FURBEARER PROGRAM

STATEWIDE HARVEST & MANAGEMENT REPORT 2011-2012

MONTANA

Montana Fish, Wildlife & Parks

WILDLIFE RESTORATION

FURBEARER PROGRAM

2011-12 STATEWIDE

HARVEST AND MANAGEMENT REPORT

PERIOD COVERED: July 2011 – June 2012

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Program Goals

1) Maintain well-distributed and healthy furbearer populations and associated habitats.

2) Provide ecological, recreational, cultural, educational, economic, and scientific benefits of the state's furbearers though sound resource management.

3) Address the social impacts of furbearers on human health, private property, and agricultural values.

Statewide Objectives

1) Monitor population trends and the distribution of each furbearer species.

2) Maintain Montana's viable populations of each species by promoting the conservation and enhancement of furbearer habitats.

3) Address the interest by resident publics for consumptive and non-consumptive uses of the state's furbearer resource.

4) Optimize recreational harvest opportunities through a sustained use management approach under regulatory protections.

5) Minimize animal damage and/or nuisance wildlife problems utilizing Department policies and management practices.

6) Promote trapping practices that minimize the take of non-target species and maximizes the humane harvest of furbearers.

7) Develop a public understanding and acceptance for the basis of the consumptive use of furbearers.

Management Strategies

1) Identify and associate species distribution and population trends with delineated habitats.

2) Investigate species population trends through species/habitat surveys, species occurrence reports, harvest data, and research information.

3) Utilize regulatory mechanisms to provide trapper/hunter participation, harvest data, and biological information.

4) Include furbearer species in land management decisions.

Harvest and Management Activities

1) Population information and harvest data are collected by county and/or trapping district and reported by trapping district and statewide in this report. This method is intended to more closely describe the association between species diversity, distribution, and abundance with identified ecosystems and to use reconcilable legal units in the state. Furbearer species with harvest seasons are beaver, otter, muskrat, mink, marten, fisher, wolverine, bobcat, and swift fox. Furbearers with a closed season are lynx, and are not included in this report. Weasel, skunk and coyote are state classified predators while red fox, raccoon, and badger are nongame species of which limited harvest data is collected so they are included in this report.

2) The annual harvests of otter, marten, fisher, wolverine and bobcat are monitored through a statewide pelt tagging and harvest registration system. Registration is initiated under 24-hour mandatory reporting through an automated telephone call-in system referred to as the Mandatory Reporting Response Entry (MRRE) system. All pelt tag sealing and completion of species harvest registration forms, which are generated in MRRE, are conducted by FWP personnel. Marten, fisher, wolverine and swift fox pelts are tagged under the authority of the state, while otter and bobcat are tagged under oversight of the U.S. Fish & Wildlife Service to meet federal CITES pelt export requirements.

3) Harvest data on the three remaining furbearers (beaver, muskrat, mink) and six fur-producing animals (weasel, skunk, coyote, fox, raccoon, badger) was collected through a trapper harvest survey questionnaire. In addition, the same harvest data is collected on the five tagged/registered furbearers through the same survey questionnaire to specifically measure trapper effort and catch rates. Trapper effort will be used in developing long-term species population trend indices. The trapping and fur harvest survey was mailed to all resident and nonresident license holders. No reminder was sent to non-respondents. Expanded estimates of furbearer trapping, hunting, and harvest activities were made from the returned sample. The survey requests information on the estimated number of species harvested by county and trapping district, harvest method, and harvest effort. Summary harvest statistics and calculated catch rates were generated by a software package through FWP's Research & Technical Services Unit.

4) Mandatory carcass collections are required for fisher and wolverine, and skulls must be surrendered from harvested bobcat and swift fox. Marten skulls have not been required to be turned in since the 2008-09 season, but were collected in prior years. All carcasses and skulls are forwarded to FWP's Wildlife Laboratory in Bozeman for biological analysis to determine specimen age, sex, body condition, food habits, reproductive history, and to collect tissue samples for potential genetic analysis.

5) A Montana fur dealer survey conducted by the state furbearer coordinator has been replaced by checking the North American Fur Auction (NAFA) website after the winter and spring sales in order to obtain average pelt values for each fur-producing species. An increasing number of Montana trappers are shipping directly to NAFA. This information can be used to calculate economic fur value of each species as a predictor of harvest pressure (i.e. higher prices = greater harvest pressure).

6) Annual winter furbearer snow track surveys are conducted by biologists following standardized survey protocol and track identification methods in Trapping Districts 1-4 (NW and SW mountainous forest habitats). The numbers of track detections were recorded along selected routes for furbearers, which include marten, fisher, wolverine, lynx, bobcat; prey species such as snowshoe hare and pine squirrel; and lion, weasel and coyote. Standardized forms are used to record species track detections and track identification measurements.

   Snow track surveys are utilized to determine: a) species occurrence/distribution, b) population trend from long-term track detection rates, and c) relative species abundance. A prey index of snowshoe hare numbers is used to predict furbearer population fluctuations and annual recruitment of several furbearer species. This is a continuing activity to further develop route design, survey and track detection methodology, and to further investigate population trend analysis and density estimate techniques.

7) Biologists in trapping districts 4-7 are in the process of developing lagomorph prey indices through the use of headlight surveys. The numbers of lagomorphs are counted on established routes three times each survey period. This index to prey availability is utilized to predict bobcat population fluctuations by anticipating changes in annual rabbit production (March surveys) or recruitment levels (September surveys).

8) Department furbearer occurrence/distribution report forms are distributed and collected annually. Reports are completed only by Department personnel from verified reports or personal observations. Accumulated reports provide species occurrence and location data to assist in delineating statewide and trapping district distribution of selected furbearer species (otter, fisher, wolverine, lynx and swift fox).

9) Furbearer research is an ongoing statewide activity that is utilized to address management related issues on a species-specific basis when funding is available. One furbearer program project (otter genetics study) was initiated during the report period and external research projects were either being conducted or completed during this time (lynx and bobcat).

Statewide Harvest and Management Results

Harvest and management results were analyzed by county and trapping district and reported as a statewide summary. The seven legally defined trapping districts (TDs) and 56 Montana counties are shown in Fig. 1.

License Sales

The 5,053 trapping license sold during the 2011-12 season was an increase of 20% from the previous year of 4,073 licenses and 21% above the 10-year average (Fig. 2). License purchases at the seven regional offices and the Helena headquarters are somewhat mixed each year. In 2011-12 all regional offices had increased sales from the previous year and the Helena headquarters had an increase in sales of 66% (Table 1). Online sales likely account for the increase in Helena based purchases. Again, a general upward trend in statewide license sales is apparently continuing through 2011-12 from the lowest number at any time of the 1,736 licenses sold in 1990-91.

Annual Harvest Summary

Montana's furbearer harvest for the 2011-12 season is presented in Table 2. A 10-year harvest summary for years that species harvest data is available is presented in Table 3. These figures represent the known legal harvest of registered furbearer species and an estimated harvest of the remaining six species based on the trapper harvest survey. Detailed harvest statistic estimates by species, trapping district and county are available in the Trapping and Fur Harvest Reports (Gude, pers. comm.). During the most recent year available, trapper survey questionnaires were returned from 35% of the 5,053 people who purchased a trapper's license during the 2011-12 furbearer season. The total number of animals reported being taken during the 2011-12 season increased by 32% over the 2010-11 season (Table 3). This increase may be the result of mild weather conditions, generally stable populations of most furbearing animal species in various portions of the state, and higher than average pelt prices for most species.

Pelt Prices

Pelt prices continued a general increase for most species during the 2011-12 season, with several species demonstrating large increases in value, particularly beaver, otter, muskrat, mink, fisher, bobcat, and red fox (Table 4). The most significant increases in harvest numbers were reported for beaver, muskrat, marten, bobcat, coyote, fox and raccoon with decreases in the harvest of weasel and skunk, despite slightly higher prices from the previous year.

