dealt with
preference for furbearers (high interest) followed by a screening
question to eliminate individuals who did not trap in the fall from
completing the remainder of the questions. Section E dealt with
catch and sale of furs in 1980 which also was of high interest.
Sections F and G requested detailed information on 1980 trapping
behavior (low interest). Section H was next in sequence with
questions on trapping with a partner and general area trapped
(moderate interest). Section I concluded the questionnaire with
high-interest questions on objectives, opinions of regulations, and
a large space for comments. Not only did this order keep the
interest of the respondent by scattering high-interest questions
throughout the questionnaire, but also provided a logical sequence
for topics covered. Additionally, a variety of question types were
used to avoid boredom.

Pretesting and revising of the questionnaire were accomplished by mailing it to regional, research, and administrative personnel of the Department as well as a few selected trappers who participated in the interview.

A particular effort was made to insure a high response in order to have adequate returns from possibly small but significant subgroups. The final version was prepared in booklet format, type set, and printed on 8 1/2" x 11" paper. As four mailings (3 questionnaires and a postcard reminder) were to be used to obtain a high response rate, 3 cover letters were prepared for each questionnaire from the Commissioner of Inland Fisheries and Wildlife. The cover letters were written to communicate increased intensity of interest in response with each mailing. Each mailing was printed on a different color paper, using colors found to generate high response (goldenrod, green, and blue). Each questionnaire mailing consisted of a questionnaire, a map showing the trapping zones, a response envelope with the trapper's name in the return address location, and the mailing envelope. All mailing was done first class. A sample size of 1,500 holders of 1980 regular trapping licenses (approximately 30% of the total) was selected using the last digit of their license number which was reassigned randomly each year. The initial mailing was made 10 days after the close of fall trapping season (December, 1980). The first followup, a postcard reminder, was mailed 2 weeks after the initial

mailing, to those who did not respond in the first 8 mailing days.
The postcard requested everyone to participate and thanked those who
already had returned a questionnaire. As returns arrived, the date
each was received was recorded on both the questionnaire and the
envelope. The envelope with the name and license number was
separated from the questionnaire to guarantee anonymity and was used
to revise the mailing list for the next followup. Individuals with
undeliverable addresses were also removed from the list but tallied
separately. Once the daily response rate fell below one percent of
the total number outstanding at the beginning of the second mailing,
the third mailing was made. It consisted of another complete set of
materials. The fourth and final mailing was made when the response
rate declined sharply. It also included a complete set of materials.

A two-step coding procedure was used. It required responses to
be placed on a coding sheet prior to data entry to a computer disk.
A code book was prepared prior to the first mailing for coding
responses. The code book contained specific instructions about
entering the response(s) to each question. Categories for no and
unknown response were added for each question. Each questionnaire
was examined by the principal investigator and assigned a case
number. In addition, numerical codes were assigned to occupation,
other responses (if recorded), and comments which were topics
believed too subjective for the coders to decide. Finally, the
questionnaire was checked for obvious problems. Coding of data was

then performed by contract workers at the office of the principal

investigator to facilitate the handling of problems not anticipated

in the code book. Data entry at a terminal was performed at a site

remote from the investigator, so all decisions had to be made before

punching.

Once entered, a computer tape containing the data was prepared

and screened using a program (MIDAS) which edited the tape to

identify invalid responses for each question. These were then

corrected and the data set was revised. All further analysis was

done using SAS (SAS Institute, Inc., 1979). Variables not measured

directly by the questionnaire, such as income from trapping, were

generated by entering weights (e.g., pelt price) to questionnaire

variables (e.g., harvest). Frequencies of responses were tabulated

and graphed for all variables. The arithmetic means of responses

were computed for all interval or ratio variables.

Nonresponse bias is difficult to analyze. By definition,

information needed to evaluate this error is incomplete or

unavailable. Nonresponse bias was checked partially by comparing

the proportion of questionnaire respondents by area of residence

with the proportion of license holders by the same variable. This

is the only measured variable common to both the population and the

respondents.

A trapper model (Fig. 4) is hypothesized to provide a link

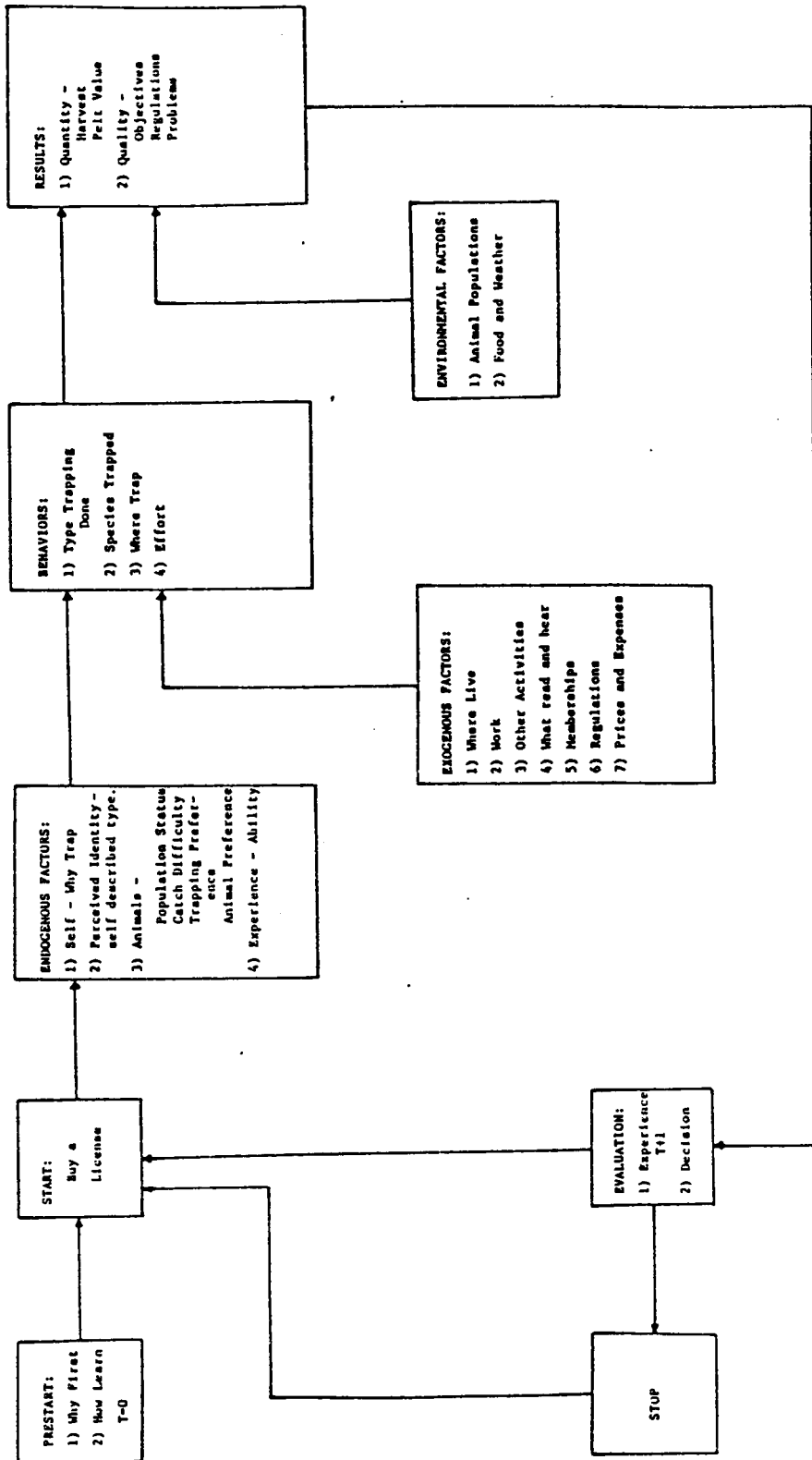between all variables from the questionnaire reported on herein.

Fig. 4. Trapper model hypothesized to explain interrelationships of characteristics measured. Blocks provide groupings within which variables from the questionnaire to be discussed are listed.

The trapper model provides a system to describe the yearly cycle of trapper characteristics measured. An entrance (PRESTART) and exit (STOP) decision opportunity is provided in the model. Within the cycle itself, eight groupings are provided to link together similar topics. The start was the decision to purchase a license; an activity described in the trapper longevity subsection. Endogenous factors included views by an individual regarding self, perceived identity (role), perception of animals and amount of experience. These internal factors interacted with exogenous factors to yield behaviors during the trapping season. These behaviors operate on another set of exogenous factors to yield results from the trapping season. These results are reported as two subgroupings: quantity and quality. Finally, the individual gains experience and some level of perceived satisfaction and is faced with leaving the system (stop trapping) or starting again the next season. The decision to stop trapping may be permanent or the individual may reenter the system later.

Trapper Longevity

A complete listing of trapping license sales from 1973-80 sorted by name and year was produced. Names were combined manually and a new file was created containing the name of trapper, address, and the years trapped. Each year was a variable coded (Y1-Y8), either yes or no, for whether the individual held a license. Address,

obvious misspelling of names, and pattern of holding license (an individual with one year missing and a similar name spelling with only that year) were used to decide whether listings were from one or multiple individuals. The 8 single variables (Y1-Y8) were combined and analyzed as a binary variable (PATTCDE) of 8 places. PATTCDE could represent any combination of an individual's year variables (Y1-Y8) in a value from 1 to 256. A summary of the frequency of each PATTCDE value was produced for each wildlife management unit and statewide. The year a person first held a trapping license was the year entered. In one sense it was the "birth" of the trapper. The year after an individual last held a license was the year leaving or "death." When an individual skipped a year or years but appeared again in later years, the individual was termed a "dropout" during the intermediate years during which a license was not held. The year in which an individual reappeared was termed "reentry." Year class was the calendar year an individual first began trapping.

After completing the initial statewide analysis, it was found that license sales files were incomplete for the years 1973-75. In these years, only licenses purchased through October 1 were included in the automated record. Those purchased after October 1 were irretrievably lost. Analysis was redone for the 5 years with complete records. PATTCDE for these 5 years represents any combination of years trapped with a variable between 0 and 31.

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After completion, it was found that a new license type (junior trapping) was mistakingly included in the 1980 file. After this was corrected, analysis was redone on a statewide and geographical basis (Figure 5). Management Units were combined to provide sufficient numbers for analysis based on perceived differences in trappers and known differences in land use pattern, population, species occurrence, season length, and climate. Analysis consisted of constructing cohort life tables and life equations for trappers in each geographic region and statewide, and a statewide survivorship curve following conventional life table methodology (Smith, 1974).
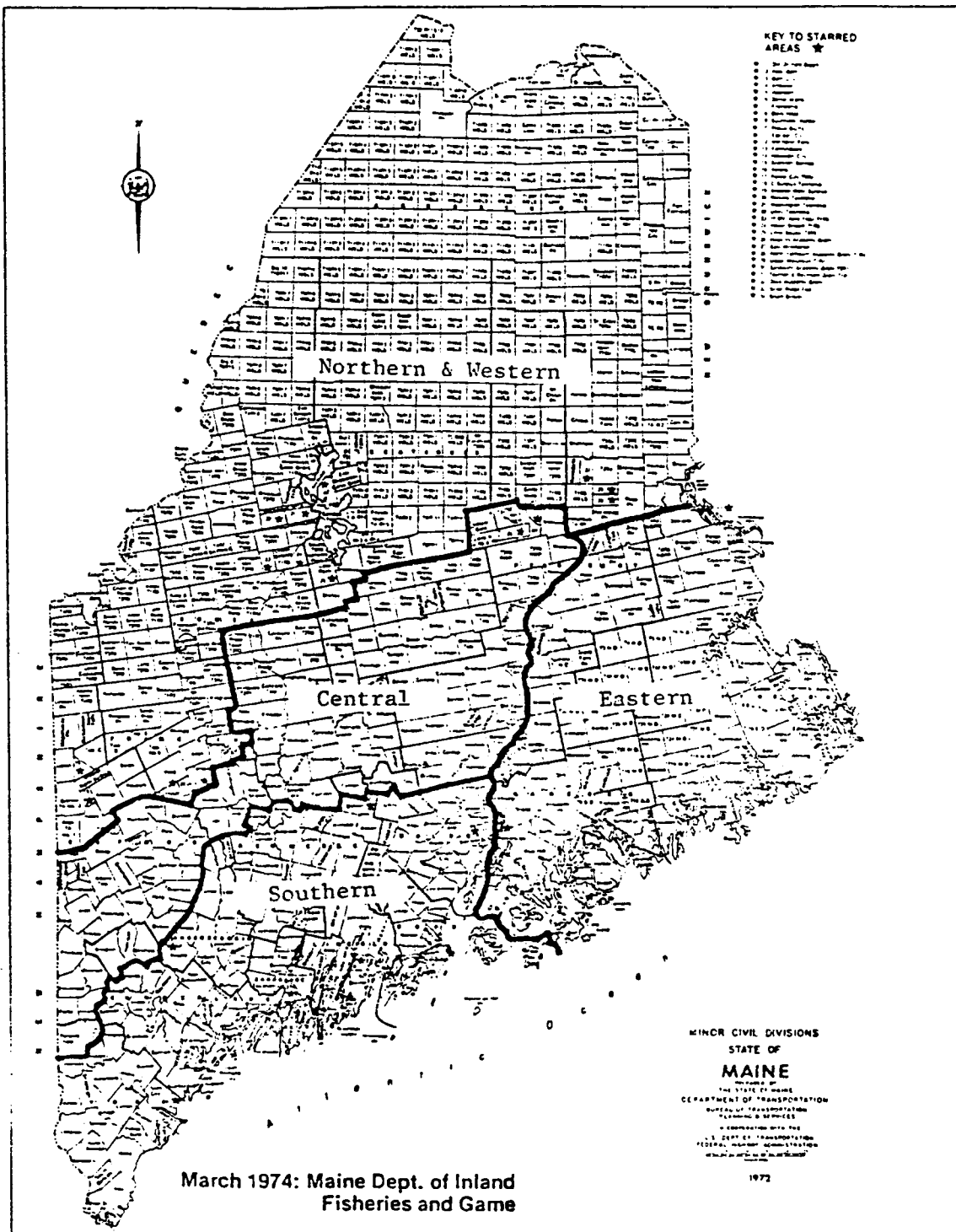
Fig. 5. Geographic regions within Maine obtained by grouping similar areas used for questionnaire analysis.

RESULTS

Questionnaire

Questionnaires with some usable information were returned by
1,226 of the 1,482 potential respondents (18 questionnaires were
undeliverable); a response rate of 83 percent. A summary of
questionnaire returns by dates and timing of reminders is contained
in Table 8. Following each reminder, returns increased but the
amount of increase was lower with each reminder (Fig. 6). Of the
1,226 returns, 941 respondents did some trapping in the fall;
thereby their reports were usable in the complete analysis.

A Chi-square analysis (Zar, 1974) detected no significant
difference between the proportion of all trappers and the proportion
of questionnaire respondents residing in the four geographic regions
($p > 0.500$). As a result, nonresponse bias was assumed not to be a
problem in further analysis. Reporting and discussing results from
the questionnaire will follow the trapper model presented in Fig. 4
and discussed in the Introduction.

Prior to starting to trap (PRESTART), individuals must decide to
participate and must gain initial information on how to trap. All
trapping license holders were asked to indicate the reasons why they
first began to trap. They were given a list of eight possible
reasons and an "other" category. The responses, in order of
importance, are listed in Table 9 along with the frequency and

Table 8. Questionnaire returns by day, weekly cummulative number and percent returned, and timing of reminders.