Species Harvest Summary

Statewide species harvest trends by trapping districts and statewide are presented in the Species Harvest Summary section (pages 17 to 60). The statewide harvest of most species was generally stable to increasing with a large increase in the muskrat harvest from 2010-11 and slight increases that have continued in marten and bobcat numbers over the past several years. These changes are variable, however, among the seven trapping districts. Harvest numbers may correspond to species abundance within each habitat type, although other variables, such as trapper effort and catch rate, may be more useful indicators to correlate harvest data with population trends. Under this assumption, there are specific implications for habitat and species management opportunities.

Population Monitoring

Results calculated from the trapper harvest survey that reports trapper effort for all species, including the known registered species harvest, provided Catch Per Unit Effort (CPUE = # animals harvested/1,000 trap days) which is used to help monitor population trends (Species Harvest Summary (pages 17 to 60). Using estimated catch rates (trap days/catch) from the annual harvest survey continues to be evaluated as a population monitoring parameter. Metrics such as these will be examined further to determine how well they may reflect species population trend. Graphs of the CPUE for species groups, to compare trends among similar species, are presented on pages 56 and 57 in the Species Harvest Summary section.

Results of carcass collections from fisher and wolverine, and skull turn-in from otter and bobcat are shown under each of these species sections in the Species Harvest Summary (pages 17 to 60). The most important aspect of these collections is to extract a tooth for age determination. The graphs illustrate analysis of the biological parameters reported, which are juvenile/adult female ratios, age structure, sex ratios, and median ages of the harvest sample which should represent

population parameters. Not all years or most recent years may be available for age data, as processing adult teeth can take 1-2 years for results. Marten skull collections were discontinued beginning with the 2008-09 season. Fisher and wolverine sample sizes are very small, so they do not necessarily represent a population trend. Any additional species information from wildlife laboratory analysis will be reported as it becomes available in future reports.

The statewide results from annual snow track surveys conducted in Trapping Districts 1-4, which were initiated in 1990-91, are presented as the most recent 10-year summary in Table 19. Numbers reported indicate total track detections recorded for prey species, selected furbearers and several predators from combined route data. The corresponding indices of track detection rates per 100 miles traveled are provided in Table 20. Long-term trends in species detection rates may indicate changes in relative abundance. Statewide species track detection rates graphed as an index of abundance are presented in Figures 55 to 58. Statewide results through 2011-12 indicate track detection rates increased slightly for snowshoe hare from the previous year but remained below the long-term average. There was also an increase in pine squirrels track detections for this period. An increase in marten detection rates in 2011-12 were also above the 10-year average. Both fisher and wolverine detection rates in 2011-12 were slightly below the 10-year averages of 0.7 and 2.4, respectively. Detection rates declined substantially for lynx with a small reduction in lion track detections.

The number of FWP occurrence/distribution reports received showed a consistent trend during the past several years with the majority of reports collected for wolverine and swift fox. These reports need to be entered in a locational referenced database, similar to the furbearer harvest database that provides species distribution data. The number of counties in the state for reported swift fox observations continues to increase.

Furbearer Research

Research related to furbearers that were supported and/or permitted by FWP or the state furbearer program during the report period included a bobcat study and lynx project in northwestern Montana. The bobcat study has been completed while the lynx project is ongoing. Wolverine work conducted from 2002-2010 has been completed and published. A bibliography of most furbearer program related research to date is listed on pages 61 to 67 in this report.

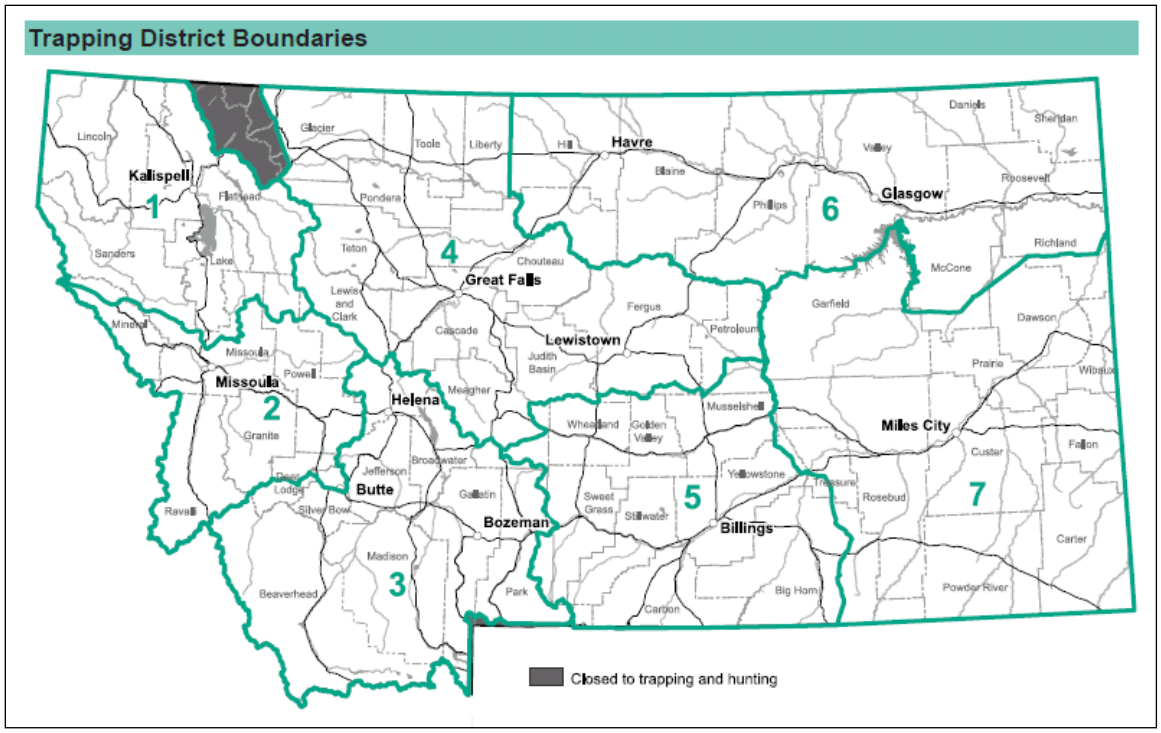

Figure 1. Map of Montana delineating furbearer regulation trapping districts and counties.

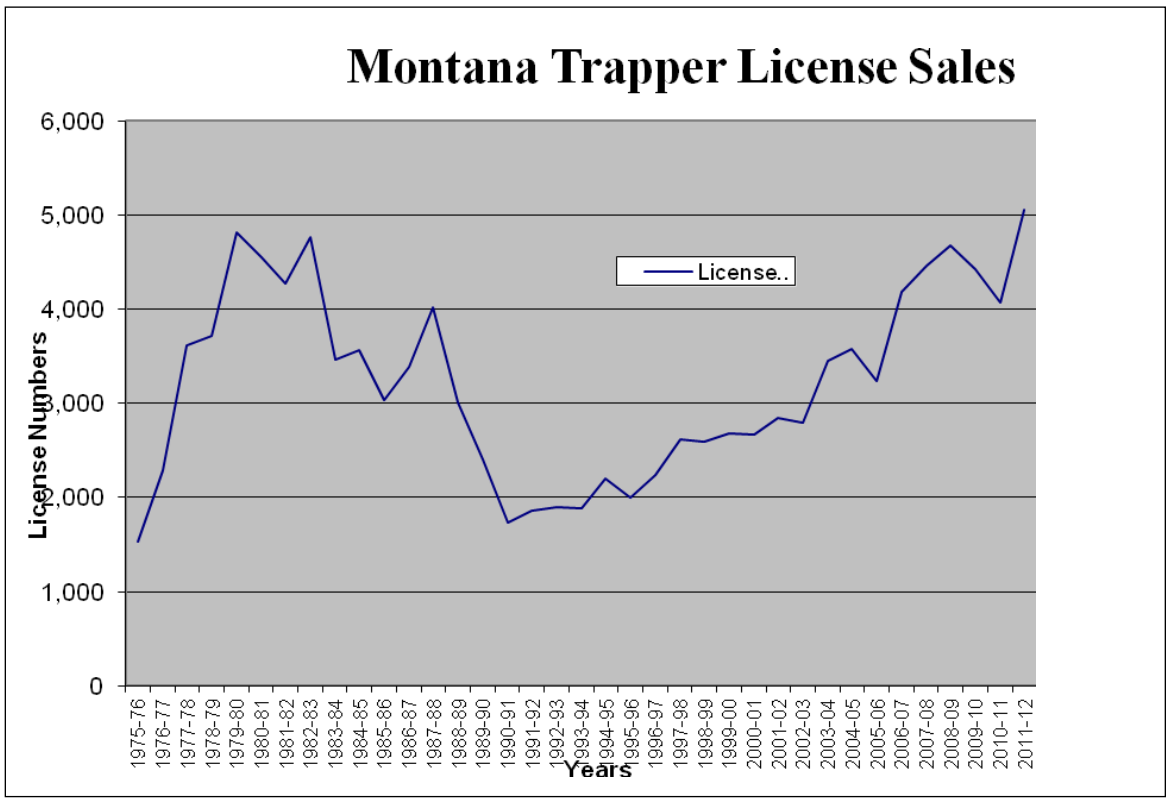

Figure 2. Montana trapper license sales trend, 1975-76 to 2011-12.

Table 1. Montana trapping license sales, 2011-2012.

License Type	Kalispell	Missoula	Bozeman	Great Falls	Billings	Glasgow	Miles City	Helena	Statewide
General	610	459	883	541	638	151	427	1,171	4,506
Youth	14	7	8	3	4	1	2	2	41
Landowner	5	2	54	30	26	10	31	5	127
Nonresident	0	0	1	0	0	0	4	0	5
Total	629 (+7%)	468 (+6%)	907 (+16%)	577 (+6%)	668 (+2%)	162 (+38%)	462 (+6%)	1,178 (+66%)	5,053 (+20%)

Table 2. Montana furbearer, predator and nongame species harvest summary, 2011-2012.

Trapping District	1	2	3	4	5	6	7	Total*
Beaver	357	1,225	1,805	1,931	567	696	252	6,833
Otter	22	19	21	3	3	0	0	68 (7)
Muskrat	1,740	6,304	11,057	3,180	705	3,452	799	27,236
Mink	53	190	415	102	58	23	29	872
Marten	353	420	308	2	1	--	--	1,083
Fisher	2	5	--	--	--	--	--	7
Wolverine	0	2	0	0	0	--	--	2
Bobcat	259	104	275	311	308	91	627	1,975
Swift Fox	-	-	-	-	-	16	-	16
Weasel	199	105	15	6	0	15	3	342
Skunk	32	120	292	140	436	117	597	1,735
Coyote	292	6-05	1,243	4,660	1,834	3,487	4,276	16,398
Red Fox	29	541	333	328	450	196	591	2,469
Raccoon	73	322	1,141	503	2,989	380	1,000	6,409
Badger	3	12	237	714	12	284	213	1,474
Total	3,414	9,974	17,142	11,880	7,363	8,757	8,387	66,919

Figure may include animals harvested in unknown trapping district and ( ) indicates incidental harvest.

Table 3. Montana furbearer, predator and nongame species 10-year harvest (legal) summary, 2002-2003 to 2011-2012.

Year	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Beaver	8,475	9,361		8,918	7,421	7,219	7,124	5,795	5,445	6,833
Otter	83	80	88	93	78	67	60	64	58	68
Muskrat	11,448	11,915		21,270	17,014	10,042	10,699	12,754	18,494	27,236
Mink	1,071	808		1,306	1,348	1,018	655	584	760	872
Marten	1,053	1,062	1,248	952	856	1,141	844	711	932	1,083
Fisher	7	8	7	9	9	6	7	6	8	7
Wolverine	15	10	11	11	9	9	4	3	4	2
Bobcat	1,786	1,783	2,114	2,201	2,228	2,389	2,428	1,738	1,644	1,975
Weasel	405	321		243	503	310	175	120	488	342
Skunk	1,422	2,996		2,325	1,933	2,599	1,845	2,717	3,975	1,735
Coyote	10,725	12,286		9,412	10,886	9,723	6,969	9,048	8,489	16,398
Fox	2,552	2,056		2,473	3,164	1,862	1,696	1,471	1,418	2,469
Raccoon	4,662	5,936		4,540	4,368	4,506	4,052	4,099	2,201	6,409
Badger	1,012	1,788		1,166	1,330	871	643	450	609	1,474
TOTAL	44,716	50,411		54,939	51,145	41,762	37,201	39,110	45,531	66,919

Table 4. Average pelt price reported by species, 1990-91 to 2011-12.

Year	Beaver	Otter	Muskrat	Mink	Marten	Fisher	Wolverine	Bobcat	Coyote	Red Fox	Raccoon	Weasel	Skunk	Badger
1990-91	9.52	25.15	0.73	13.84	25.47	35.00	140.00	90.98	13.01	8.45	4.32	0.27	4.05	5.29
1991-92	11.81	17.50	1.30	20.50	25.58	40.00	130.00	87.00	23.95	22.50	8.28	2.25	4.25	7.65
1992-93	8.02	39.76	1.18	10.21	17.24	35.00	135.00	85.37	22.18	11.17	10.68	3.50	4.52	8.38
1993-94	12.35	33.30	1.54	10.02	21.74	32.74	147.80	90.43	15.78	10.68	10.10	2.00	3.01	6.82
1994-95	14.95	30.00	1.67	9.31	15.00			81.75	20.61	15.33	9.30	2.66	3.40	11.87
1995-96	16.13	35.95	2.82	9.16	19.17		200.00	75.42	19.46	18.58	10.97	1.75	6.15	10.00
1996-97	23.59	30.98	3.83	14.48	25.01			124.05	24.68	17.74	15.26	1.83	3.86	11.19
1997-98	21.18	20.00	1.94	9.54	17.25			95.25	17.15	12.72	14.67	1.00	2.85	11.73
1998-99								85.50						
1999-00					19.33			98.67	22.06					
2000-01	15.98	59.17	1.71	8.37	19.95	28.62	212.94	106.05	18.93	16.24	10.02	1.50	3.73	15.98
2001-02	12.40	47.93	2.07	10.05	18.70	25.12	225.00	135.25	23.70	22.65	19.30	2.00	5.00	18.50
2002-03	14.00	75.00	2.10	10.50	19.50	25.00	225.00	203.00	30.70	24.00	11.00	3.00	7.00	21.50
2003-04	14.50	90.00	2.15	11.00	20.50	28.10	275.00	280.25	28.50	20.00	11.50	3.00	5.50	23.00
2004-05	15.25	94.00	2.25	11.50	19.50	28.25	275.00	325.00	30.70	21.50	11.00	3.00	7.00	23.50
2005-06	20.50	100.00	3.50	15.00	45.50	35.00	300.00	345.00	38.50	25.00	11.50	3.00	6.50	27.50
2006-07	23.49	80.00	3.20	12.88	61.57	74.31	217.85	257.33	43.36	20.84	22.05	4.96	4.04	27.57
2007-08	24.80	40.91	3.23	15.22	77.29	87.51	280.35	449.45	37.90	22.49	33.22	5.69	5.27	42.60
2008-09	25.21	30.85	2.55	11.53	37.58	42.83	254.67	281.35	30.70	21.59	17.86	4.02	2.32	24.80
2009-10	16.74	51.10	4.23	17.39	47.76	50.08	211.42	346.54	35.29	22.34	18.02	4.07	2.34	72.56
2010-11	16.57	57.63	6.66	17.48	61.98	47.58	253.15	411.84	73.16	24.37	18.50	3.13	2.11	24.12
2011-12	38.22	102.29	10.19	23.14	55.94	74.99	319.67	426.31	77.30	57.49	19.45	3.16	7.30	38.61

BEAVER

The statewide beaver harvest has been relatively stable over the last several years, but was higher in 2011-12 than the previous two years and has been at a much lower level since the most recent peak harvests in the late 1990s (Fig.3). The estimated 2011-12 harvest level of 6,833 is below the 10-year average harvest level, despite the highest reported pelt price during the past 18 years (Table 5).