Week	Mon.	Tues.	Wed.	Thurs.	Fri.	Cumulative Returned	
						Number	Percent
12/3-12/12		*		14	91	105	8.6
12/15-12/19	236	55	69	31	24	520	42.4
12/22-12/26	44	17	14**	No mail: Holidays		595	48.5
12/19-1/2	30	57	76	No mail: Holiday	43	801	65.3
1/5-1/9	67	17	26	15	15	941	76.8
1/12-1/16	13	5	9	6	4***	978	79.8
1/19-1/23	9	15	39	11	25	1,077	87.8
1/26-1/30	25	6	8	5	3	1,124	91.7
2/2-2/6	4	2****	2	7	16	1,155	94.2
2/9-2/13	30		10	10	3	1,208	98.5
2/16-2/20	8		1	3	1	1,221	99.6
2/23-2/27	1	0	3	0	1	1,226	100.0

*Initial questionnaire mailed

**1st reminder: postcard

***2nd reminder: questionnaire

****3rd reminder: questionnaire

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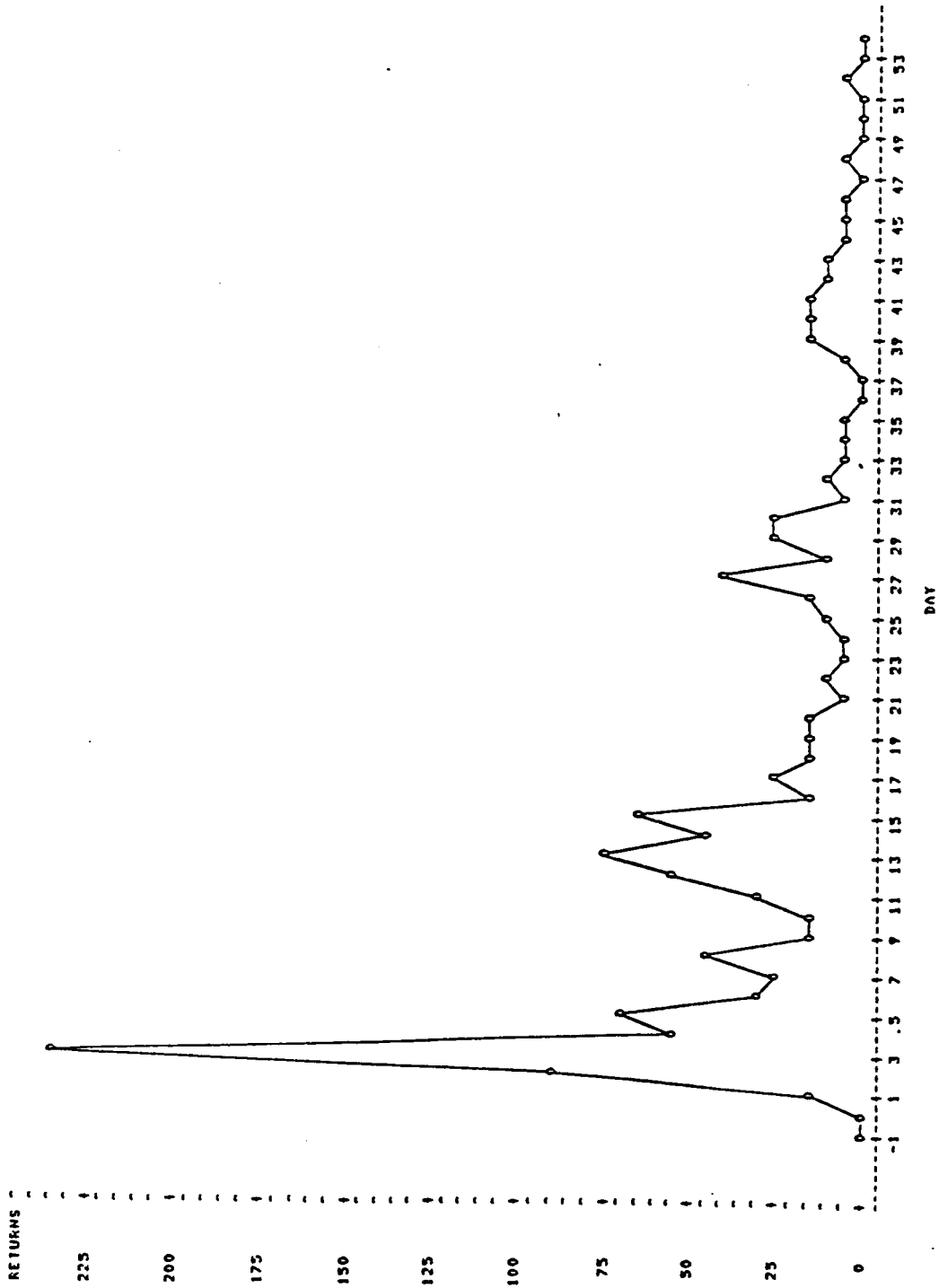
Fig. 6. Questionnaire returns by day when mail is delivered at State Offices (weekends and holidays deleted). Initial mailing made on day = -1, first reminder on day = 10, second reminder on day = 24, and third reminder on day = 36.

Table 9. Frequency and percentage of 1980 licensed trappers selecting reasons for why they first began to trap (N = 1188).

Reason	Individuals	
	Number	Percent
Interest in outdoor activities	732	61.6
Interest in animals and animal habits	568	47.9
Challenge of trapping	543	45.7
Accompany a family member	395	33.2
Make money	381	32.1
Read about trapping in books and magazines	345	29.0
Accompany a friend who trapped	330	27.8
Control animal populations	155	13.0
Other responses	54	4.5

percent selected. Individuals first began to trap primarily because of an interest in outdoor activities and animals, although the view of trapping as a challenge was also important. As with most of the questions with the option of listing other responses, very few additional ones were recorded. This would suggest that the interview used to develop the questionnaire was successful. Because individuals were allowed to select more than one response, a complete analysis of why individuals begin to trap would include a profile of all responses selected and correlations among responses.

A second component of beginning to trap is where the individual obtains initial information and skills. Individuals were asked to indicate the ways trapping was first learned. Once again an "other" category with room for a write-in response was provided. Respondents selected self-taught responses (from books or magazines and trial-and-error) as the two most common (Table 10). Less than 1 percent of the individuals completed a trapper-training course.

Once an individual has made the initial commitment to trap, the trapper enters a system where internal and personal (endogenous) factors will interact with external (exogenous) factors resulting in certain behaviors. Trappers were asked several questions to identify and measure some of these internal factors. For an individual in the first year of trapping, why he or she is trapping in that year would be expected to be similar to why they first began to trap. For other trappers, the reasons may be modified by

Table 10. Frequency and percentage of licensed trappers in 1980 selecting source for how they first learned to trap (N = 1182).

	Individuals	
Source	Number	Percent
Trial-and-error and experience	653	55.2
Books or magazines	478	40.4
Family member	416	35.2
Friend or acquaintance	376	31.8
Older trapper	358	30.3
Trapper training program	9	0.8
Other	16	1.4

experiences encountered during the trapping season and experience
gained. Individuals were asked to select the reasons why they trap
now from a list of 10 possible ones. Room was provided for other
responses. Although the reasons are not directly comparable to the
ones listed for why they first trapped, there are some notable
differences (Table 11). Although challenge was the third-ranked
reason why individuals initially trapped, challenge against the
animal was the most common reason for why they trap now. Another
major change was the increase in individuals currently trapping to
make money, although this was still less than one-half of all
respondents.

A second internal factor examined was an individual's perceived
identity as a trapper. Respondents were asked to classify
themselves as a type of trapper from a list of 4 categories and an
"other" response. They were only allowed to select one response.
No description was attached to the categories. This was thought to
allow the individuals to express a view not restricted to a single
factor (e.g., money). The distribution of individuals within these
categories was surprisingly different (Table 12), with only 35
individuals considering themselves professionals.

Differences occur between categories of types of trappers for at
least one behavior. Public hearings are used by the Department to
obtain input on proposed regulations. Individuals participating in
public hearings by speaking and/or voting exert considerable

Table 11. Frequency and percentage of 1980 licensed trappers
selecting reasons for why they trap now (N = 1185).

Reason	Individuals	
	Number	Percent
Enjoy a challenge against the animal	708	59.7
Participate in outdoor recreation	667	56.3
Enjoy and learn about nature	623	52.6
Escape from daily routine	519	43.8
Make money	455	38.4
Find solitude	379	32.0
Control damage or disease	275	23.2
Have companionship	225	19.0
Teach others	201	17.0
Engage in competition	126	10.6
Other	60	5.1

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Table 12. Classification of trappers based on self-selected trapper
           types (N = 1148).

Type of Trapper	Individuals	
	Number	Percent
Professional	35	3.0
Semi-professional	161	14.0
Part-time	424	36.9
Recreational	506	44.1
Other	22	2.0

influence on the adoption of regulations. Respondents were asked
whether they have ever attended public hearings on trapping
regulations and if so, how regularly. Overall, nearly 80 percent of
the trappers never had attended public hearings and only 10 percent
attend regularly. Seventy-two percent of those classifying
themselves as professionals have attended a hearing (Table 13).
Although those who considered themselves professional or semi-
professional were only 17 percent of respondents, they comprised
nearly 40 percent of trappers who regularly attended hearings.

Trappers have internal preferences for and opinions of animals
and trapping. Several questions were asked in this area. Trappers
were asked to rank their preference for the 3 major types of
trapping in Maine; beaver (or winter), fall land, and fall water.
The ranking was done in a two-step procedure by first asking them to
select the type of trapping they would do if they could only do
one. Next, they were asked to select their second choice if they
could only do two types. A score and ranking was obtained by
weighting a first choice selection as 2, a second choice as 1, and
"not selected" as 0. The frequency of selections times the weight
was summed and averaged for each type of trapping, yielding a score
from 0 to 2 (Table 14). Fall land trapping was the highest
preferred type of trapping followed by fall water. Beaver was least
preferred even though the highest recorded beaver harvest in Maine

Table 13. Percentage of individuals ever attended and frequently attended public hearings by self-described type of trapper.

Type of Trapper	Percent	
	Ever Attended Hearings	Regularly Attended Hearings
Professional	71.9	40.6
Semi-professional	35.7	18.5
Part-time	20.1	7.4
Recreational	18.7	6.0

Table 14. Preference for type of trapping by all questionnaire respondents based on weighted ranking (N = 1154). Maximum score is 2.0

Type of Trapping		Individuals		Preference
		Number	Percent	
Fall Land:	Ranked 1	649	56.2	1298
	Ranked 2	356	30.8	356
	Total	1005	87.0	1654
	Mean Score			1.43
Fall Water:	Ranked 1	329	28.5	658
	Ranked 2	508	44.0	508
	Total	837	72.5	1166
	Mean Score			1.01
Beaver:	Ranked 1	175	15.2	350
	Ranked 2	258	22.3	258
	Total	433	37.5	608
	Mean Score			0.53

(19,000) by the most beaver trappers occurred during the winter of 1980.

A similar procedure was used to obtain ranks for individual animals within two categories; upland and aquatic furbearers. The procedure to make initial choices was expanded to include a third choice and the weights attached to the first, second, and third choice were 3, 2, and 1 respectively. The subsequent scale for each category of animal was 0 to 3. Within the upland furbearers, fox (red and gray) was the top-rated animal followed by fisher, raccoon, coyote, bobcat, and marten (Table 15). Skunk and weasel received little attention. For the aquatic furbearers, muskrat was the preferred species, followed by mink, beaver, and otter (Table 16).

Two other internal factors measured by this survey instrument were the trapper's opinion of the population status and the catch difficulty by species. Respondents were asked to select 1 of 7 responses for each species indicating what has happened to the population during the last 3 years. The first 5 indicated change in degrees from large increase through no change to a large decrease. The last 2 responses were for "none present" and "do not know." As this scale is cumbersome to convert to a single meaningful numerical score, the results for the first 6 categories (not including "do not know") are reported in Table 17 as the number and percent of trappers selecting each response by species. This opinion about population was considered an internal factor as it

Table 15. Preference for species of upland furbearer by all
questionnaire respondents based on weighted ranking
(N = 1168). Maximum score is 3.0.

Type of Trapping		Individuals		Preference
		Number	Percent	
Fox:	Rank 1	512	43.8	1536
	Rank 2	329	28.2	658
	Rank 3	192	16.4	192
	Total	1033	88.4	2386
	Mean Score			2.04
Fisher:	Rank 1	260	22.3	780
	Rank 2	307	26.3	614
	Rank 3	262	22.4	262
	Total	829	71.0	1656
	Mean Score			1.42
Raccoon	Rank 1	176	15.1	528
	Rank 2	221	18.9	442
	Rank 3	273	23.4	273
	Total	670	57.4	1243
	Mean Score			1.06
Coyote:	Rank 1	140	12.0	420
	Rank 2	187	16.0	374
	Rank 3	232	19.9	232
	Total	559	47.9	1026
	Mean Score			0.88

Table 15. Continued

Type of Trapping		Individuals		Preference
		Number	Percent	
Bobcat:	Rank 1	33	2.8	99
	Rank 2	71	6.1	142
	Rank 3	106	9.1	106
	Total	210	18.0	347
	Mean Score			0.30
Marten:	Rank 1	45	3.9	135
	Rank 2	46	3.9	92
	Rank 3	73	6.2	73
	Total	164	14.0	300
	Mean Score			0.26
Skunk:	Rank 1	0	0.0	0
	Rank 2	2	0.2	4
	Rank 3	4	0.3	4
	Total	6	0.5	8
	Mean Score			0.01
Weasel:	Rank 1	0	0.0	0
	Rank 2	1	0.1	2
	Rank 3	5	0.4	5
	Total	6	0.5	7
	Mean Score			0.01

Table 15. Preference for species of aquatic furbearer by all
           questionnaire respondents based on weighted ranking (N =
           1166). Maximum score is 3.0.

| Species | | Individuals | | Preference |
		Number	Percent	
Muskrat:	Rank 1	502	43.1	1506
	Rank 2	341	29.2	682
	Rank 3	189	16.2	189
	Total	1032	88.5	2377
	Mean Score			2.04
Mink:	Rank 1	211	18.1	633
	Rank 2	466	40.0	932
	Rank 3	291	25.0	291
	Total	968	83.0	1856
	Mean Score			1.59
Beaver:	Rank 1	391	33.5	1173
	Rank 2	172	14.8	344
	Rank 3	277	23.8	277
	Total	840	72.0	1794
	Mean Score			1.54
Otter:	Rank 1	62	5.3	186
	Rank 2	179	15.4	358
	Rank 3	387	33.2	387
	Total	528	53.9	931
	Mean Score			0.80

Table 17. Trapper evaluation of furbearer population trend over the last 3 years (1978–80) by species (percentage given is percent of row total) for those individuals with an opinion.

Species	Large Increase	Small Increase	No Change	Small Decrease	Large Decrease	None Present
Aquatic						
Beaver # (%)	106 (10.3)	220 (21.0)	262 (25.4)	246 (23.9)	173 (16.8)	23 (2.2)
Muskrat # (%)	61 (5.7)	164 (15.2)	382 (35.4)	232 (21.5)	225 (20.9)	15 (1.4)
Mink # (%)	14 (1.5)	117 (12.1)	513 (53.2)	185 (19.2)	113 (11.7)	22 (2.3)
Otter # (%)	31 (3.5)	162 (18.3)	473 (53.5)	110 (12.4)	66 (7.5)	42 (4.8)
Upland						
Red Fox # (%)	59 (5.4)	178 (16.4)	267 (24.6)	301 (27.7)	272 (25.0)	9 (0.8)
Gray Fox # (%)	5 (0.8)	33 (5.1)	99 (15.3)	25 (3.9)	44 (6.8)	439 (68.1)
Coyote # (%)	557 (54.3)	267 (26.0)	79 (7.7)	70 (6.8)	19 (1.9)	34 (3.3)

Table 17. Continued.

Species	Large Increase	Small Increase	No Change	Small Decrease	Large Decrease	None Present
Fisher #	29	170	387	217	163	46
(%)	(2.9)	(16.9)	(37.7)	(21.6)	(16.3)	(4.6)
Marten #	45	110	132	38	24	378
(%)	(6.2)	(15.1)	(18.2)	(5.2)	(3.3)	(52.0)
Raccoon #	57	161	319	263	301	6
(%)	(5.1)	(14.5)	(28.8)	(23.8)	(27.2)	(0.5)
Skunk #	223	167	455	51	28	22
(%)	(23.6)	(17.7)	(48.1)	(5.4)	(3.0)	(2.3)
Oppossum #	0	6	48	2	6	571
(%)	(0.0)	(0.9)	(7.6)	(0.3)	(0.9)	(90.2)

does not necessarily correlate with other indices of population status. For example, over one-half of the trappers responding indicated the raccoon population was decreasing where they trapped over the last 3 years. This assessment was made in the same year that a record high harvest was obtained. In addition to preference and opinion of population status of furbearer species, an individual's opinion of catch difficulty will influence trapping behavior. Respondents were asked to rate each species on a scale of 0 to 10 on how difficult they believed each animal was to catch. Values were attached to the scale so that 0 was not difficult, 10 was very difficult, and 5 was average. Individuals were to assume population levels were sufficient to trap and were encouraged to give an opinion even if they had never trapped one of the species. The average score in decreasing species order is presented in Table 18. Once again, the ranking is considerably different from the preference scale. Fox was the most preferred upland furbearer but was second in catch difficulty. Muskrat was the most preferred aquatic furbearer yet was lowest in catch difficulty. The results were not unexpected when mixing information on individuals with a variety of objectives and levels of experience. An individual with no experience would be expected to prefer species considered easy to catch while ones with high difficulty would be preferred by an individual with considerable experience and motivated by challenge

Table 18. Mean estimated opinion of catch difficulty of furbearers on scale from 0 (not difficult) to 10 (very difficult).

Species	Mean Catch Difficulty
Coyote	8.5
Fox	7.9
Otter	7.3
Bobcat	6.8
Mink	5.3
Fisher	5.0
Beaver	4.7
Marten	4.2
Raccoon	2.7
Weasel	2.1
Muskrat	1.3
Skunk	1.2

against the animal. Other individuals may be applying an economic value criterion to preference.

If there were no external influences on a trapper, the behaviors exhibited in trapping would be expected to be due entirely to internal factors, some of which have just been described. This is not the situation, since there are also external factors which influence the actions actually taken. Some of these external factors are regulations, prices of pelts (both predicted and actual) and expenses, occupation and sources of time to trap, other outdoor activities, membership in outdoor groups, sources of information on the outdoors, and location of residence.

Regulations are the most commonly used mechanism by a wildlife agency to manage furbearers. Regulations are of a myriad of types but all attempt to modify the effective effort expended by trappers. Table 19 contains a list and description of types of furbearer regulations used in Maine during the last 10 years. As was pointed out in the introduction with the fisher limits, the attempted goal of a regulation is not necessarily realized, particularly when the trapper is poorly understood. Regulations will be discussed more later.

Several questions were asked regarding price information obtained by the trapper. Respondents who trapped in the fall were asked their source of information on pelt prices. The majority of individuals obtain predicted price information from local

Table 19. List and description of tyeps of furbearer regulations used in Maine during the 10 years (1971-80) to impact harvest.

Regulations	Description
Season limit	Individual can only tag (and presumably harvest) maximum number of a species each year (for example, 3 fisher and 5 marten in 1976 and 1977).
Quota	All individuals can only tag (and presumably harvest) a maximum number of a species and then season is closed (for example, 400 bobcats statewide in 1978).
Season length	Season shortened to restrict total effort on a species (for example, bobcat in 1976). Most extreme would be closed season (for example, marten in 1971-72).
Concurrent openings	Open seasons for all species on same date to prevent individuals from concentrating on more than a few species and minimize "opening day phenomenon" (for example, water and land trapping open on same day in 1978, 1980).
Limit equipment	Traps determined to be highly effective are eliminated during all or part of season (for example, conibear traps set on land eliminated during 1976 and 1977 seasons to protect fisher).
Trap tending	Traps must be checked at least once during a time interval (for example, land traps must be checked every 72 hours in unorganized townships).

furbuyers. The next most important sources are other trappers and fur market reports (Table 20). That furbuyers is the highest is not surprising because nearly all trappers (> 90%) indicated that they sell all of their fur within Maine. Although more than one-half the respondents did not select making money as a reason for trapping, only 6 percent reported not knowing anything about expected fur prices. Although the point was made that trapper preference for animals did not follow economic value, monetary return does appear to be an important consideration. A majority of respondents who trapped in the fall reported income equal to or greater than expenses. This suggests that, for these individuals at least, monetary return for pelts is significant in reimbursing expenses. No attempt was made to estimate actual expenses beyond this comparison even though expenses are another important consideration.

Most individuals who trap in Maine are employed in an occupation other than trapping. Nearly 80% of the respondents worked during the fall trapping season. Individuals were asked to indicate the types of time which they spent fall trapping. Although many take vacation, the majority fit trapping around work by working shorter days (Table 21). This question received a number of responses to the "other" choice. Many trappers were unemployed or retired. The unemployment rate in Maine during the fall of 1980 was 7.7 percent (Beverly Gilchrist, State Planning Office, personal communication).

Table 20. Sources of pelt price information reported by
           questionnaire respondent who trapped in the fall, 1980
           (an individual could select more than one) (N = 932).

Source	Individuals	
	Number	Percent
Local furbuyers	657	70.5
Other trappers	427	45.8
Fur market report	373	40.0
Prices last year	107	11.5
Trappers' organization	59	6.3
Nowhere; did not know	59	6.3

Table 21. Types of personal time used to trap during the fall
season, 1980, by questionnaire respondents (N = 1150).

Type of Personal Time	Individuals	
	Number	Percent
Shortened work days	652	56.7
Paid vacations	268	23.3
Unpaid vacation	149	13.0
Working hours	105	9.1
Before and after work	29	2.5
Unemployed (write-in)	41	3.6
Retired (write-in)	55	4.8
Other	222	19.3

Occupations modify the behavior exhibited by trappers by limiting the time available.

Trappers in Maine have limited time available to trap. Even those with no occupational responsibility are limited by the short length of the fall trapping season when compared to other states. The model being used to describe trappers would be misleading if individuals were not recognized as being other types of resource users, as well. Respondents were asked to indicate in which other outdoor activities they take part. The percentage for each is contained in Table 22. Many of the activities overlap the trapping season to varying degrees (bear, small game, and waterfowl hunting along with predator calling) but deer and raccoon hunting are significant in that seasons for these are completely contained within the trapping season. Over 90% of the respondents indicated deer hunting as an activity besides trapping. An overlap between hunting and trapping exists and to clarify the amount of time allocated to trapping alone would require further, fairly sophisticated, analyses.

Organization membership and publications read are two additional external factors which provide the agency an opportunity to influence trapper behavior. Respondents were asked to select from a list of organizations those to which they belong. A majority of individuals (50.7%) do not hold a membership in any sportsman or outdoor organization even though trappers are active in a variety of

Table 22. Participation by questionnaire respondents in other
outdoor activities (N = 1187).

Activity	Individuals	
	Number	Percent
Deer hunting	1108	93.3
Open water fishing	1101	92.8
Small game hunting	1035	87.2
Ice fishing	897	75.6
Waterfowl hunting	502	42.3
Bear hunting	332	28.0
Raccoon hunting with dogs	229	19.3
Predator calling	178	15.0
Bobcat hunting with dogs	100	8.4

outdoor activities (Table 23). Although working with these groups
is beneficial, to channel all contact with the users through the
Maine Trappers Association, Sportsmens Alliance of Maine, and other
groups would exclude a majority of trappers from potential contacts.

Publications provide a much better opportunity to contact many
of the trappers than does a set of organizations. Only 6.4% of the
individuals who responded to the "publications read" question did
not read at least one of the publications in Table 24. Similar to
the membership question, individuals were asked to indicate which
sporting or outdoor publications are regularly read. Fur-Fish-Game
is read by considerably more respondents than any other national or
local publication (Table 27). Of the other publications, The Maine
Sportsman is read by over one-half the respondents and contains both
a trapping and an agency column. Maine Fish and Wildlife, the
agency magazine, was second in readership but this may be
misleading. Since 1979, trappers who have cooperated voluntarily
with collections of biological data from certain furbearer species
have received a complimentary subscription to this magazine. When
the program ends, individuals will be required to pay to continue a
subscription.

The final external factor in this trapper model is location of
residence. Trappers were asked to indicate township of residence.
These townships were grouped first by wildlife management units and
then some units were combined so that trappers were placed in 1 of 4

Table 23. Membership in outdoor or natural resources organizations by questionnaire respondents (N = 1184).

Organization	Individuals	
	Number	Percent
Maine Trappers Association (MTA)	368	31.1
National Rifle Association	237	20.0
Sportsmens Alliance of Maine	155	13.1
MTA local chapter	141	11.9
National Trappers Association	116	9.8
Fur Takers of America	39	3.3
National Wildlife Federation	29	2.4
Maine Audubon Society	11	0.9
National Audubon Society	7	0.6
Maine Natural Resources Council	5	0.4
Did not belong to any of the above	600	50.7

Table 24. Regular readership by questionnaire respondents of publications (N = 1186).

Organization	Individuals	
	Number	Percent
Fur-Fish-Game	831	70.1
Outdoor Life	585	49.3
Field and Stream	582	49.2
Maine Sportsmen	563	47.5
Maine Fish and Wildlife	413	34.8
Sports Afield	350	29.5
Maine Trappers Newsletter	339	28.6
The Trapper (NTA)	252	21.2
SAM Newsletter (Sportsmans Alliance of Maine)	200	16.9
The Voice of the Trapper	125	10.5
National Wildlife	71	6.0
Fur Age Weekly	13	1.1
Do not read any of the above	76	6.4

geographic regions within the state. Trapping seasons were established based on wildlife mangement unit boundaries.

Based on the trapper model (Fig. 4), the internal and external factors are hypothesized to result in a set of behaviors during the trapping season. After discussing four of these behaviors which were measured through the questionnaire, an example of the complexity of the interrelationship of three will be demonstrated. Trappers were asked to check boxes indicating in which types of trapping (beaver, fall land and fall water) they participated during the 1980 season. Fall land trapping (71%) was the most commonly done followed by fall water (57%) and beaver (35%). By separating the possible combinations of these variables, distinctive categories were obtained in which to place individuals. Table 25 lists the categories and frequency and percent of respondents in each one. The final number in the table is the estimated total number of license holders in the category; obtained by multiplying the questionnaire respondents in a category by the total license sales divided by total questionnaire respondents (e.g., beaver total = 106 x 5,161 divided by 1,214 = 449). Of particular significance is the "did not trap" category. For respondents who indicated they were trappers by purchasing a license, 11% did not set a trap during the 1980 season. This corresponds to 578 individuals within the total licensed trapper population of 5,161.

Table 25. Exclusive type of trapper behavior by animal species
groups which were pursued (no overlap between types).

| Type of Trapper | Questionnaire Respondents | | Estimated Total Number in 1980 (ratio-conversion) |
	Number	Percent	
Beaver	106	8.7	449
Fall land	230	18.9	975
Fall water	83	6.8	351
Beaver and land	54	4.4	227
Beaver and water	27	2.2	114
Land and water	339	27.9	1,440
Beaver, land and water	239	19.7	1,017
Did not trap	136	11.2	578
TOTAL	1,214	100.0	5,161

During the discussion of preference, trappers were seen not only to have varying preference for types of trapping but also for individual species. Correspondingly, trappers not only do general types of trapping but also pursue specific animals. Trappers who trapped in the fall were asked to indicate for which species they specifically set traps. There were considerable differences among species within the furbearer categories (Table 26). Approximately three-quarters of the respondents who fall trapped pursued fox (red or gray) and raccoon. Bobcat and marten, both species restricted to limited portions of the state, were trapped for by only 15% of the trappers. Muskrat and mink were the most commonly pursued aquatic furbearers (65%) while otter, even with a statewide distribution, was only trapped for by 28% of fall trappers.

There were three options available to an individual in fall trapping season. A northern and western season was from October 20 - November 30. A southern season was from October 28 - November 30. Trappers could trap in either or both zones. Of the individuals responding to the section, 61% trapped only in the southern zone, 27% trapped only in the northern zone and 12% trapped in both zones. Trappers operating in both zones would have the opportunity of 2 opening days. Analysis of furbearer harvest data indicates that a large proportion of the harvest occurs during the first part of the season (Table 27).

Table 26. Frequency and percent of questionnaire respondents who trapped in the fall who set traps in 1980 for each of the species (N = 911).

Species	Individuals	
	Number	Percent
Red Fox	690	76
Raccoon	666	73
Muskrat	616	68
Mink	595	65
Fisher	553	61
Coyote	401	44
Otter	252	28
Beaver	221	24
Bobcat	154	17
Marten	140	15
Skunk	71	8
Grey Fox	45	5
Weasel	35	4

Table 27. Harvest chronology for 3 furbearer species with known harvest dated from biological sample by 5-day periods for 1980.

Zone	Season Dates (N = 41)	Percent	Percent of Harvest Coyote (N = 52)	Fisher (N = 52)	Fisher (N = 70)
North & West (WMU 3)	Oct. 21-Oct. 25	(12.2)	48.1	26.9	51.4
	Oct. 26-Oct. 30	(12.2)	23.1	34.6	14.3
	Oct. 31-Nov. 4	(12.2)	11.5	17.3	18.6
	Nov. 5-Nov. 9	(12.2)	13.5	5.8	11.4
	Nov. 10-Nov. 14	(12.2)	1.9	3.8	0.0
	Nov. 15-Nov. 19	(12.2)	0.0	0.0	0.0
	Nov. 20-Nov. 24	(12.2)	1.9	1.9	4.3
	Nov. 25-Nov. 30	(14.4)	0.0	9.6	0.0
	(% of season, N = 34)		(N = 50)	(N = 98)	(N = 522)
South (WMU's 6 & 8)	Oct. 29-Nov. 2	(14.7)	72.0	42.9	62.6
	Nov. 3-Nov. 7	(14.7)	24.0	35.7	23.8
	Nov. 8-Nov. 12	(14.7)	14.0	9.2	7.9
	Nov. 13-Nov. 17	(14.7)	4.0	4.1	3.1
	Nov. 18-Nov. 22	(14.7)	2.0	2.1	1.7
	Nov. 23-Nov. 27	(14.7)	0.0	0.0	0.6
	Nov. 28-Nov. 30	(11.8)	0.0	0.0	0.4

A final major behavioral response category for trappers is effort expended. Respondents were asked to indicate during which dates they had land and water traps set in each zone. In addition, they were asked to indicate the average number of traps of each type set. Finally, the average number of traps set for selected species was asked of trappers in each zone. Change-in-effort was studied by plotting trapping effort by day of season using several of these measures. Fig. 7 is a plot of questionnaire respondents with land traps set by day of season for both trapping zones. In both zones, the number of individuals who trap peaks during the first 10 days and then declines throughout the season. The decline for southern Maine is steeper than for northern Maine and the total percent drop is less in the north even though the season is longer. The same relationship holds for respondents who water trapped (Fig. 8).

If number of traps set by day of season were known, it would be possible to have a more accurate measure of effort. Information presented in Figs. 7 and 8 provides an accurate measure of effort only if all trappers have an equal number of traps set. However, if the mean does not have a large standard deviation, then the information can provide an index on a relative scale. This does not appear to be the case in the average number of traps set as demonstrated by the large (generally greater than 100%) coefficients of variation indicating high variability (Table 28). Data on traps
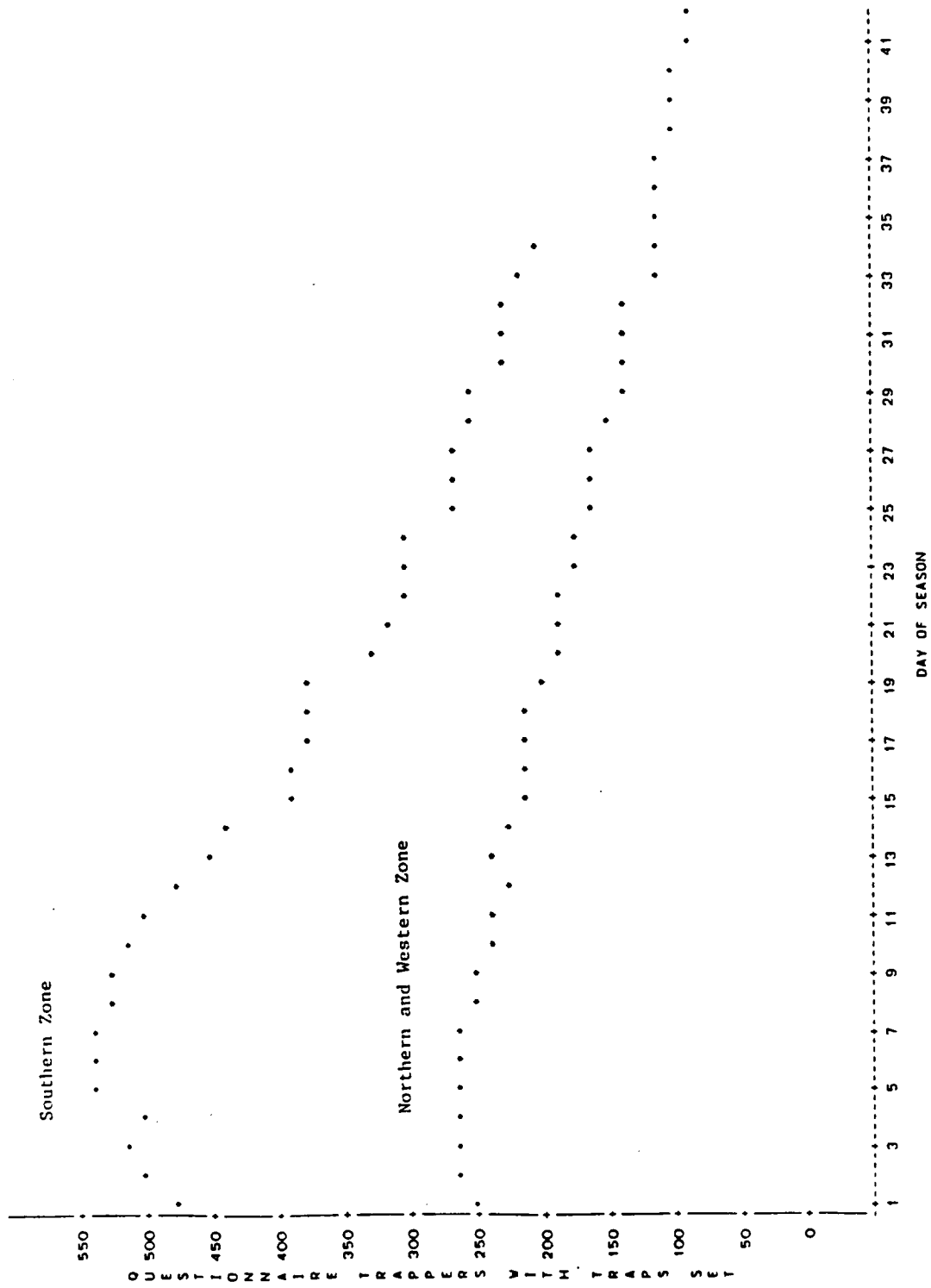
Fig. 7. Plot of number of questionnaire respondents with land traps set by day of season in the Northern and Western, and Southern Zones.
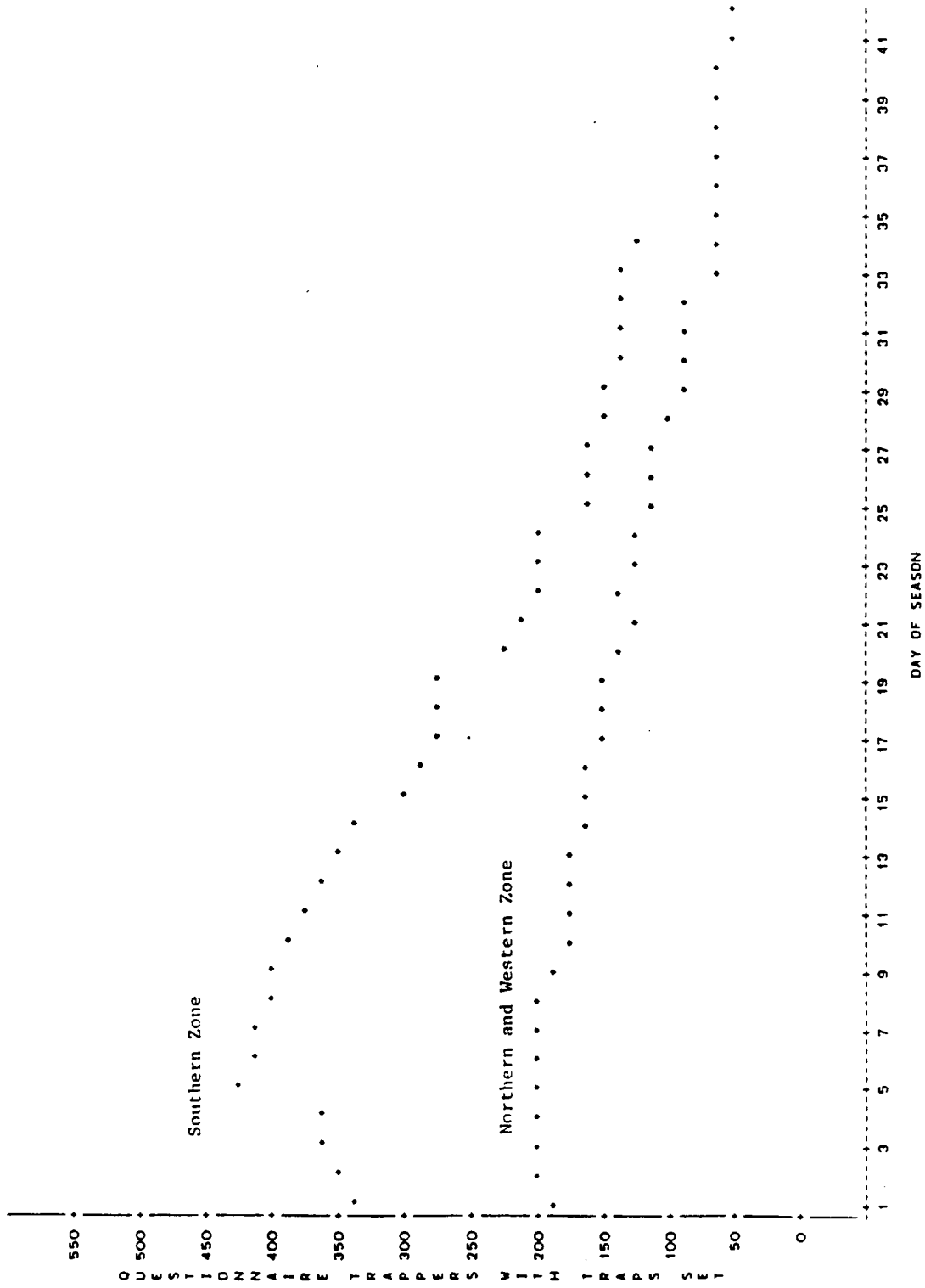
Fig. 8. Plot of number of questionnaire respondents with water traps set by day of season in the Northern and Western, and Southern Zones.