Examining the trend in CPUE it appears harvest effort increased during the 2011-12 season after several years of a general decline, indicating that more beaver are being taken per unit of effort (Fig. 4). Population monitoring activities for beaver are based completely on harvest survey data, with the CPUE considered to indicate relative population trend, which could be considered as increasing, with recent decreases since 2007-08. A comparison of CPUE for beaver with the other semi-aquatic species is shown in Fig. 51.

Generally higher pelt prices will lead to more trapper effort, as reflected in the CPUE during 2011-12 for beaver and an increase in harvest numbers, particularly in certain portions of the state. Habitat conditions may also be influencing beaver numbers by expanding water areas and riparian tributaries as a result of good spring moisture conditions, at least in some regional areas of the state, particularly in western and central Montana.

Table 5. Beaver harvest, pelt price, and quota level if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	823	1173	2795	2637	2164	1847	248	11699	14.95	
1995-96	679	846	1854	2118	2127	711	285	8620	16.13	
1996-97	626	1118	2961	5681	3453	1590	1122	16550	23.59	
1997-98	698	1194	4460	3005	2227	972	959	13515	21.18	
1998-99	510	1045	3243	3942	1900	718	276	11634		
1999-00	908	1298	2821	2966	1961	2265	587	12805		
2000-01	399	1095	2623	1756	2528	407	247	9056	15.98	
2001-02	499	1394	3242	2953	1266	1273	460	11156	12.41	
2002-03	685	1071	2296	2040	1201	777	399	8475	14.01	
2003-04	424	1485	2336	2074	2175	477	389	9361	14.51	
2004-05									15.25	
2005-06	767	628	2852	1970	856	1626	219	8918	20.51	
2006-07	479	944	2067	1450	1509	661	310	7421	23.49	
2007-08	209	812	1409	788	698	994	313	7219	24.81	
2008-09	415	513	2015	1199	618	460	107	7124	25.21	
2009-10	466	836	1021	1034	437	233	295	5795	16.74	
2010-11	315	825	963	1356	709	16	267	5445	16.57	
2011-12	357	1225	1805	1931	567	696	252	6833	38.22	

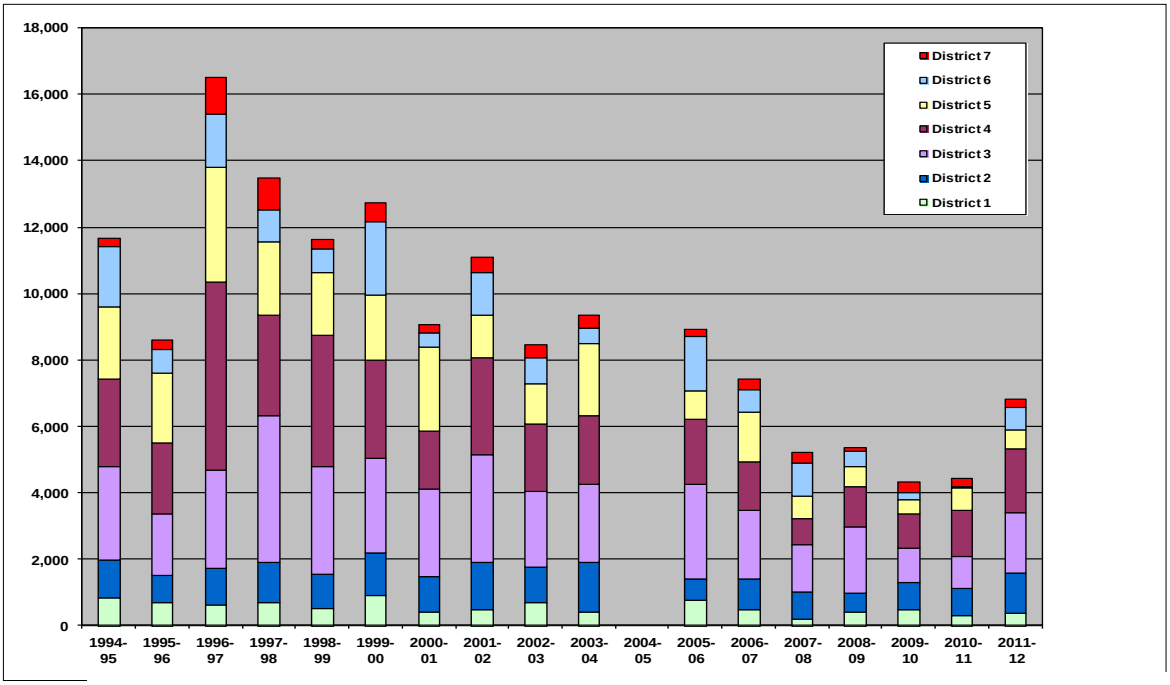

Figure 3. Statewide beaver harvest by trapping district, 1994-95 to 2011-12.

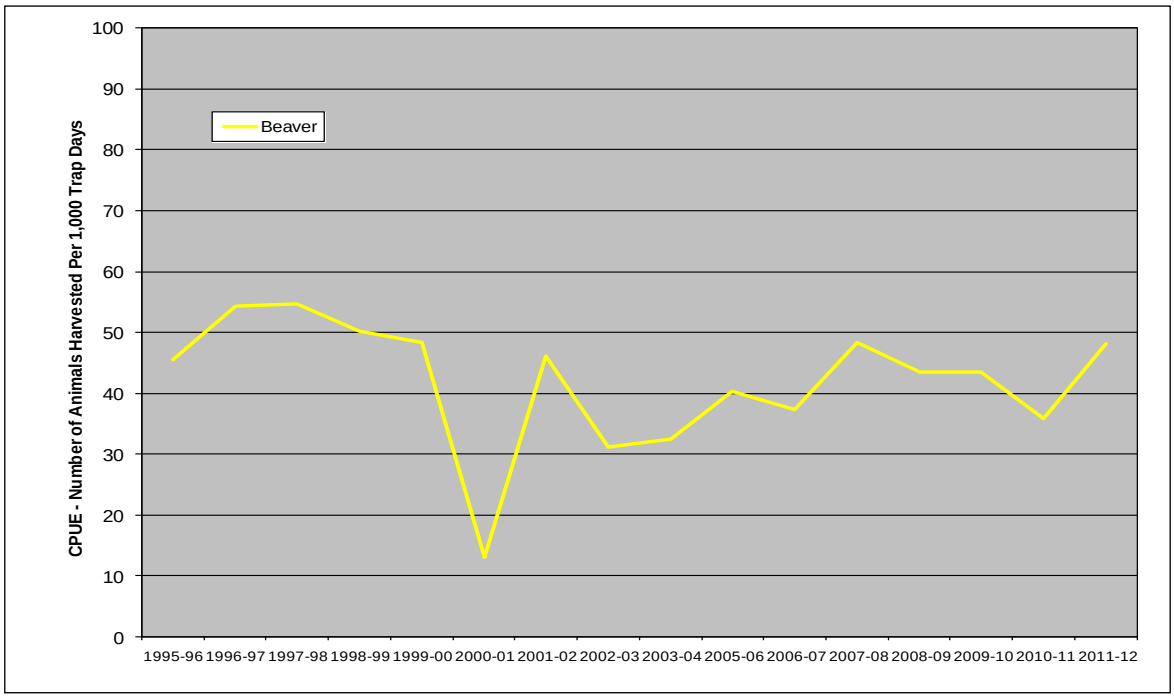

Figure 4. Statewide trend in beaver harvest from CPUE, 1995-96 to 2011-12.