Table 28. Mean, range, and coefficient of variation for the reported average number of traps set by trapper per day of season by category and trapping zone.

Category of Trap	Trapping Zone	Average Number of Traps		
		Mean	Range	Coefficient of Variation
Water	Northern and Western	34.3	1-300	137.8
	Southern	25.6	1-175	91.1
Otter	Northern and Western	1.6	0-21	175.7
	Southern	1.1	0-31	210.3
Land	Northern and Western	24.1	0-150	86.7
	Southern	22.5	0-400	136.2
Fisher	Northern and Western	4.8	0-50	152.7
	Southern	4.2	0-60	160.2
Marten	Northern and Western	6.0	0-222	275.8

by day was not obtained by this questionnaire; but rather must be gathered using a diary or daily log kept by individuals.

Respondents who trapped in the fall were asked to estimate the average number of traps set over the time they participated in water and land trapping. In addition, land trappers were asked the average number of traps set specifically for fisher in both zones and for marten in the northern and western zones. Water trappers were asked the average number set specifically for otter. The averages for an individual were used for the days on which traps were set to obtain another measure of effort. Fig. 9 estimates the number of total land and fisher traps set in the southern zone by day of season. Fig. 10 gives the number of total land, fisher, and marten traps by day in nothern and western ones. In both zones, the total number of traps declines at a faster rate than those set for fisher and marten. Trappers commonly comment that the sets used for marten and fisher are less bothered by inclement weather and interference from deer hunters than land sets for other species. Similar patterns occurred for total traps for both zones (Figs. 11 and 12). Although otter traps are plotted on these graphs of water traps and appear stable, the lines are an artifact of the scale of the map since very few otter traps are set. The relative rates of decline between zones for total water traps were reversed from land traps. In the northern and western zones, use of water traps declined at a faster rate than use of land traps. Weather

Fig. 9. Plot of total land (T) and fisher (F) traps set in the Southern Zone by day of season by questionnaire respondents.
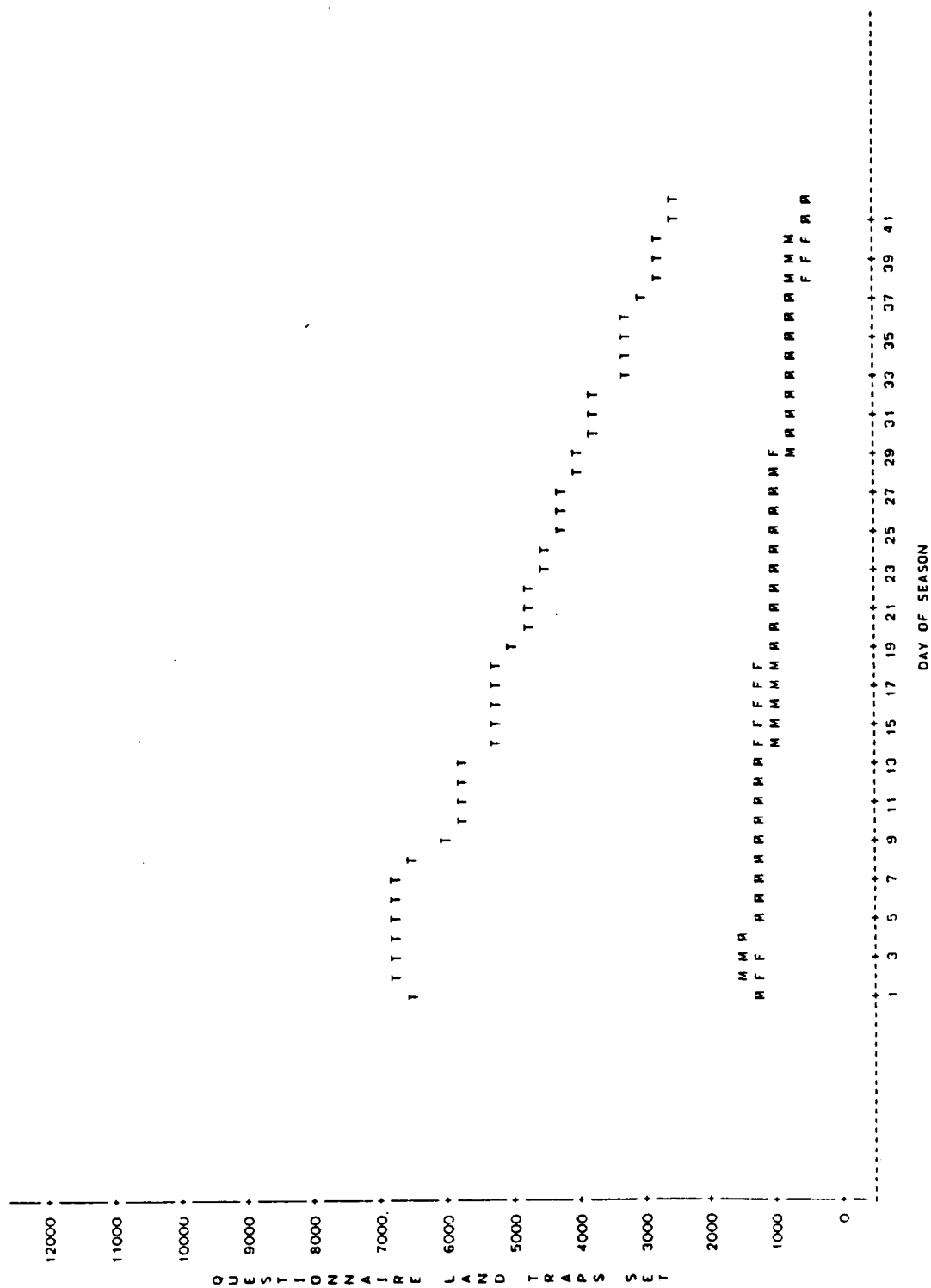
Fig. 10. Plot of total land (T), fisher (F), and marten (M) traps set in the Northern and Western Zone by questionnaire respondents.
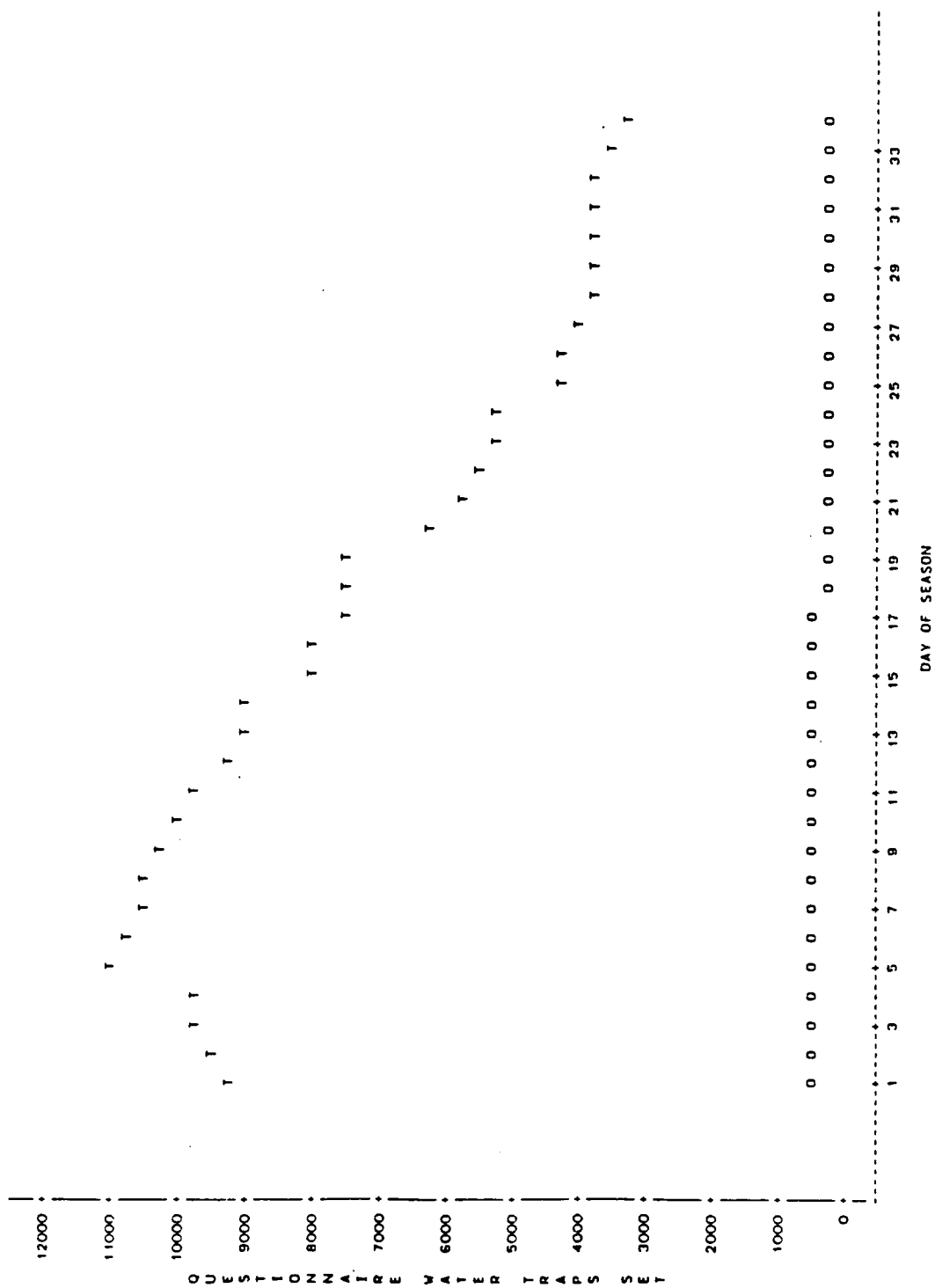
Fig. 11. Plot of total water (T) and otter (O) traps set in the Southern Zone by day of season by questionnaire respondents.
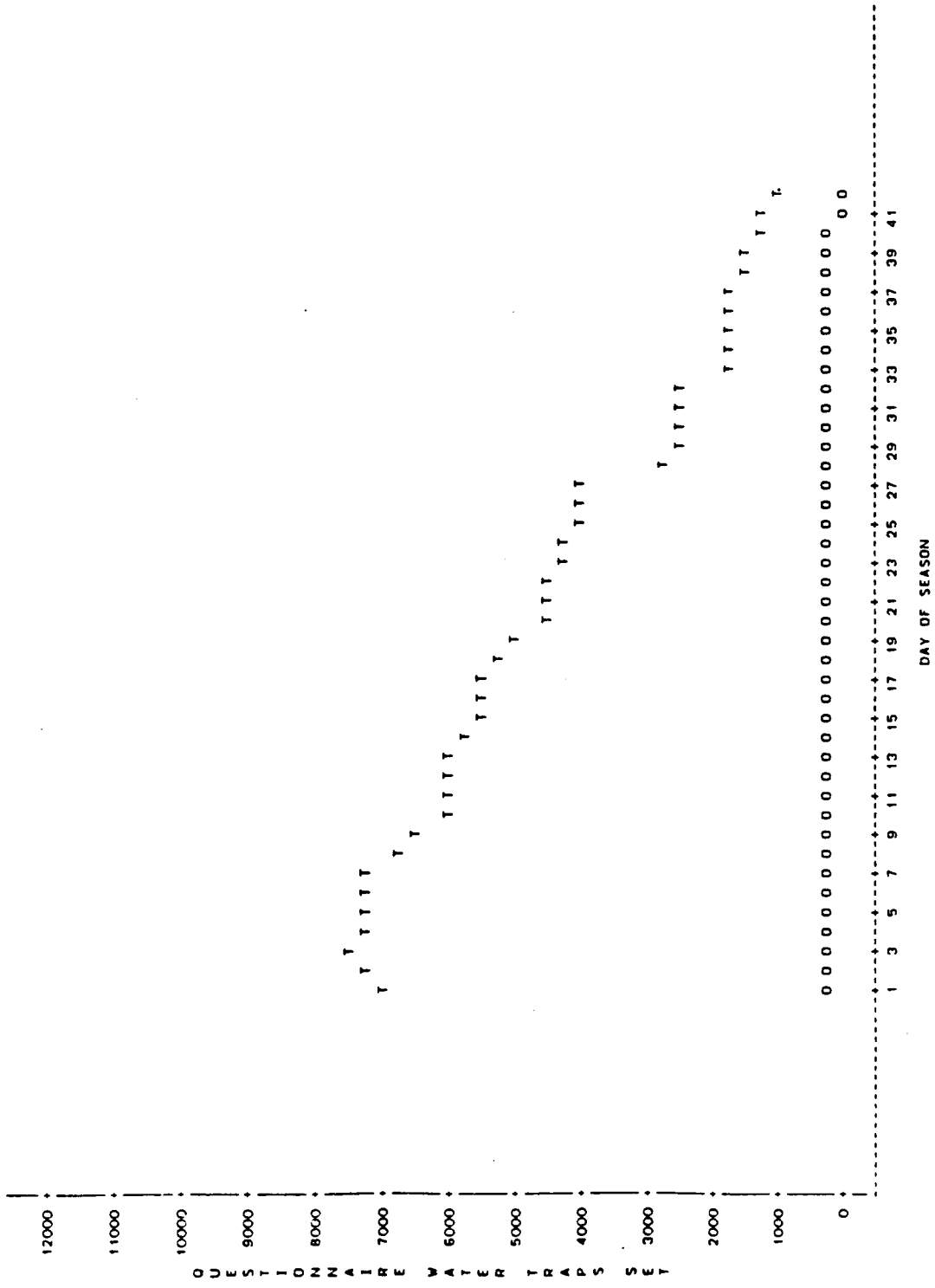
Fig. 12. Plot of total water (T) and otter (O) traps set in the Northern and Western Zone by questionnaire respondents.

conditions have a large impact on water trapping since freeze-up
severely limits muskrat trapping activities. In a study conducted
during 1962-64, pond freeze-up in northern Maine occurred from
October 25 - November 8, while ponds in southern Maine froze 2-4
weeks later (Carson, 1965). Individuals in the northern and western
zones may continue to trap land animals at a higher rate than
trappers in other areas due to a lack of opportunity to trap water
animals for very long, due to freeze-up.