OTTER

Otter are one of the five furbearers that are required to be reported, registered and pelt tagged so that the actual number of harvested animals is known. The 2011-12 harvest of 68 otters is about 8% below the 10-year average of 74 otters (Table 6). The otter harvest has always been managed through a trapper limit and then since the 2002-03 season also under trapping district (TD) quotas. Up through the 2001-02 season a one otter per trapper limit was in place, which was also changed in 2002-03 to a two otter limit per trapper under the regulated quota in each of the seven TD's. The two otter limit and quota changes were made in response to healthy populations, to reduce incidental take in beaver sets, and more interest by trappers as pelt prices were increasing at that time. Quotas were used as a harvest management tool to maintain well distributed and healthy otter populations, while providing more opportunity and flexibility to harvest otter by the trapping community. The total quota for the state has increased from 84 in 2002-03 to 95 in 2007-08 at which level it has remained (Table 6). The statewide otter harvest increased with pelt prices until a peak price and corresponding harvest occurred in 2005-06. Harvest has since declined through the 2011-12 season, despite a higher pelt price similar to the 2005-06 pelt value. However, the long-term harvest level and proportion of the harvest by TD has remained relatively stable (Fig. 5).

The statewide trend in otter harvest CPUE is relatively stable (Fig. 6) and a comparison of otter CPUE with the other semi- aquatic species is presented in Fig. 51. Population monitoring for otter consists of the collection and analysis of biological data from the harvest sample through mandatory carcass turn-in from trappers through the 2011-12 season. Although not all data is not available for some years, trends in population parameters that show juveniles per adult female, age structure, sex ratios, and median ages shown in Fig. 7 to 10 indicate a relatively stable population on a statewide basis.

Table 6. Otter harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	23	7	23	4	5	0	0	62	30.01	
1995-96	17	8	22	6	7	0	1	61	35.95	
1996-97	17	8	27	7	6	0	0	65	30.98	
1997-98	15	8	41	13	7	0	0	84	20.01	
1998-99	17	4	34	9	3	0	0	67		
1999-00	18	9	26	8	3	0	0	64		
2000-01	13	15	18	1	1	0	0	48	59.17	
2001-02	28	23	39	5	1	0	0	96	47.93	
2002-03	21	13	35	8	4	0	1	83	75.01	84
2003-04	19	18	33	8	2	0	0	80	90.01	84
2004-05	25	19	32	8	3	0	1	88	94.01	92
2005-06	20	22	36	8	5	0	2	93	100.01	93
2006-07	21	17	29	6	5	0	0	78	80.01	93
2007-08	24	14	17	5	2	0	1	67	40.91	95
2008-09	21	14	22	0	3	0	0	60	30.85	95
2009-10	21	20	17	8	2	0	0	68	51.10	95
2010-11	20	14	18	4	3	0	0	59	57.63	95
2011-12	22	19	21	3	3	0	0	68	102.29	95

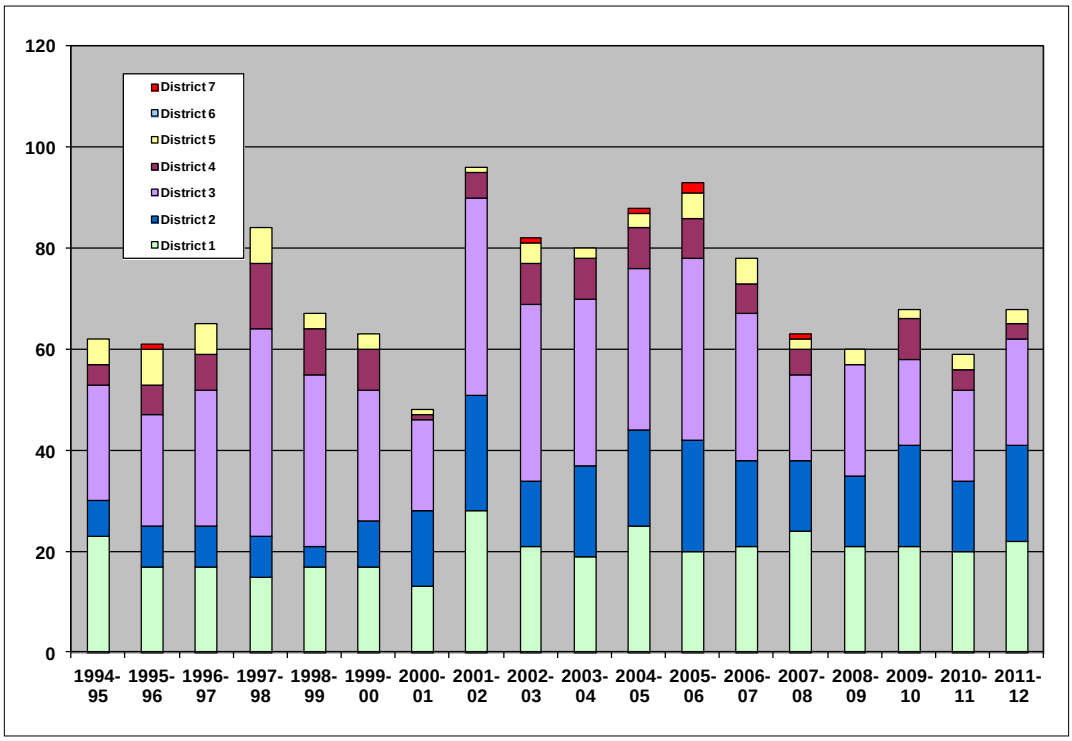

Figure 5. Statewide otter harvest by trapping district, 1994-95 to 2011-12.

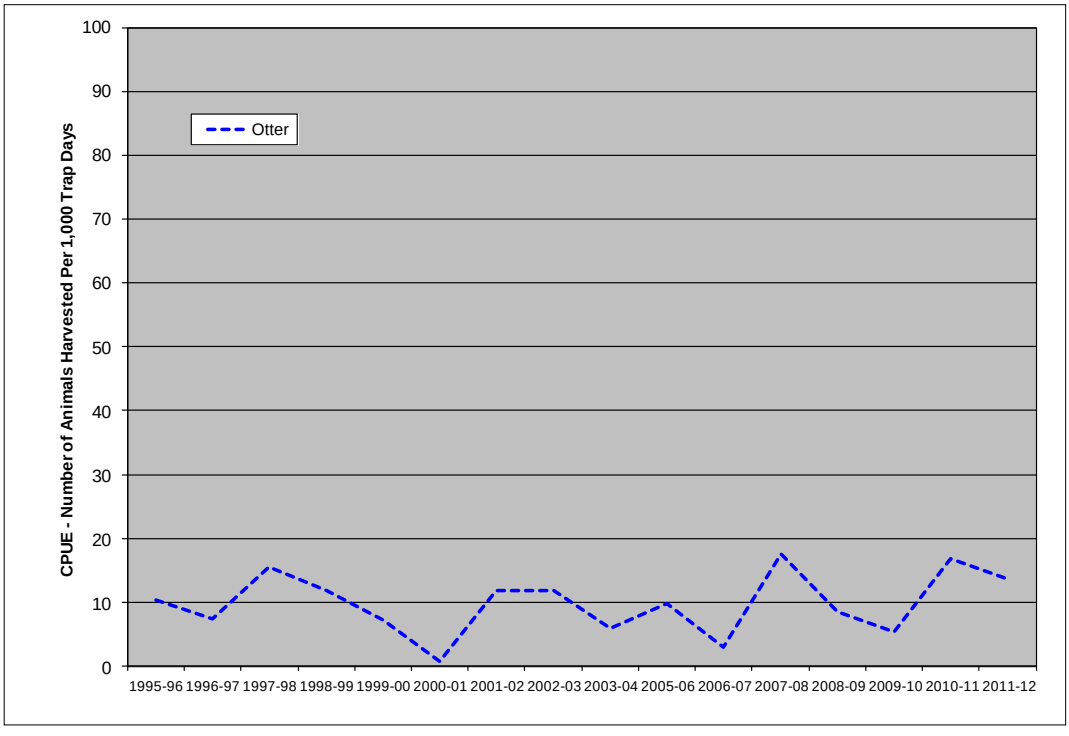

Figure 6. Statewide trend in otter harvest from CPUE, 1995-96 to 2011-12.

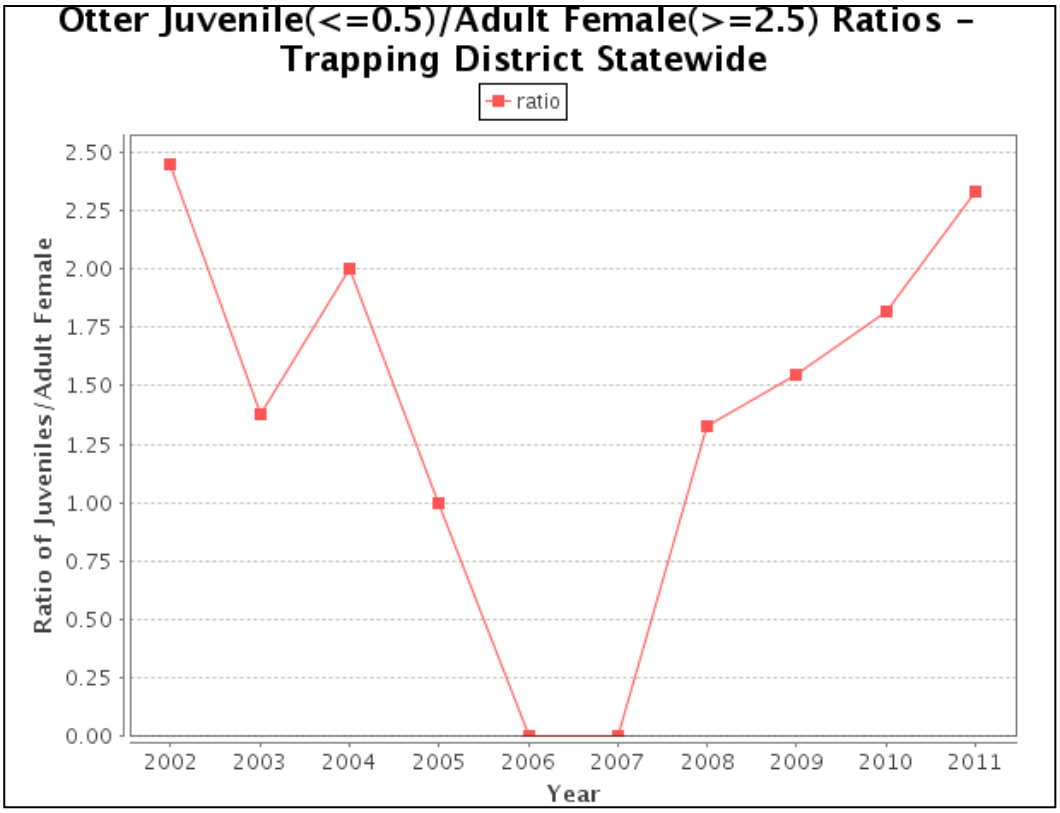

Figure 7. Otter population parameter of juveniles per adult female ratio, 2002-03 to 2011-12.

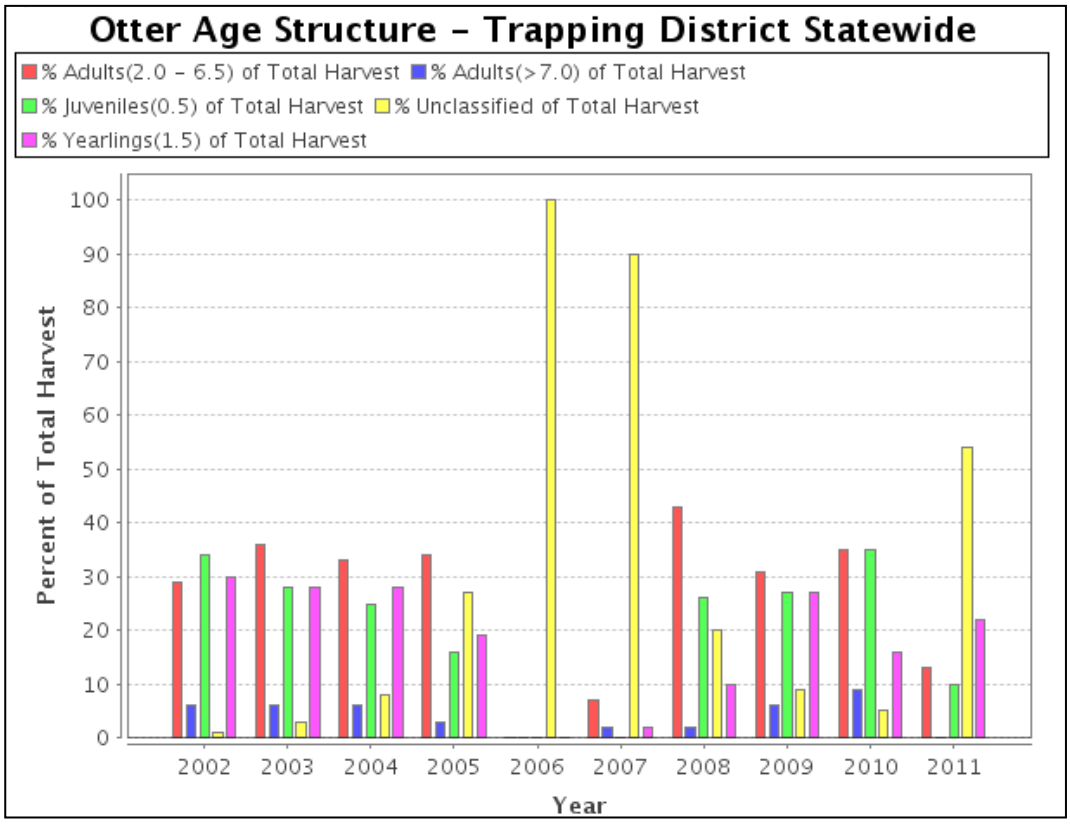

Figure 8. Otter population parameter of age structure, 2002-03 to 2011-12.