The behavior combinations from only three of the variables
discussed (type of trapping done, species trapped for, and zones
trapped in) are demonstrated in Fig. 13. Although only one pathway
is followed through the 3 behaviors, it can be seen that the
possible combinations are numerous (121). The categories produced
exhaust the Maine trapper population (i.e., provided more categories
than there are people to place in a category) if even one more
complex variable (such as effort) is added. For this reason,
detailed analysis of grouping of behavioral variables is not
reported.

The behavior of a trapper after interacting with at least 2
dynamic external factors (animal population levels and environmental
conditions) during the season has certain results. These results
may be quantitative and qualitative. The quantitative results are
harvest and dollar value received; the ones about which wildlife
managers have most concerned themselves. Less obvious, but equally

Type of Trapping   Species Pursued   Zone Where Trapped

Northern and Western Zone

Both Zones

Southern Zone

Bobcat

Coyote

Fisher

Fox

Marten

Mink

Muskrat

Otter

Raccoon

Beaver

Beaver

Fall Land

Fall Water

Beaver and Land

Beaver and Water
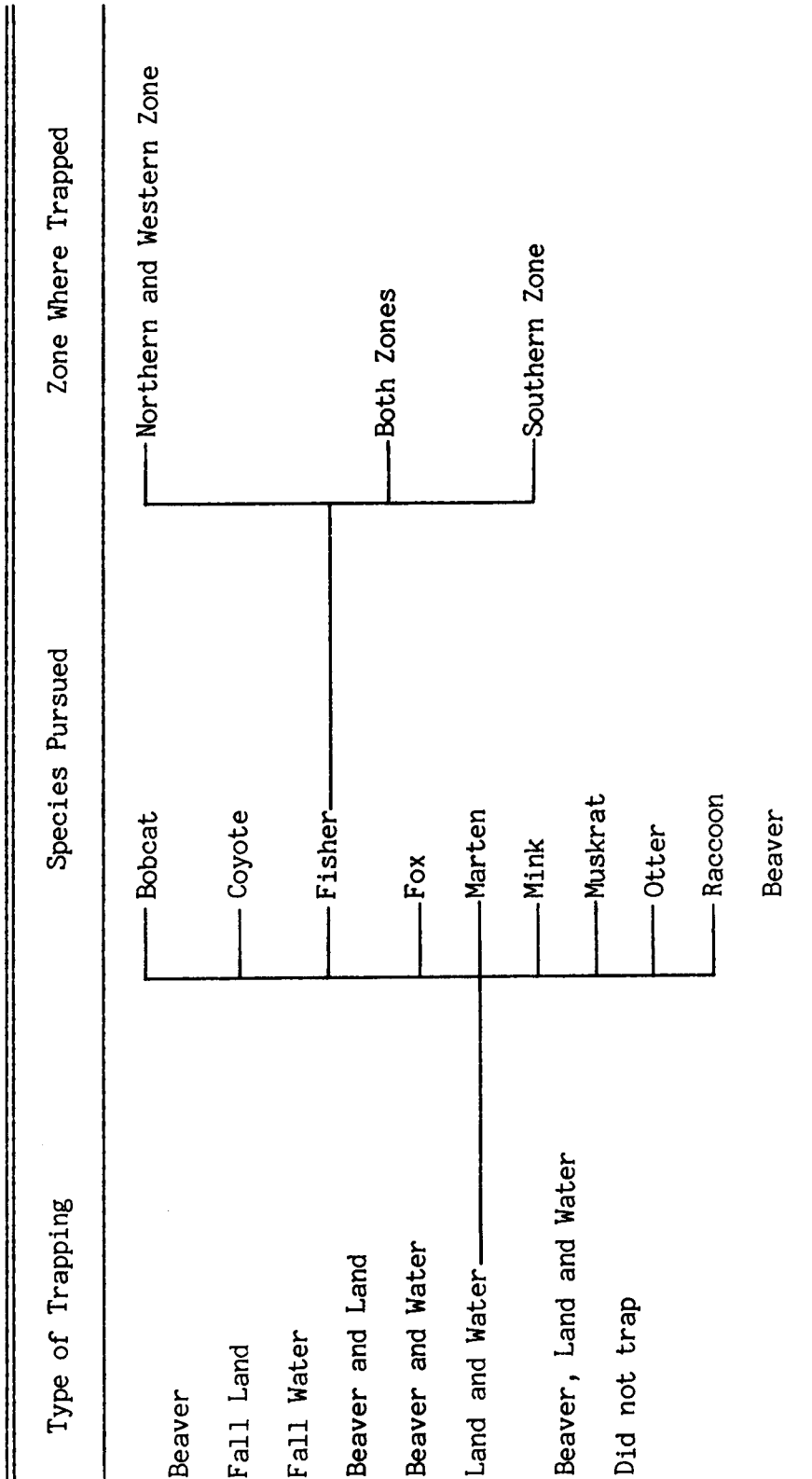
Land and Water

Beaver, Land and Water

Did not trap

Fig. 13. Example of combinations of behaviors available to trapping license buyers from three variables (121 possible pathways). All species are not pursued during each type of trapping so the possible pathways are less than the possible combinations.

important, are the qualitative results which include objectives, attitude toward regulations, and problems encountered.

Maine keeps detailed records each year on the harvest of most furbearers. During 1980, the pelts of 9 species (beaver, bobcat, coyote, fisher, gray fox, marten, otter, raccoon, and red fox) were required to be tagged with an individually numbered metal seal. Harvests of species which are not tagged are estimated from furbuyer reports. Individuals who trapped in the fall were asked to indicate the number of each species which they harvested in 1980. The sum harvest of species projected to the total trapper population is contained in Table 29. This table also contains the estimated harvest from pelt tag records for trappers. For all species except beaver for which a comparison can be made, the questionnaire estimate is higher than the estimate from tagging records. The estimate exceeded the known amount by from 12 to 70 percent. This difference could be due to a return rate bias favoring more successful trappers and/or a response bias of inflated values. Reported harvests from individuals who only trapped beaver did not complete this question, resulting in the under-estimate of the beaver harvest.

During 1980, average pelt price values were not estimated in Maine. In order to estimate the value of fur harvested by questionnaire respondents who trapped in the fall, average pelt values obtained via a trapper questionnaire in New Hampshire were

Table 29. Comparisons of reported harvests versus tagged harvest by species.

Species	Harvest Estimate from Pelt Tag Records	Harvest Estimate by Trappers	
		Number	(Percent Difference)
Beaver	19,153	17,395	(-10)
Bobcat	153	212	(+39)
Coyote	650	1,058	(+70)
Fisher	1,883	2,185	(+16)
Fox (Red and Gray)	3,986	6,570	(+65)
Marten	3,224	3,604	(+12)
Mink	N/A	3,944	(-)
Muskrat	N/A	72,275	(-)
Otter	N/A	1,058	(-)
Raccoon	9,945	15,516	(+56)
Skunk	N/A	6,013	(-)
Weasel	N/A	1,262	(-)

used. Table 30 contains the estimated value (in dollars) of pelts harvested by questionnaire respondents by species. Subtotals are calculated for the upland and aquatic species groups. Raccoon was the most valuable furbearer to trappers in 1980 followed by muskrat, beaver, red fox, and fisher. These 5 species accounted for 87 percent of the total economic value of furbearer pelts in 1980.

The economic value of the reported harvest by individuals was also calculated and is presented in Fig. 14. As would be expected from a trapper population consisting predominantly of individuals who view themselves as recreational or part-time trappers, most individuals have low incomes from pelt sales from trapping. Based on the categories given in the figure, $1,250 appears to be the income which few individuals exceed.

The qualitative results of the trapping season were evaluated over sets of objectives, possible regulations, and possible problems facing trappers in Maine. A set of 12 trapper-oriented objectives, some of which overlap, were obtained from the interview procedure. These were presented with an importance measurement scale of 0 (not important) to 10 (very important) to individuals who trapped in the fall. Respondents were asked to evaluate the objectives and to give a score to each which reflected how important it was to them. Average scores for each objective are contained in Table 31. Two of the 3 highest-rated objectives deal with maintaining animal populations at proper levels. Monetary return, which is perceived

Table 30. Economic value of pelts harvested by questionnaire
respondents who trapped in the fall. The value is
adjusted to total license sales by species, species
group, and total.

Species Group	Species	Harvest[1]	Mean Pelt[2] Price (Dollars)	Estimated Value (Dollars)	Percent of Value Within Species Group	Percent of Value Total Species
Aquatic	Muskrat	72,275	6.62	478,460	45.6	21.0
	Beaver	17,395	23.08	401,477	38.3	17.6
	Mink	3,944	31.52	124,315	11.9	5.5
	Otter	1,058	42.13	44,574	4.2	2.0
	Aquatic Subtotal			1,048,826	10.0	45.1
Upland	Raccoon	15,516	31.50	488,754	39.8	21.5
	Red Fox	6,430	55.97	359,887	29.3	15.8
	Fisher	2,185	115.55	252,477	20.5	11.1
	Marten	3,604	15.40	55,502	4.5	2.4
	Coyote	1,105	24.70	27,294	2.2	1.2
	Bobcat	212	103.50	21,942	1.8	1.0
	Skunk	6,013	2.66	15,995	1.3	0.7
	Gray Fox	140	40.48	5,667	0.5	0.2
	Weasel	1,262	1.00	1,262	0.1	0.1
	Upland Subtotal			1,228,780	10.0	54.9
Total				2,277,606		10.0

[1] Harvest is questionnaire estimate.
[2] From New Hampshire questionnaire, except as adjusted.

Table 31. Mean importance of objectives for respondents who trapped
in the fall expressed on a scale of 0 for no importance
to 10 for most important.

Objective	Score
Protect animal populations	8.5
Provide highest pelt primeness	8.0
Reduce animals where overabundant	7.7
Provide most days before freeze-up	6.5
Distribute pressure evenly	6.4
Equalize opportunity (days) throughout State	6.3
Obtain most days before deer season	5.9
Reduce conflict with deer hunters	5.6
Maximize income	5.2
Reduce trapper movement	5.2
Provide longest possible season	4.9
Reduce conflict with bird hunters	4.7

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Fig. 14. Frequency of respondents who trapped in the fall and monetary value (dollars) per trapper of pelt sales from their reported 1980 harvest.

by many to be the most important concern of trappers, was only the eighth-rated objective. Surprisingly, several of the top-rated objectives conflict with each other. While trappers want to maximize pelt primeness (the second objective weighted as 8.0) which requires later seasons, they also want the most days before freeze-up (the fourth objective weighted as 6.4) and deer season (the seventh objective weighted as 6.0).

Further interpretation of the objective question about objectives is difficult because individuals were not restricted in their use of the importance scale. It was possible for an individual to rate all objectives as 10 or 0. Better discrimination might have been obtained by restricting the total number of importance points an individual could spend on the entire set of objectives. A Churchman-Ackoff (Churchman and Ackoff, 1954) type measurement scale such as was used with the interview would be preferred if fewer items were rated.

A set of 17 possible problems facing trapping in Maine were presented to all individuals receiving the questionnaire. Respondents were asked to evaluate these problems using a 5-position, 20-point-spread Likert-type scale from "strongly agrees this is a problem" to "strongly disagrees this is a problem" with a middle value of "uncertain". Of the 17 problems presented, only 2 (disease and the use of conibear traps) received an average rating on the "not a problem" side of the scale (Table 32). Although

Table 32. Trapper evaluation of possible problems facing trapping in Maine on a scale of -10 for strongly disagree to +10 for strongly agree by geographic region and statewide.[1]

Rank	Problem	North & West	Central	East	South	State-wide
1.	Trap theft	+5.8	+6.2	+5.6	+6.0	+6.0
2.	Increase trapper numbers	+4.5	+5.4	+4.5	+5.3	+5.0
3.	Trapper ethics	+3.5	+4.4	+4.1	+5.0	+4.4
4.	Coyote populations	+4.7	+4.4	+4.4	+4.1	+4.4
5.	Law violation	+1.4	+2.6	+2.9	+3.5	+2.8
6.	Federal law banning	+2.1	+2.1	+2.7	+2.3	+2.3
7.	Land posting	+1.0	+1.9	+1.6	+3.4	+2.2
8.	Loss of habitat	+1.4	+1.9	+2.3	+2.7	+2.1
9.	Coon hunters	+0.3	+2.4	+1.0	+2.0	+1.7
10.	State law banning	+1.7	+1.2	+2.4	+1.4	+1.5
11.	High fur prices	+0.6	+1.7	+0.2	+1.8	+1.3
12.	Deer hunters	-0.2	+0.4	+0.5	+2.0	+0.8
13.	Spraying pesticides and herbicides	+0.6	+0.3	+2.2	+0.5	+0.7
14.	Bird hunters	-0.5	+0.7	+0.6	+1.3	+0.7
15.	Declining animal population	-0.2	+0.6	-0.3	0.0	+0.1
16.	Disease	-0.4	-0.5	-0.5	-0.5	-0.5
17.	Conibear trap	-2.6	-2.5	-2.1	-3.1	-2.7

[1] Five-position Likert-type scale with a 20-point-spread so that: strongly disagree = -10; disagree = -5; uncertain = 0; agree = +5; strongly agree = +10.

problems covered a wide variety of areas, the 3 highest-rated
ones, and 4 of the top 5, are people oriented. The coyote
population was the only nonperson-oriented problem in the top 5.
Land posting and habitat loss were seventh and eighth overall.
Regional differences did occur in rating of problems. Coyotes were
rated second in northern and western Maine where human population
density and resulting people-oriented problems were lower. In
southern Maine, with the densest human population and highest
trapper density, habitat loss and land posting were much more
important.

From experiences during the trapping season, trappers develop
opinions about regulations. This opinion about regulations appears
to be negative (i.e., there is resistance). Regulations are merely
a means to meet agency and user objectives, but sometimes
regulations designed to obtain a highly-rated objective are so
negatively perceived that they negate the achievement of the
objective. Individuals who trapped in the fall were asked to
evaluate a set of 14 regulations which could be used to reduce
harvest by reducing trapping pressure if this were determined to be
necessary. These regulation options consist of 3 (close season,
shorten season, and harvest limit) which have been used in Maine and
11 totally new. A Likert-type scale (5 position, 20-point-spread)
from strongly agree (+10) to strongly disagree (-10) was provided to
make the evaluation. Table 33 contains the mean response for each

Table 33. Trapper evaluation of possible regulations to reduce harvest pressure on a scale of -10 for strongly disagree to +10 for strongly agree.[1]

Regulation	Score
Close season[2]	+5.4
Require fur hunters license	+2.4
Set a trapper season limit	+2.3
Test new trappers	+1.0
Require mandatory trapper training	+0.7
Set a statewide season limit	-1.4
Require a professional trappers license	-1.6
Shorten season	-3.0
Limit number traps	-3.8
Require registered trap lines	-4.1
Raise license price	-4.2
Limit number of licenses	-4.2
Limit licenses by type	-5.6
Restrict type traps and sets	-5.9

[1] Five position Likert-type scale with a 20-point-spread so that: strongly disagree = -10; disagree = -5; uncertain = 0; agree = +5; strongly agree = +10.

[2] This category should be disregarded due to an unforeseen problem with wording on the questionnaire (see text).

of these options. Due to an inconsistency in wording, the top-rated

regulation (close season) score and rank should be dismissed from

consideration. A conditonal phrase was attached to this regulation

which added importance to its need that was missing from the

others. With the "close season" option eliminated, the highest

rated regulation was one directed at hunters exclusively. It would

also be unfair to compare this option to the others. The 12

remaining regulation options consist of 10 with which trappers have

no experience in Maine and 2 which have been used recently (trapper

season limit and shorten season). Only 3 of the remaining 12

regulations received a score indicating agreement with the option.

Surprisingly, the most positively rated objective was given to a

trapper season limit; a regulation proposal which has been

consistently opposed by a majority of trappers attending public

hearings. The only other regulations not rated negatively concern

mandatory training or testing new trappers which would not directly

affect anyone completing the questionnaire. The remaining

regulations which would restrict activities or limit trapping

opportunity were opposed.

Trapper Longevity

Trapping license sales increased 56% from 3,307 in 1976 to 5,161

in 1980. During this 5-year span, 8,211 different individuals

purchased resident trapping licenses. Yearly increases ranged from

18% in 1977 to 7% in 1978 (Table 34). Yearly increases in the low
years of 1978 and 1980 appear to be the result of two different
processes. In 1978 when the increase was 7%, the number of new
entries to the population was the lowest of any year and 11% below
the mean number of entries. In 1979, the first year mortality loss
rate for this small year class was the lowest recorded. In 1980,
when the increase was 8%, the number of entries was near average but
the number of people deserting (includes dropouts) was the highest
of any year and 24% above the mean. This increase was distributed
among all four year-classes (1976, 1977, 1978 and 1979; designating
the year a license was first purchased) but was particularly
apparent in the 1976 year-class containing the more experienced
trappers.

A cohort life table (Table 35) of trapper longevity was
constructed by geographic region and statewide. For each year-class
within the cohort the table gives the number holding a license in a
season (1_x), the number not buying a license for the following
season (d_x), and the proportion not buying a license for the
following season. Statewide mortality rate for the first-year
license buyers was considerably higher than for subsequent years.
For the year classes 1977, 1978 and 1979, the mortality rate (loss
plus dropouts) from the first to the second year was 40, 37 and 41%
respectively. The rate (23%) was lower for the 1976 year class but
this was undoubtedly due to the analysis procedure. Although this

Appendix 3. Trapper longevity life equation of statewide Maine trappers for the years 1976-80.