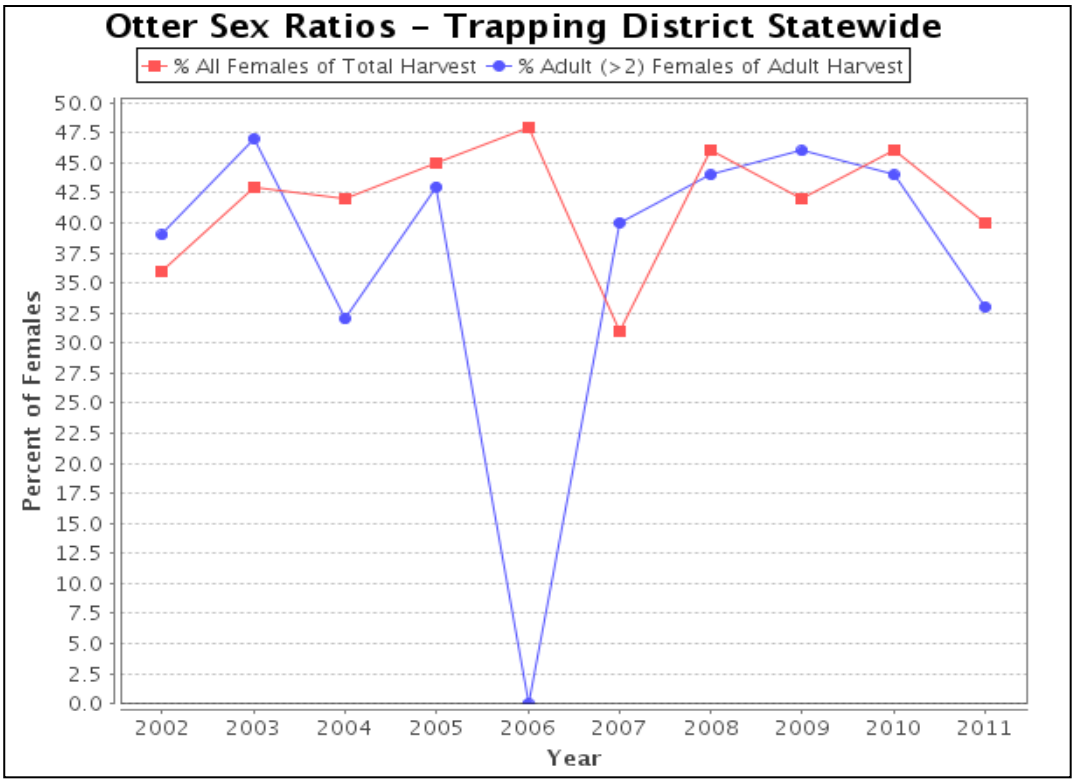

Figure 9. Otter population parameter of sex ratios, 2002-03 to 2011-12

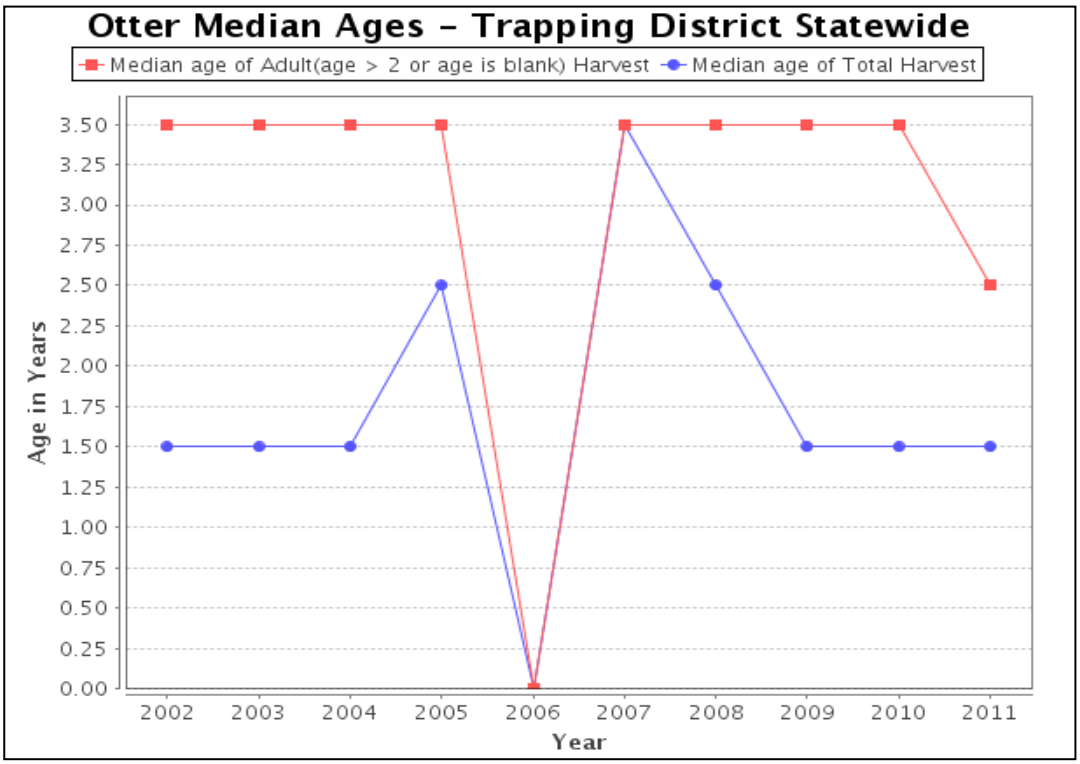

Figure 10. Otter population parameter of median ages, 2002-03 to 2011-12.

MUSKRAT

The statewide muskrat harvest has continually increased during the past five years with a significant peak harvest of 27,236 animals during the 2011-12 season, that was 32% more harvested muskrats than the estimated numbers for the previous year (Table 7). This was accompanied by higher than average pelt prices of $10.19 compared to the previous 10-yeara average pelt price of $3.20. In addition, the estimated 2011-12 muskrat harvest was 48% above the 10-year average harvest of 14,087 animals (Fig. 11).

Population monitoring activities for muskrat are based completely on harvest survey data, with CPUE from the harvest survey considered to be an indicator of relative population trend, which could be considered as stable to increasing, with a recent increase until the 2011-12 season. Examining the trend in CPUE it appears harvest effort has generally increased, indicating that more muskrat are being taken per unit of effort until leveling off somewhat during the 2011-12 season (Fig.12). A comparison of CPUE for muskrat with the other semi-aquatic species is shown in Fig. 51.

Table 7. Muskrat harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	1393	4905	4394	2152	925	404	83	14256	1.67	
1995-96	716	4177	3271	1791	1276	181	39	11727	2.82	
1996-97	2980	3992	2732	3712	1799	772	134	16121	3.83	
1997-98	2552	3887	5043	3519	1499	2122	205	18826	1.94	
1998-99	2270	2240	3495	2609	709	811	111	12243		
1999-00	1643	3156	2651	3049	794	763	1191	13247		
2000-01	897	6170	2905	536	2844	129	361	13842	1.71	
2001-02	556	5681	3409	599	596	132	43	11070	2.07	
2002-03	1427	3915	4571	952	308	156	119	11448	2.11	
2003-04	869	3923	5625	864	318	45	270	11915	2.15	
2004-05									2.25	
2005-06	1561	4902	9862	2203	888	1217	637	21270	3.51	
2006-07	1850	4821	5210	2418	1868	728	117	17014	3.21	
2007-08	510	806	1188	761	522	442	146	10042	3.23	
2008-09	485	1131	2037	801	567	0	0	10699	2.55	
2009-10	852	2564	3054	1953	546	404	48	12754	4.23	
2010-11	949	1977	4452	4684	628	822	51	18494	6.66	
2011-12	1740	6304	11057	3180	705	3452	799	27236	10.19	

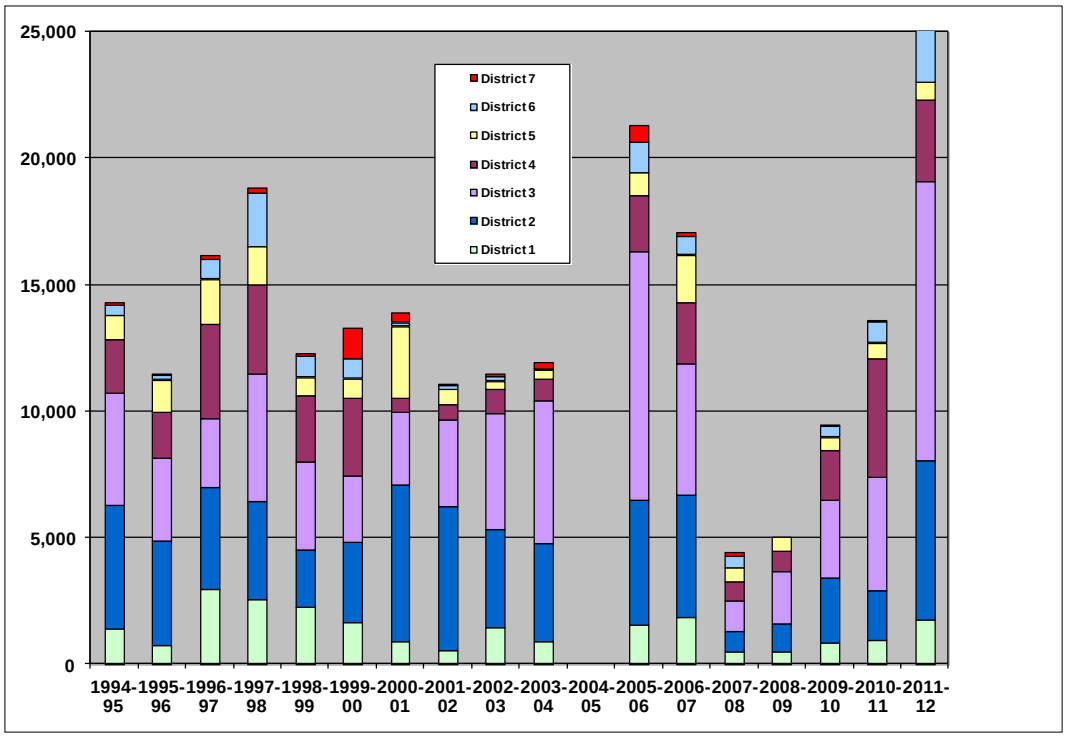

Figure 11. Statewide muskrat harvest by trapping district, 1994-95 to 2011-12.