Type of Gain or Loss	Year Class					Total	% Change
	1976	1977	1978	1979	1980		
1976 Trapper Population	3307					3307	
1977 Deaths (Exits)	-507					-507	
Dropouts	-256					-256	
Dropouts from Prev. Years Still Out[1]	(--)					(--)	
Births (Entries)	--	+1343				+1343	
Reentries	--	--				--	
Trapper Population	2544	1343				3887	(+18%)
1978 Deaths (Exits)	-271	-411				-682	
Dropouts	-151	-132				-283	
Dropouts from Prev. Years Still Out[1]	(111)	(--)				(111)	
Births (Entries)	--	--	+1092			+1092	
Reentries	+145	--	--			+145	
Trapper Population	2267	800	1092			4159	(+ 7%)
1979 Deaths (Exits)	-211	-153	-338			-702	
Dropouts	- 94	- 44	-64			-202	
Dropouts from Prev. Years Still Out[1]	(77)	(41)	(--)			(118)	
Births (Entries)	--	--	--	1246		+1246	
Reentries	+185	+ 91	(--)	--		+276	
Trapper Population	2147	694	690	1246		4777	(+15%)
1980 Deaths (Exits)[2]	-301	-177	-191	-511		-1180	
Dropouts[2]	--	--	--	--		--	
Dropouts from Prev. Years Still Out[1,2]	(--)	(--)	(--)	(--)		(--)	
Births (Entries)	--	--	--	--	+1223	+1223	
Reentries	+171	+ 85	+ 64	--		+320	
Trapper Population	2017	602	563	735	1244	5161	(+8%)

1. Not added or subtracted in this year but recorded for informational purposes.
2. Everyone missing in last year assumed to be deaths.

Table 35. Trapper longevity cohort life table of Maine trappers[1] for the years 1976-80 by geographic region of trappers residence and statewide.

Year of Season	1976 l_x	1976 d_x^2	1976 n_x	1977 l_x	1977 d_x^2	1977 n_x	1978 l_x	1978 d_x^2	1978 n_x	1979 l_x	1979 d_x^2	1979 n_x	1980 l_x	1980 d_x^2	1980 n_x	Total l_x	Total d_x^2	Total n_x
Northern and Western Region (Units 1, 2, 3)																		
1976	632	144	.228													632	144	.228
1977	438	48	.098	218	79	.367										706	127	.180
1978	440	19	.043	139	21	.151	178	64	.360							757	104	.137
1979	421	26	.062	118	20	.169	114	20	.175	213	83	.390				866	149	.172
1980	395	---	---	98	---	---	94	---	---	130	---	---	208	---	---	925	---	---
Central Maine Region (Unit 4)																		
1976	1065	248	.233													1065	248	.233
1977	817	60	.073	476	168	.394										1243	228	.183
1978	757	70	.092	258	23	.089	370	139	.376							1385	232	.168
1979	687	36	.052	235	40	.170	231	44	.190	391	182	.465				1544	302	.196
1980	651	---	---	195	---	---	187	---	---	209	---	---	390	---	---	1633	---	---
Eastern Maine Region (Units 5 and 6)																		
1976	533	118	.221													533	118	.221
1977	415	61	.147	219	90	.411										634	151	.238
1978	354	14	.040	129	14	.109	209	77	.368							692	105	.152
1979	340	23	.068	115	10	.087	132	27	.205	232	86	.371				819	146	.178
1980	317	---	---	105	---	---	105	---	---	145	---	---	220	---	---	893	---	---
Southern Maine Region (Units 7 and 8)																		
1976	1077	253	.235													1077	253	.235
1977	824	108	.131	480	206	.429										1304	314	.241
1978	716	17	.024	274	48	.175	335	122	.364							1325	187	.141
1979	699	45	.054	226	22	.097	213	36	.169	410	160	.390				1543	273	.176
1980	654	---	---	204	---	---	177	---	---	250	---	---	423	---	---	1708	---	---

Table 35. Continued.

Statewide

Year of Season	l_x	1976 d_x^2	1976 n_x	1977 l_x	1977 d_x^2	1977 n_x	1978 l_x	1978 d_x^2	1978 n_x	1979 l_x	1979 d_x^2	1979 n_x	1980 l_x	1980 d_x^2	1980 n_x	Total l_x	Total d_x^2	Total n_x
1976	3307	763	.231													3307	763	.231
1977	2544	277	.109	1343	543	.404										3887	820	.211
1978	2257	120	.053	800	105	.132	1092	402	.368							4159	628	.151
1979	2147	130	.061	694	92	.133	690	127	.184	1246	511	.410				4777	860	.180
1980	2017	---	---	602	---	---	553	---	---	735	---	---	1244	---	---	5161	---	---

1. Does not include junior, complimentary, or non-resident license holders.
2. Includes both deaths and dropouts. In year dropout reenters, it is subtracted from d_x column.

year is actually a composite of new trapper and long-time trappers, all were assumed to be new. Mortality rate during the second year of holding a license declined to at least one-half the first year rate for all age classes with data. The information presented in the cohort life table is summarized graphically as survivorship curves (Fig. 15).

Regional differences occurred in several of the trapper population parameters examined. Trappers in the northern and western region were more stable than others. They had the smallest fluctuation in yearly percent increase (range of 7-14%) and the lowest average first year mortality rate. The southern region had the greatest fluctuation in yearly percent increase (2-21%) and the central region had the highest average first-year mortality rate. Life equations for the 4 regions are in Appendices 3-6.
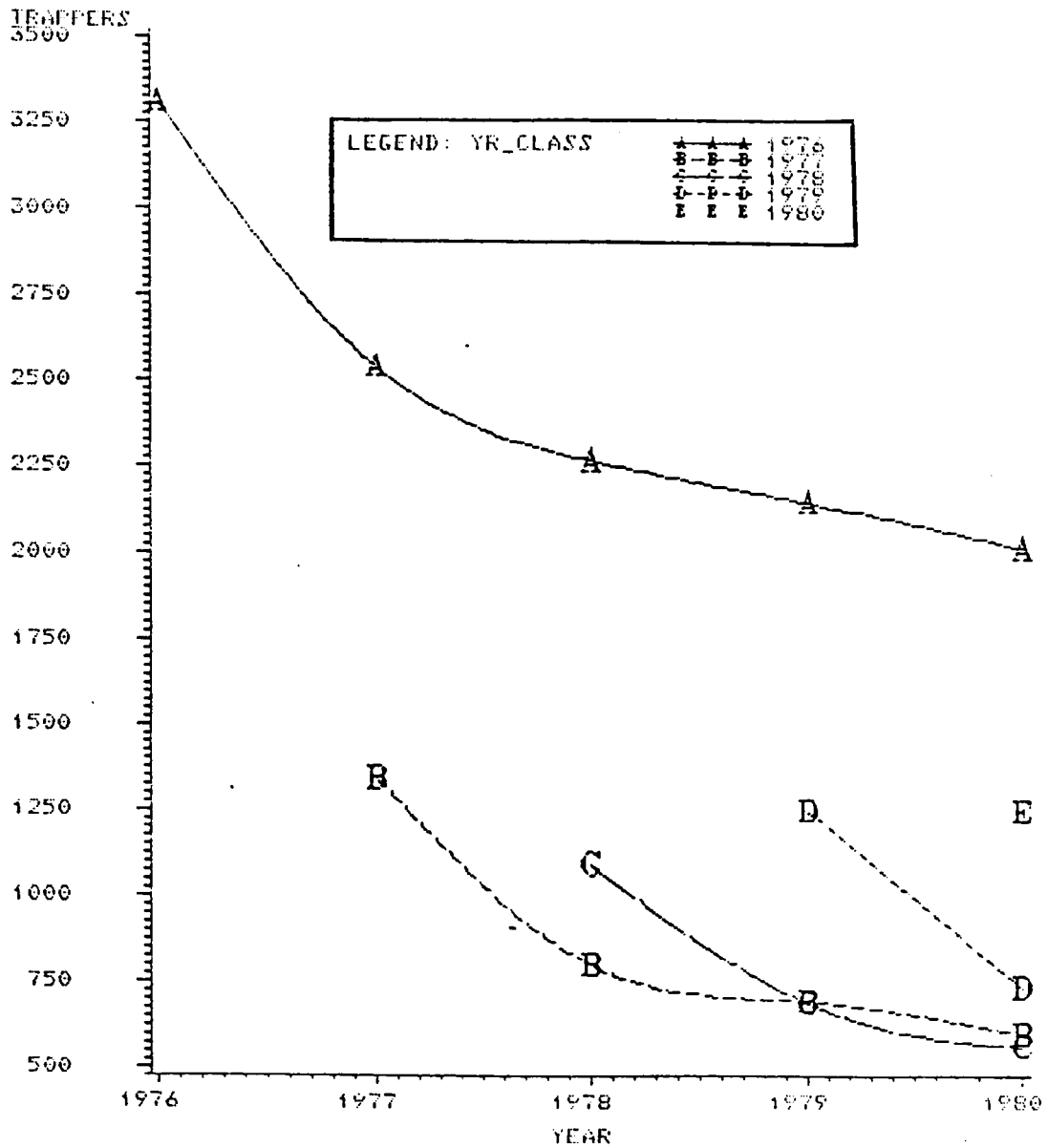
Fig. 15. Survivorship curve of Maine trappers for the years 1976-80 by year class (YR_CLASS).

DISCUSSION AND RECOMMENDATIONS

Questionnaire

A trapper model was hypothesized (Fig. 3) to explain the

interrelationships of characteristics of trappers. The purpose of

the model was to explain the yearly cycle of trapping activities of

an individual in a system format. While being helpful in relating

characteristics of trappers, the model also identified several areas

which were not covered in the questionnaire. Actual animal

populations and weather conditions were assumed to affect the

results of the trapping season (quantity and quality), but no

attempt was made actually to measure these effects. The factors in

these boxes may be as (or more) important in modifying behaviors

than in modifying results.

An evaluation box was added to the system to portray an

individual comparing results of the season to expectations. There

were no questions to address this evaluation. Questions could have

been asked regarding how well the season "fulfilled" the reasons why

the individual trapped (i.e., was there a perceived "profit", was

there a perceived net health or recreation gain, or was there

worthwhile social interaction?). Also, an attempt could have been

made to identify those factors most responsible for a shortfall.

The questionnaire did provide useful information for the upper

portion of the model (Prestart, Start, Endogenous Factors,

Exogenous Factors, Behaviors and Results). The model is believed to be unique in hunting and trapping studies in relating a variety of characteristics as a system. Future studies would benefit by hypothesizing a complete model and then designing the survey instrument to address each category.

Trapping requires skill beyond the scope of many other outdoor activities. In addition, trapping regulations and statutes are complex compared to hunting and fishing. Therefore, it is disturbing that so few trappers have received training in the activity and so many are self-taught. This is probably the reason that the trapper-related problems of trap theft, increased trapper numbers, trapper ethics, and law violations were said to be four of the highest ranked problems facing trapping in Maine. A mandatory hunter education program has been adopted in many other states as well as Maine, yet mandatory trapper education, though recently adopted, will not be implemented until 1988. Mandatory trapper education or incentives (e.g., lower license costs) for voluntary education program participation before the purchase of a trapping license may do much to address these problems.

Public hearings are the primary means used by the Department of Inland Fisheries and Wildlife to get public input into the regulations process. From this questionnaire, it appears that public hearings attract individuals from subgroups (publics) disproportionate to their occurrence in the general public.

Professional and semi-professional trappers are over-represented at public hearings compared to the majority of the trapper population. The observation was made that when faced with choices of regulation options, trappers selected an option (trapper season limit) which has been consistently criticized by public hearing attendees. This apparent inconsistency could be due to individuals selecting a familiar regulation, even though distasteful, over one which is new. But, it could also be due to individuals at public hearings not representing the public as a whole. There is a perception in the public that the Department does not respond to the wishes of the majority. This is not surprising in that the Department, through the public hearing process, may not have a way to determine the objectives of the public. More dispersed informal public meetings organized and run by local representatives of the Department and other information - communication techniques (e.g., questionnaires) may be more effective in gathering public input and teaching about many aspects of the fur system than current methods.

Many states, including Maine, promote managing furbearer harvests by controlling season length. This does not appear justified when effort over time is examined. Respondents to the questionnaire who trapped in the fall reported the dates during the season for which they had at least one trap set and the average number of traps. Because only the average traps and not the traps by day were obtained, the desired comparison of effort (trap-nights)

was not possible. However, the estimated average does give relative
changes and may be sufficient in view of the undesirable and
unlikely alternative of having individuals keep an accurate diary.
Some comparison of the effort expended over time can be made by
examining number of individuals trapping by day-of-season and
average traps set by an individual per day-of-season. In both areas
of the state, and for both types of fall trapping, the number of
individuals trapping and the average traps set peaked, then began to
decline during the first 10 days of the season, even though season
lengths were 34 and 42 total days. These seasons were short
compared to some other northeastern states (65 days in Vermont, 78
days in New Hampshire, and 120 days in Connecticut). There are
several possible reasons for the fall-off. Most individuals are
part-time, or recreation trappers and may quickly satisfy their
desire to trap. Weather conditions deteriorate quickly in October
and November, making trapping difficult. Individual animals may be
more susceptible early in the season when harvests contain
inexperienced juveniles. Another reason not previously considered
in Maine is the competition for the trappers' time provided by other
outdoor activities. Over 90 percent of trappers are deer hunters
and deer hunting begins shortly after the trapping season. Trappers
also racoon hunt (19%). This hunting season opens with trapping
season. Competition for time may be a major cause of the rapid
decline in trapping effort.

Just as obtaining public input into management objectives is a problem, so also is communicating information to and educating the public. Large numbers of Maine trappers, as a public, appear to be reachable other than by a direct mailing via only one source, namely one national outdoor magazine, Fur, Fish and Game. Wildlife managers in Maine were totally unaware of this (personal communication, agency staff) and have never submitted information for publication in this magazine. Considerable effort is expended to work with the Maine Trappers Association and to publish articles in the Department magazine, yet a large group of trappers never receive it. With publics larger than 5,000 (such as 250,000 deer hunters in Maine), it is important to identify communication sources through which information can be provided.

There are several specific research needs which are apparent after this study. Several results from this work indicate the trapper population is dynamic and yet the work reported on herein is essentially a "point-in-time" measurement. Since the questionnaire was administered, fur pelt prices have declined as have the number of licensed trappers. Trapping seasons have been adjusted to address objectives and problems identified in this study. Voluntary trapping seminars have been conducted throughout the state and a mandatory training course will be required beginning in 1988. During the 1983-84 legislative session, a serious attempt was made to eliminate the trapping of one species (black bear). The core

questions from this study should be re-asked and answers reported in a similar format to measure the change these events have had on the trapper populations.

The effort in information developed from this study is unique and has been useful in evaluating the status of furbearer populations and preparing species management plans. However, it is limited by being a point estimate. In a similar manner, this measure needs to be repeated periodically to provide points from which to make projections for long-range planning.

A major emphasis of this study was to identify distinct subgroups of trappers, yet this was not fully accomplished. Additional data analysis using multivariate procedures may provide insight into these groups. Once variables are identified which appear to be distinctive, a resurvey needs to be done which will provide better information on outputs of the individual (actual harvest, species specific effort, and harvest per unit effort).

While trappers have a major consumptive impact on furbearers, there are other user groups which also impact selective species. "Dog-hunters" harvest a majority of the bobcats and racoons, yet little is known about who they are and what they do. Nothing is known of their objectives, attitudes, and motivations. A similar study should be done of furbearer hunters. In a similar manner, little is known of other consumptive wildlife users (deer hunters, waterfowl hunters, etc.) in Maine.

Trapper Longevity

The process used to follow trapper license buying activity was a cumbersome one. Standard computer programs to calculate and prepare life equations and tables would not work because trappers who stopped buying a license (those who "died") could re-enter the population in a subsequent year. With license-buying history computerized, a program should be written to update automatically the longevity data base each year and perform the desired analysis.

SUMMARY AND CONCLUSIONS

Questionnaire

A mail questionnaire was constructed after information was gathered by a personal interview. The questionnaire was designed to characterize the trappers in Maine. A response rate of 83% was obtained. Information was presented in a trapper model to hypothesize the relationships among the variables in a yearly cycle of trapper activity. Significant findings are summarized below.

1. Respondents first began to trap primarily because of an interest in outdoor activities and interest in animals along with a view of trapping as a challenge.

2. Trapper education for most respondents was a self-taught process.

3. The challenge of catching the animal was the most common reason that respondents gave for why they now trap.

4. The majority of respondents viewed themselves as "recreational trappers."

5. While only 17% of individuals classify themselves as professional or semi-professional trappers, they make up 40% of those who regularly attend public hearings.

6. Fall land trapping was both the most preferred type of trapping and the one in which there was greatest

participation. Beaver trapping was least preferred even though a record beaver harvest was obtained in 1980.

7. Fox was the most preferred upland furbearer and muskrat was the most preferred aquatic one.

8. Trapper evaluation of species population status did not appear to correspond with other indices of population status for some species.

9. Although a majority of individuals did not list making money as a reason for trapping, over 90% obtained preseason information on pelt prices.

10. Trappers also participate in many other outdoor activities, the most common being deer hunting, an activity which overlaps the trapping season.

11. Most trappers do not belong to any outdoor organization but a high percentage do read one national outdoor publication.

12. A significant percentage of individuals (11%) who purchased a trapping license did not trap.

13. Trapper effort and harvest are greatest early in the season. A majority stop trapping before the season ends.

14. Trapping results in both a harvest (animal numbers and economic value) and attitudes toward objectives, regulations, and problems.

15. Top-rated objectives of trappers are "animal populations in proper balance with habitat" and "maximum pelt primeness." Maximizing income ranked eighth out of 12 objectives.

16. Some highly-rated objectives conflicted with one another. Achieving maximum pelt primeness requires a late-starting trapping season and allowing trapping for the most days before freezing necessitates a balance between a late and early start.

17. The three highest rated problems and four of the top five were attitudinal, psychological, or sociological (people oriented).

18. When presented with regulation options, respondents rated a trapper season limit as the most acceptable option even though this regulation is opposed consistently at public hearings.

Trapper Longevity

License buying by trappers from 1976 through 1980 were studied by examining license files by a computer. Information was presented in life table and life equation formats. Significant findings are summarized below.

1. Trapping license sales increased 56% from 1976 through 1980 during a time of corresponding pelt value increases.

2. From 37 to 41% of the individuals who first purchased a
    license during this period did not purchase one the next
    year.

3. After trappers have held a license for longer than one
    year, they are less likely to drop out. After holding a
    license for one year, the dropout rate is less than half
    that for first-year license buyers.

4. The statewide pattern was followed in all geographic
    regions. The only geographic trend was a greater
    fluctuation in yearly trends in regions with the greatest
    human populations.

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Appendix 1. Maine trapper license sales, 1965-81 (calendar year).

Year	Number Sold
1965	1,600
1966	1,587
1967	1,507
1968	1,496
1969	1,741
1970	1,648
1971	1,649
1972	1,943
1973	2,532
1974	3,221
1975	3,369
1976	3,336
1977	3,932
1978	4,192
1979	4,826
1980	5,612
1981	5,333
1982	5,421
1983	4,926
1984	4,783

Appendix 2. Trapper questionnaire with cover letter sent in initial mailing.

DEPARTMENT OF

INLAND FISHERIES AND WILDLIFE

284 STATE STREET
AUGUSTA, MAINE 04333

GLENN H. MANUEL
Commissioner

J WILLIAM PEPPARD
Deputy Commissioner

December 1, 1980

Dear Maine Trapper:

You have been selected as one of 1,500 Maine trappers to receive the attached questionnaire as a part of a statewide study of trappers and furbearers. The Department is undertaking this project in order to gather specific types of information needed to help manage furbearers in coming years. I feel very strongly that both the Department and trappers have common goals; that is, to maintain our fur resources for future generations to use and enjoy, and to provide for the best level of use of these renewable natural resources.

Unfortunately, many factors which were not considered just a few years ago are affecting trappers, trapping, furbearer management, and the achievement of the above goals. These include a growing anti-trapping and anti-steel trap movement, unprecedented fur prices, extremely heavy trapping pressure, high harvest levels, and federal restrictions governing the export of certain furbearers. Because of these conditions, it is extremely important that the Department and trappers join forces and work toward achieving common goals. Your assistance with the attached questionnaire will help us better provide for the needs of trappers and furbearers in the future.

Please fill out the questionnaire as completely and as accurately as possible, and return it in the enclosed envelope. Your answers will be kept strictly confidential and will not be used for any purposes other than those described. We need your answers to the questions, so do not give the questionnaire to anyone else.

Thank you very much.

Sincerely,

Glenn H. Manuel
Commissioner

MAINE TRAPPER SURVEY

INSTRUCTIONS: Fill out the following questionnaire as completely and accurately as possible. Instructions on answering a question are in parentheses ( ). Special instructions are in ALL CAPITAL LETTERS. Some questions ask for more than one answer. Answer the questions for yourself only, even if you trap with a partner or family member. When reporting what you catch, list only those animals which you caught yourself. If you did not trap in 1980 or beaver trapped only, place a check in the box below and complete sections A through D and return to us. A map is included showing the 1980 trapping zones to help you answer the questions in Section F. Be sure you return your questionnaire no matter how much of the form you complete.

If you did not trap in the fall in 1980, place a check in this box.   ☐

SECTION A.   This first section deals with how and why you began to trap, why you trap today, and the other outdoor activities in which you take part.

---

1. At what age did you first go trapping? _____

2. Why did you first begin to trap? *(Check one or more ways which apply to you.)*

   ☐ a. You went along with a family member who trapped.
   ☐ b. You went along with a friend who trapped.
   ☐ c. You were interested in outdoor activities.
   ☐ d. You read about trapping in books and magazines.

   ☐ e. You were interested in animals and animal habits.
   ☐ f. You wanted to make money.
   ☐ g. You saw trapping as a challenge.
   ☐ h. You wanted to control animal populations due to damage or disease.

   ☐ i. Other (describe):_____

3. How did you first learn to trap? *(Check one or more of the ways which apply to you.)*

   ☐ a. From one or more family member(s) who trapped.
   ☐ b. From a friend or acquaintance who trapped.
   ☐ c. From an older trapper.

   ☐ d. From books or magazines.
   ☐ e. From a trapper training program.
   ☐ f. By trial-and-error and experience.

   ☐ g. Other (describe):_____

4. How many total years have you trapped? _____

5. Counting this year (1980), how many consecutive years (without missing a year) have you trapped?_____

6. Have you ever trapped in a state other than Maine?

   ☐ a. Yes
   ☐ b. No

7. What are the reasons that you trap now? *(Check one or more of the reasons which apply to you.)*

   ☐ a. Having companionship of your friends and family.
   ☐ b. Participating in recreation in the outdoors.
   ☐ c. Making money.
   ☐ d. Enjoying and learning about nature.
   ☐ e. Teaching others about trapping.

   ☐ f. Experiencing the challenge of you against the animal.
   ☐ g. Finding solitude.
   ☐ h. Escaping from your daily routine.
   ☐ i. Competing against other trappers.
   ☐ j. Controlling animal damage or disease.

   ☐ k. Other (describe):_____

8. To which of the following sportsmen or outdoor groups do you belong? *(Check all to which you belong.)*

   ☐ a. Maine Trappers Association (MTA)   ☐ f. National Rifle Association (NRA)
   ☐ b. Local Chapter of Maine Trappers Association   ☐ g. National Wildlife Federation
   ☐ c. National Trappers Association (NTA)   ☐ h. National Audubon Society
   ☐ d. Sportsmens Alliance of Maine (SAM)   ☐ i. Maine Audubon Society
   ☐ e. Fur Takers of America (FTA)   ☐ j. Natural Resources Council of Maine

9. Which of the following sportsmen or outdoor magazines or newsletters do you regularly read? You do not need to subscribe, but you do have access to and read the magazine. *(Check all which you regularly read.)*

   ☐ a. Maine Trappers Newsletter   ☐ g. Field and Stream
   ☐ b. The Trapper (NTA)   ☐ h. Sports Afield
   ☐ c. The Voice of the Trapper   ☐ i. Maine Fish and Wildlife
   ☐ d. SAM Newsletter   ☐ j. National Wildlife
   ☐ e. Fur Age Weekly   ☐ k. Fur-Fish-Game
   ☐ f. Outdoor Life   ☐ l. Maine Sportsmen

10. Have you ever attended a public hearing on trapping regulations?

    ☐ a. Yes
    ☐ b. No ─────────────→ IF NO, GO TO QUESTION 12.

          11. Do you attend public hearings on trapping regulations at least once a year?

              ☐ a. Yes
              ☐ b. No

12. If you were to classify yourself as a trapper, which one of the following categories would best describe you? *(Check only one category.)*

    ☐ a. Professional trapper.   ☐ c. Part-time trapper.
    ☐ b. Semi-professional trapper.   ☐ d. Recreational or hobby trapper.

    ☐ e. Other (describe):_____

SECTION B. This next section deals with opinions you have on trapping, furbearers, and furbearer populations.

---

1. Classify the following animals according to how difficult you believe they are to catch using the scale of 0 through 10, with 0 as not difficult, 10 as very difficult, and 5 as average. You can have an opinion about an animal even if you have never trapped one. When considering each animal, assume that enough animals are present to trap. *(Put a number from 0 to 10 in the blank provided with each animal.)*

Scale

```
   NOT                                        VERY
DIFFICULT              AVERAGE              DIFFICULT
   ├────┬────┬────┬────┬────┬────┬────┬────┬────┤
   0    1    2    3    4    5    6    7    8    9   10
```

    _____ a. fox   _____ e. marten   _____ i. otter
    _____ b. coyote   _____ f. muskrat   _____ j. beaver
    _____ c. bobcat   _____ g. raccoon   _____ k. skunk
    _____ d. fisher   _____ h. mink   _____ l. weasel

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2. Following are some statements about trapping. For each statement, select a response from the following list which best expresses how you feel about the statement. *(Record the number of your choice in the blank provided with each statement.)*

RESPONSES:
1. Strongly agree
2. Agree
3. Uncertain
4. Disagree
5. Strongly disagree

_____ a. It is possible to catch coyotes and foxes using a foot-snare.
_____ b. It is possible to set a trap specifically for coyotes which will not catch other furbearers.
_____ c. It is possible to reduce significantly coyote populations over a large area (such as a county) through trapping.
_____ d. It is possible to reduce significantly marten populations by over-harvesting them by trapping.
_____ e. It is possible to reduce significantly fisher populations by over-harvesting them by trapping.

3. In the area that you trap, indicate what has happened to the populations of the following species during the past three years by selecting one of the responses. *(Record the number of your choice in the blank provided with each species.)*

RESPONSES:
1. Large increase
2. Small increase
3. No change
4. Small decrease
5. Large decrease
6. None present
7. Don't know

_____ a. beaver   _____ e. red fox   _____ i. marten
_____ b. muskrat   _____ f. gray fox   _____ j. raccoon
_____ c. mink   _____ g. coyote   _____ k. skunk
_____ d. otter   _____ h. fisher   _____ l. opossum

4. The following are some possible major problems facing trapping in Maine. For each suggested problem, select a response from the possible choices which best expresses your feeling on whether it is a major problem in Maine. *(Record the number of your choice in the space provided with each problem.)*

RESPONSES:
1. Strongly agree
2. Agree
3. Uncertain
4. Disagree
5. Strongly disagree

_____ a. Trap theft.   _____ j. High fur prices.
_____ b. Federal law banning the leghold trap.   _____ k. Ethics of some trappers.
_____ c. State law banning the leghold trap.   _____ l. Disease.
_____ d. Declining animal populations.   _____ m. Pesticide and herbicide spraying.
_____ e. Loss of animal habitat.   _____ n. Increased coyote population.
_____ f. Land posting.   _____ o. Conibear traps.
_____ g. Conflicts with deer hunters.   _____ p. Poaching of animals when season closed.
_____ h. Conflicts with bird dog hunters.   _____ q. Conflicts with coon dog hunters.
_____ i. Increased number of trappers.

SECTION C. This section contains general questions about you so that we can compare trappers in Maine with other outdoor groups and with trappers in other parts of the country who have answered similar questions.

1. What is your age? _____

2. How many years have you lived in Maine? _____

3. What is your sex?

    ☐ a. Male
    ☐ b. Female

4. What is your legal residence?

    Town, township, or plantation _____   County _____

5. What is the highest level of formal education you have completed? *(Check only one response.)*

    ☐ a. None   ☐ e. Two-year technical school
    ☐ b. Elementary (K-Grade 6)   ☐ f. College (4 years)
    ☐ c. Junior High (Grades 7-8)   ☐ g. Beyond (M.S. or more)
    ☐ d. High School (Grades 9-12)

6. What is your occupation? *(If in school, list as student.)*

    _____

7. Do you work at your occupation during the fall trapping season?

    ☐ a. Yes
    ☐ b. No

8. What are the principal sources of time you spend fall trapping? *(Check one or more of the sources which apply to you.)*

    ☐ a. Working hours   ☐ d. Shorter work days
    ☐ b. Paid vacation   ☐ e. Take time before and after work
    ☐ c. Unpaid vacation

    ☐ f. Other (describe): _____

9. Which category comes closest to describing the amount you reported as gross income on your 1979 federal tax return? *(Check only one response.)*

    ☐ a. $0 − $2,000   ☐ d. $7,001 − $12,000
    ☐ b. $2,001 − $5,000   ☐ e. $12,001 − $20,000
    ☐ c. $5,001 − $7,000   ☐ f. $20,001+

10. In which of the following outdoor activities do you take part besides trapping? *(Check all of the activities which apply to you.)*

    ☐ a. Open water fishing   ☐ f. Waterfowl hunting
    ☐ b. Ice fishing   ☐ g. Bobcat hunting with dogs
    ☐ c. Deer hunting   ☐ h. Raccoon hunting with dogs
    ☐ d. Bear hunting   ☐ i. Predator calling
    ☐ e. Small game hunting

SECTION D.   This section deals with preferences you have for furbearers and types of trapping.

---

1. The major types of trapping in Maine are:

   1. Beaver
   2. Fall land
   3. Fall water

   _____ a. If you could only do one type of trapping, which would it be? *(Record the number of your choice in the blank provided.)*
   _____ b. If you could only do two types of trapping, which would be your second choice? *(Record the number of your choice in the blank provided.)*

2. The upland furbearers in Maine are:

   1. bobcot   5. marten
   2. coyote   6. raccoon
   3. fisher   7. skunk
   4. fox   8. weasel

   _____ a. If you could trap for only one of these land animals, which would it be? *(Record the number of your choice in the blank provided.)*
   _____ b. If you could trap for only two of these land animals, which would be your second choice? *(Record the number of your choice in the blank provided.)*
   _____ c. If you could trap for only three of these land animals, which would be your third choice? *(Record the number of your choice in the blank provided.)*

3. The aquatic furbearers in Maine are:

   1. beaver   3. muskrat
   2. mink   4. otter

   _____ a. If you could trap for only one of these water animals, which one would it be? *(Record the number of your choice in the space provided.)*
   _____ b. If you could trap for only two of these water animals, which would be your second choice? *(Record the number of your choice in the space provided.)*
   _____ c. If you could trap for only three of these water animals, which would be your third choice? *(Record the number of your choice in the space provided.)*

4. In which of the major types of trapping did you participate during the 1980 season? *(Check one or more which apply to you.)*

   ☐ a. Beaver trapping
   ☐ b. Fall land trapping
   ☐ c. Fall water trapping

IF YOU DID NOT FALL TRAP IN 1980, STOP HERE AND RETURN YOUR QUESTIONNAIRE.

SECTION E. This section deals with your catch and sale of furs in 1980.

---

1. How many of each of the following animals did you catch in 1980? *(Record in the space provided* only the animals you took *during the beaver, fall land and fall water seasons.)*

   _____ a. red fox   _____ f. marten   _____ j. mink
   _____ b. gray fox   _____ g. weasel   _____ k. otter
   _____ c. coyote   _____ h. raccoon   _____ l. beaver
   _____ d. bobcat   _____ i. muskrat   _____ m. skunk
   _____ e. fisher

2. We need to know whether trappers ship or carry fur out of Maine for sale. Which category describes where you sell your fur? *(Check only one choice.)*

    ☐ a. You sell all your fur in Maine.
    ☐ b. You sell part of your fur out-of-state.
    ☐ c. You sell all of your fur out-of-state.

3. For the fall trapping season (1980), how did (or will) your income from trapping compare with your expenses? *(Check only one choice.)*

    ☐ a. Income less than expenses.
    ☐ b. Income equal to expenses.
    ☐ c. Income greater than expenses.

4. From where did you obtain information on what to expect for fur prices this year? *(Check one or more of the sources which apply to you.)*

    ☐ a. Local furbuyers.   ☐ d. Trapper organizations.
    ☐ b. Fur market report in paper or magazine.   ☐ e. Prices paid last year.
    ☐ c. Other trappers.   ☐ f. Nowhere; I did not know.

    ☐ g. Other (describe):_____

SECTION F. This section of questions concerns the effort expended at different types of trapping. These questions, although the most difficult to answer, are very important for our understanding of animal populations and harvest levels throughout the state. If you are not sure of the answer to a question, record your best guess. Do not leave the answer blank. In estimating the average number of traps set, if you have 30 traps set for one-half the season and 10 traps set for the other half, then your average number of traps would be 20.

---

1. The water trapping season in the southern deer zone was October 28 – November 30 this year. Did you water trap in the southern zone this year? *(See the map.)*

    ☐ a. Yes
    ☐ b. No ——————→ **IF NO, GO TO QUESTION 5.**

                       2. **IF YES,** during what dates of the season did you have water traps set in this zone?

                                  _____

                       3. *On the average*, how many water traps did you have set in the southern zone during the days you water trapped?

                                  _____

                       4. How many of these were intentionally set for otter? _____

5. The land trapping season in the southern deer zone was also October 28 – November 30 this year. Did you land trap in the southern zone this year? *(See the map.)*

    ☐ a. Yes
    ☐ b. No ——————→ **IF NO, GO TO QUESTION 9.**

                       6. **IF YES,** during what dates of the season did you have land traps set in this zone?

                                    _____

7. *On the average*, how many land traps did you have set in the southern zone during the days you land trapped?

_____

8. How many of these were intentionally set for fisher? _____

9. The water trapping season in the northern and western deer zones was October 20 – November 30 this year. Did you water trap in these zones this year? *(See the map.)*

☐ a. Yes
☐ b. No ⸻⟶ IF NO, GO TO QUESTION 13.

10. IF YES, during what dates of the season did you have water traps set in this zone?

_____

11. *On the average*, how many water traps did you have set in these zones during the days you water trapped?

_____

12. How many of these traps were intentionally set for otter? _____

13. The land trapping season in the northern and western deer zones was October 20 – November 30 this year. Did you land trap in these zones this year? *(See the map.)*

☐ a. Yes
☐ b. No ⸻⟶ IF NO, GO TO QUESTION 18.

14. IF YES, during what dates of the season did you have land traps set in these zones?

_____

15. *On the average*, how many land traps did you have set in these zones during the days you land trapped?

_____

16. How many of these were intentionally set for fisher? _____

17. How many of these traps were intentionally set for pine marten? _____

18. Which of the following animals did you intentionally trap for in 1980? This means that you made at least one set with this animal in mind. You did not have to catch one of these animals. Also, you may have caught some animals you didn't intentionally set for such as a beaver in an otter set, so do not include these. *(Check one or more of the animals which apply for you.)*

☐ a. red fox   ☐ f. marten   ☐ j. mink
☐ b. gray fox   ☐ g. weasel   ☐ k. otter
☐ c. coyote   ☐ h. raccoon   ☐ l. beaver
☐ d. bobcat   ☐ i. muskrat   ☐ m. skunk
☐ e. fisher

SECTION G. This group of questions is about the length of your trapline and the amount of time and equipment you used in trapping.

1. What was the length (in miles) of your principal trapline this fall? (The length would be the entire distance around your line.) _____

2. If you had one, what was the length (in miles) of your secondary trapline this fall? _____

3. What percentage (amount) of your trapping this fall was done within the following distances from your residence?

_____ a. Within 0-10 miles of your residence.
_____ b. Within 11-25 miles of your residence.
_____ c. Within 26-50 miles of your residence.
_____ d. Within 51-100 miles of your residence.
_____ e. Over 100 miles from your residence.

4. *On the average*, how many miles per day did you drive while trapping this fall? _____

5. *On the average*, how many miles per day did you travel (including driving, canoeing, walking, etc.) on your trapline this fall? _____

6. Which of the following types of transportation did you use on your trapline this fall? *(Check any types which were used by you.)*

☐ a. 2-Wheel drive car
☐ b. 2-Wheel drive truck
☐ c. 4-Wheel drive car or truck
☐ d. ATV
☐ e. Trail bike or motorcycle
☐ f. Bicycle
☐ g. Canoe
☐ h. Boat
☐ i. Airplane
☐ j. Hiking

7. Which of the above is your main type of transportation? *(Record the letter of the type which applies to you.)*

_____

8. What is the greatest distance you will make a land set from where you can drive your car or truck? *(Check only one choice.)*

☐ a. Within sight of the vehicle (distance doesn't matter).
☐ b. Within 100 yards, but out of sight.
☐ c. Within ¼ mile, but out of sight.
☐ d. Within ½ mile, but out of sight.
☐ e. Within 1 mile, but out of sight.
☐ f. Over 1 mile.
☐ g. Did not land trap.
☐ h. Did not use car or truck.

9. Which of the following did you use for a base of operations from which to trap this fall? *(Check all those which you used.)*

☐ a. Residence
☐ b. Private camp
☐ c. Commercial camp
☐ d. Travel trailer or camper
☐ e. Tent
☐ f. Car or truck

☐ g. Other (describe): _____

10. How many days did it take you to set up your principal trapline this fall? _____

11. How many days did it take you to set up your secondary trapline this fall? (If you didn't have one, write zero.)

_____

12. *On the average*, how many hours per day on *weekdays* did you spend trapping this fall (while you had traps set)?

_____

13. *On the average*, how many hours per day on *weekends* did you spend trapping this fall (while you had traps set)?

_____

SECTION H. This next section deals with where and with whom you trapped.

---

1. How did you decide the general areas where you trapped this fall? *(Check all answers that apply.)*

   ☐ a. To work same area as trapped before.
   ☐ b. To go where the amount of furbearer sign
        was greatest.
   ☐ c. To take advantage of longer season dates.
   ☐ d. To avoid other trappers.

   ☐ e. To avoid deer hunters.
   ☐ f. To stay near home.
   ☐ g. To go where animal damage problem greatest.
   ☐ h. To trap an area on your normal travel route.

   ☐ i. Other (describe): _____

2. What percentage of your land trapping was done on each of the following land ownership types?

   _____ a. Your own land.
   _____ b. Private land whose owner has less than 500 acres.
   _____ c. Private land whose owner has more than 500 acres.
   _____ d. Public land owned by the state.
   _____ e. Public land which is federally owned.
   _____ f. Unknown ownership.

3. Did you ask for permission to trap on private land this year?

   ☐ a. Yes
   ☐ b. No ──────────→ **IF NO, GO TO QUESTION 5.**

                           4. **IF YES**, how many landowners refused you permission to trap? _____

5. Did you trap with a partner in 1980?

   ☐ a. Yes
   ☐ b. No ·· ──────── **IF NO, GO TO SECTION I.**

                           6. **IF YES**, with how many partners did you trap this year? _____

                           7. Which types of trapping did you do with a partner in 1980? *(Check one or more which apply to you.)*

                                 ☐ a. Beaver
                                 ☐ b. Fall land
                                 ☐ c. Fall water

                           8. What reasons best explain why you trap with a partner? *(Check all reasons which apply to you.)*

                                 ☐ a. To gain safety.
                                 ☐ b. To gain companionship.
                                 ☐ c. To be more efficient.
                                 ☐ d. To teach someone who is
                                      less experienced about
                                      trapping.

                                 ☐ e. To learn from someone who
                                       is more experienced
                                       about trapping.
                                 ☐ f. To accompany a family
                                       member.
                                 ☐ g. To compete with your
                                       partner.
                                 ☐ h. To continue a tradition.

                           ☐ i. Other (describe):_____

                              _____

9. When trapping with a partner, how do you divide your catch for tagging? *(Check only one choice.)*

☐ a. One person tags everything.
☐ b. Each person tags only what he caught.
☐ c. Each person tags his share of the catch.

☐ d. Other (describe):_____
_____

SECTION I. This last section concerns the Department's management of furbearers and trapping in Maine and what you would prefer that is done in the future.

---

1. The following are factors that the Department could consider in setting trapping seasons. Use the scale from 0-10 to give the importance you feel that should be attached to each factor, with 0 meaning not important, and 10 being very important, and 5 moderately important. *(Put a number from 0 to 10 in the blank provided with each factor.)*

Scale

NOT IMPORTANT				MODERATELY IMPORTANT					VERY IMPORTANT
0	1	2	3	4	5	6	7	8	9	10
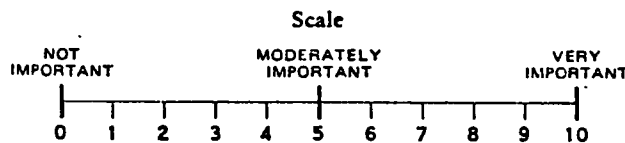
_____ a. Get the highest pelt primeness.
_____ b. Get the most number of days before deer season.
_____ c. Protect and maintain animal populations.
_____ d. Get the most number of days before freeze-up.
_____ e. Get the longest season possible when conditions are most difficult to catch animals.
_____ f. Minimize conflicts with bird hunters.
_____ g. Minimize conflicts with deer hunters.
_____ h. Minimize movement of trappers between management units.
_____ i. Distribute trapping pressure more evenly.
_____ j. Provide equal opportunity (in trapping days) for all areas of the state.
_____ k. Reduce animals in areas where they are over-populated or causing damage.
_____ l. Get the maximum income over expense for the trapper.

2. The number of trappers in Maine has increased from 1,650 in 1971 to over 5,000 in 1980. Likewise, the catch of most animals has increased greatly. For this reason, it may be necessary to reduce the harvest by reducing trapping pressure. Following are examples of types of regulations which are used elsewhere and could be used in Maine. For each option, select a response from the following list which best reflects your opinion about each option.

RESPONSES: 1. Strongly agree
2. Agree
3. Uncertain
4. Disagree
5. Strongly disagree

_____ a. Use a season limit for each trapper on species which are being overtrapped.
_____ b. Get a season limit statewide for a species and, when that is reached, close the season.
_____ c. Limit the number of traps each trapper can set at one time.
_____ d. When a species has been consistently or severely overharvested, close the season entirely for that species for a year or years.,

      _____ e. Limit the number of trapping licenses to be sold in the state.

      _____ f. Raise the price of a trapping license high enough to reduce the number sold.

      _____ g. Sell different licenses for each type of trapping and limit the number of each (beaver, fall land, and fall water).

      _____ h. Use registered traplines as the Canadians do, and allow only a certain number of trappers in a territory.

      _____ i. Shorten the trapping season.

      _____ j. Restrict the types of sets, traps, or equipment that trappers are allowed to use.

      _____ k. Require new trappers to pass a test before receiving a license.

      _____ l. Require new trappers to complete a trapper-training program.

      _____ m. Sell a professional trapper's license at a high price for those who wish to trap a large number of animals.

      _____ n. Have a special license for raccoon and bobcat dog hunters with a higher price.

3. What type of restriction or regulations other than those just listed would you suggest to reduce the over-harvest of an animal?

Thank you for your assistance. Place the completed questionnaire in the Business Reply envelope provided and mail it. No postage is necessary. If you have lost this envelope, be sure to write your return address on the envelope in which you mail the questionnaire so we know you have responded.

Appendix 3. Trapper longevity life equation of Northern and Western Maine resident trappers (Units 1, 2, 3) for the years 1976-80.

Type of Gain or Loss	Year Class 1976	1977	1978	1979	1980	Total	% Change
1976 Trapper Population	632					632	
1977 Deaths	-98					- 98	
Dropouts	-46					- 46	
Dropouts from Prev. Years Still Out	Unk[3]					Unk[3]	
Births	-0-	+218				+218	
Reentries	Unk[3]	-0-				Unk[3]	
Trapper Population	488	218				706	(+12%)
1978 Deaths	-48	- 61				-109	
Dropouts	-26	- 18				- 44	
Dropouts from Prev. Years Still Out[1]	(20)	Unk[3]				(20)	
Births	-0-	-0-	+178			+178	
Reentries	+26	Unk[3]	-0-			+ 26	
Trapper Population	440	139	178			757	(+ 7%)
1979 Deaths	-40	- 30	- 54			-124	
Dropouts	-14	- 4	- 10			- 28	
Dropouts from Prev. Years Still Out[1]	(11)	(5)	(Unk[3])			(16)	
Births	-0-	-0-	-0-	+213		+213	
Reentries	+35	+ 13	Unk[3]	-0-		+ 48	
Trapper Population	421	118	114	213		866	(+14%)
1980 Deaths[2]	-51	- 29	- 30	- 83		-193	
Dropouts[2]	-0-	-0-	-0-	-0-		-0-	
Dropouts from Prev. Years Still Out[1,2]	-0-	-0-	-0-	-0-		-0-	
Births	-0-	-0-	-0-	-0-	+208	+208	
Reentries	+25	+ 9	+ 10	Unk[3]	-0-	+ 44	
Trapper Population	395	98	94	130	208	925	(+12%)

1. Not added or subtracted in this year but have dropped out and not yet re-entered the trapper group.
2. Everyone missing in last year assumed to be deaths.
3. Unknown due to no prior data.

Appendix 4. Trapper longevity life equation of Central Maine
resident trappers (Unit 4) for the years 1976-80.

Type of Gain or Loss	Year Class					Total	% Change
---	1976	1977	1978	1979	1980		
1976 Trapper Population	1065					1065	
1977 Deaths	-146					-146	
Dropouts	-102					-102	
Dropouts from Prev. Years Still Out	Unk[3]					Unk[3]	
Births	-0-	+426				+426	
Reentries	Unk[3]	-0-				Unk[3]	
Trapper Population	817	426				1243	(+17%)
1978 Deaths	-81	-124				-205	
Dropouts	-43	- 44				- 87	
Dropouts from Prev. Years Still Out[1]	(38)	Unk[3]				(38)	
Births	-0-	-0-	+370			+370	
Reentries	+64	Unk[3]	-0-			+ 64	
Trapper Population	757	258	370			1385	(+11%)
1979 Deaths	-83	- 42	-114			-239	
Dropouts	-38	- 12	- 25			- 75	
Dropouts from Prev. Years Still Out[1]	(30)	(13)	(Unk[3])			(43)	
Births	-0-	-0-	-0-	+391		+391	
Reentries	+51	+ 31	Unk[3]	-0-		+ 82	
Trapper Population	687	235	231	391		1544	(+12%)
1980 Deaths[2]	-104	- 65	- 69	-182		-420	
Dropouts[2]	-0-	-0-	-0-	-0-		-0-	
Dropouts from Prev. Years Still Out[1][2]	-0-	-0-	-0-	-0-		-0-	
Births	-0-	-0-	-0-	-0-	+390	+390	
Reentries	+68	+ 25	+ 25	Unk[3]	-0-	+118	
Trapper Population	651	195	187	209	390	1632	(+6%)

1. Not added or subtracted in this year but have dropped out and not yet re-entered the trapper group.
2. Everyone missing in last year assumed to be deaths.
3. Unknown due to no prior data.

Appendix 5. Trapper longevity life equation of Eastern Maine resident trappers (Units 5 and 6) for the years 1976-80).

Type of Gain or Loss	Year Class					Total	% Change
	1976	1977	1978	1979	1980		
1976 Trapper Population	533					533	
1977 Deaths	-88					- 88	
Dropouts	-30					- 30	
Dropouts from Prev. Years Still Out	Unk[3]					Unk[3]	
Births	-0-	+219				+219	
Reentries	Unk[3]	-0-				Unk[3]	
Trapper Population	415	219				634	(+19%)
1978 Deaths	-50	- 66				-116	
Dropouts	-24	- 24				- 48	
Dropouts from Prev. Years Still Out[1]	(17)	Unk[3]				(17)	
Births	-0-	-0-	+209			+209	
Reentries	+13	Unk[3]	-0-			+ 13	
Trapper Population	354	129	209			692	(+ 9%)
1979 Deaths	-31	- 23	- 66			-120	
Dropouts	-14	- 6	- 11			- 31	
Dropouts from Prev. Years Still Out[1]	(10)	(9)	(Unk[3])			(19)	
Births	-0-	-0-	-0-	+232		+232	
Reentries	+31	+ 15	Unk[3]	-0-		+ 46	
Trapper Population	340	115	132	232		819	(+18%)
1980 Deaths[2]	-45	- 25	- 38	- 86		-194	
Dropouts[2]	-0-	-0-	-0-	-0-		-0-	
Dropouts from Prev. Years Still Out[1,2]	-0-	-0-	-0-	-0-	-0-	-0-	
Births	-0-	-0-	-0-	-0-	+220	+220	
Reentries	+22	+ 15	+ 11	Unk[3]	-0-	+ 48	
Trapper Population	317	105	105	146	220	893	(+ 9%)

1. Not added or subtracted in this year but have dropped out and not yet re-entered the trapper group.
2. Everyone missing in last year assumed to be deaths.
3. Unknown due to no prior data.

Appendix 6. Trapper longevity life equation of Southern Maine resident trappers (Units 7 and 8) for the years 1976-80.

Type of Gain or Loss	1976	1977	Year Class 1978	1979	1980	Total	% Change
1976 Trapper Population	1077					1077	
1977 Deaths	-175					-175	
Dropouts	- 78					- 78	
Dropouts from Prev. Years Still Out	Unk[3]					Unk[3]	
Births	-0-	+480				+480	
Reentries	Unk[3]	-0-				Unk[3]	
Trapper Population	824	480				1304	(+21%)
1978 Deaths	-92	-160				-252	
Dropouts	-58	- 46				-104	
Dropouts from Prev. Years Still Out[1]	(36)	Unk[3]				(36)	
Births	-0-	-0-	+335			+335	
Reentries	+42	Unk[3]	-0-			+ 42	
Trapper Population	716	274	335			1325	(+ 2%)
1979 Deaths	-55	- 58	-104			-217	
Dropouts	-30	- 22	- 18			- 70	
Dropouts from Prev. Years Still Out[1]	(26)	(14)	(Unk[3])			(40)	
Births	-0-	-0-	-0-	+410		+410	
Reentries	+68	+ 32	Unk[3]	-0-		+100	
Trapper Population	699	226	213	410		1548	(+17%)
1980 Deaths[2]	-101	- 58	- 54	-160		-373	
Dropouts[2]	-0-	-0-	-0-	-0-		-0-	
Dropouts from Prev. Years Still Out[12]	-0-	-0-	-0-	-0-		-0-	
Births	-0-	-0-	-0-	-0-	+423	+423	
Reentries	+56	+ 36	+ 18	Unk[3]	-0-	+110	
Trapper Population	654	204	177	250	423	1708	(+9%)

1. Not added or subtracted in this year but have dropped out and not yet re-entered the trapper group.
2. Everyone missing in last year assumed to be deaths.
3. Unknown due to no prior data.