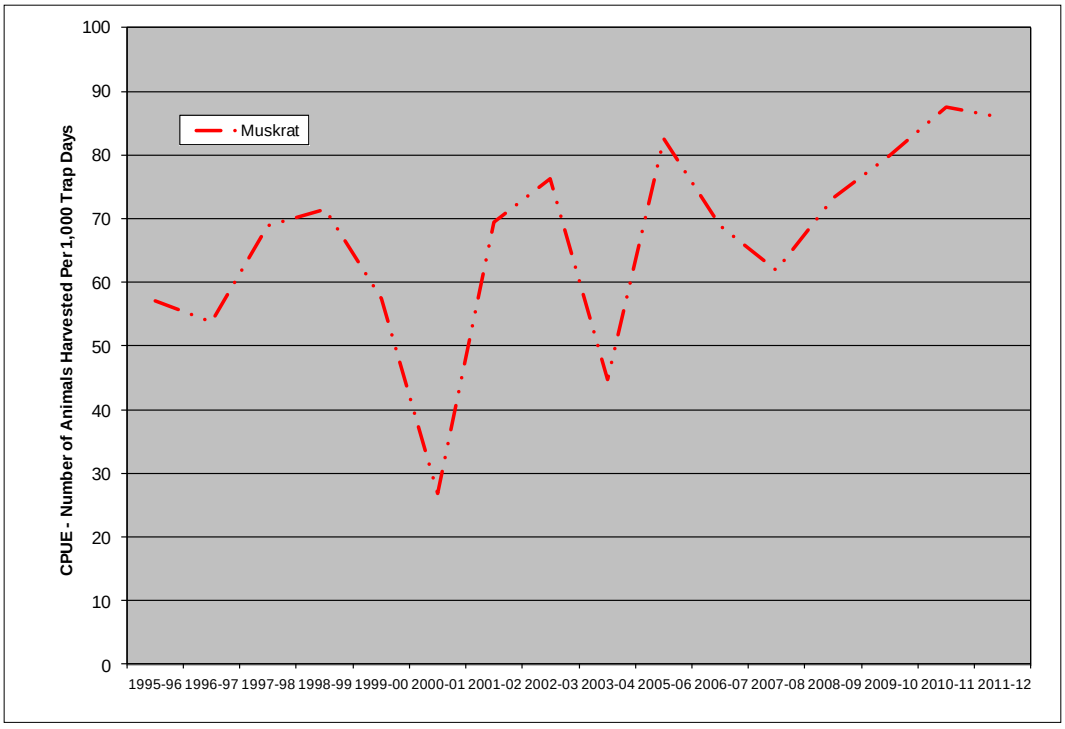

Figure 12. Statewide trend in muskrat harvest from CPUE, 1995-96 to 2011-12.

MINK

The statewide mink harvest continues to remain somewhat stable and has increased over the past several years. The 2011-12 estimated harvest of 872 mink is the highest in four years (Table 8). Mink harvest is considered to be somewhat correlated to interest in muskrat trapping, however this does not appear to be the case with the 2011-12 peak in muskrat harvest numbers. The estimated 2011-12 mink harvest was only 4% above the 10-year harvest average (Fig. 13), despite good pelt prices. The average value of mink pelts was the highest level in at least 18 years (Table 8). This average mink harvest may be a consequence of changing private ownership that precludes traditional access to small streams and wetlands, while muskrat can be found on public land wetlands.

Population monitoring activities for muskrat are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered as stable, despite the average estimated harvest during the 2011-12 season. When examining the trend in CPUE for mink, it appears harvest effort has generally remained stable, with some changes in harvest effort that may be related over time to interest in muskrat trapping, indicating that mink are being harvested at about a similar rate per unit of effort, at least until the until the 2011-12 season (Fig.14). A comparison of CPUE for mink with the other semi-aquatic species is shown in Fig. 51.

Table 8. Mink harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	187	215	274	234	97	121	17	1145	9.31	
1995-96	140	290	111	126	128	87	34	919	9.16	
1996-97	252	134	339	488	126	280	20	1638	14.48	
1997-98	220	174	381	248	289	133	49	1493	9.54	
1998-99	285	162	309	171	120	27	3	1078		
1999-00	218	183	428	325	38	476	41	1709		
2000-01	95	198	1038	103	57	15	30	1536	8.37	
2001-02	111	300	307	89	61	43	32	959	10.05	
2002-03	92	229	564	94	13	38	40	1071	10.51	
2003-04	43	290	331	71	45	3	25	808	11.01	
2004-05									2.25	
2005-06	62	151	563	92	92	340	6	1306	15.01	
2006-07	94	269	678	129	158	18	3	1348	12.88	
2007-08	122	101	80	51	86	182	98	1018	15.22	
2008-09	62	85	127	20	28	0	0	655	11.53	
2009-10	40	62	118	171	35	13	5	584	17.39	
2010-11	57	154	175	129	27	3	21	760	17.48	
2011-12	53	190	415	102	58	23	29	872	23.14	

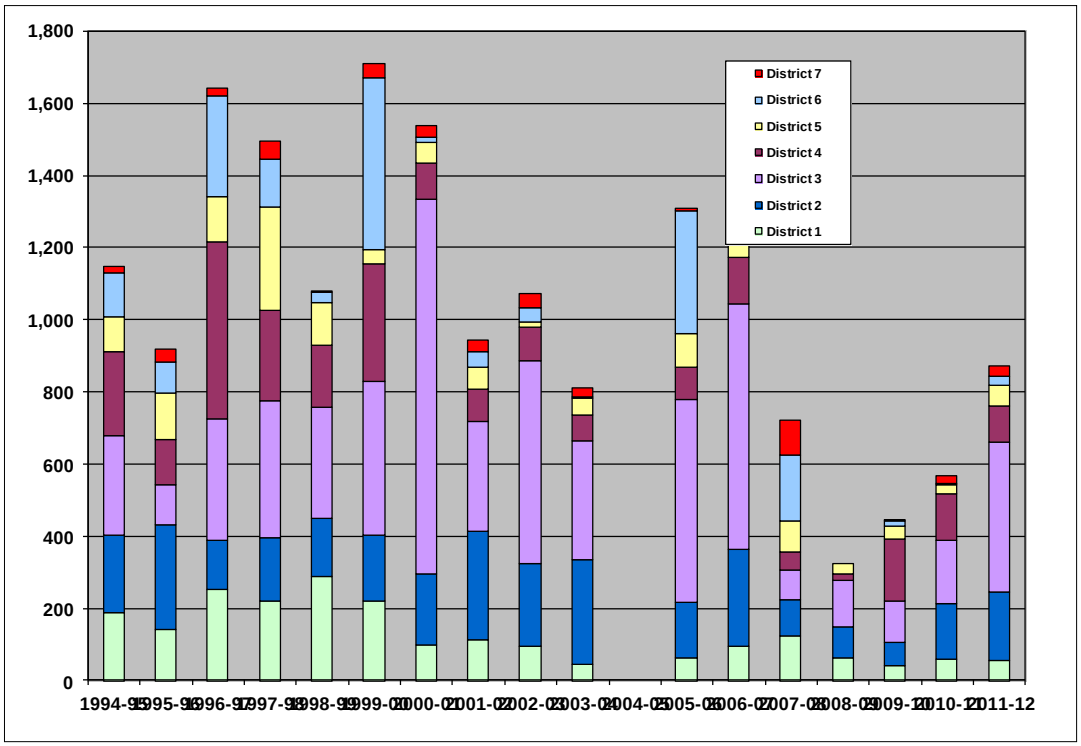

Figure 13. Statewide mink harvest by trapping district, 1994-95 to 2011-12.

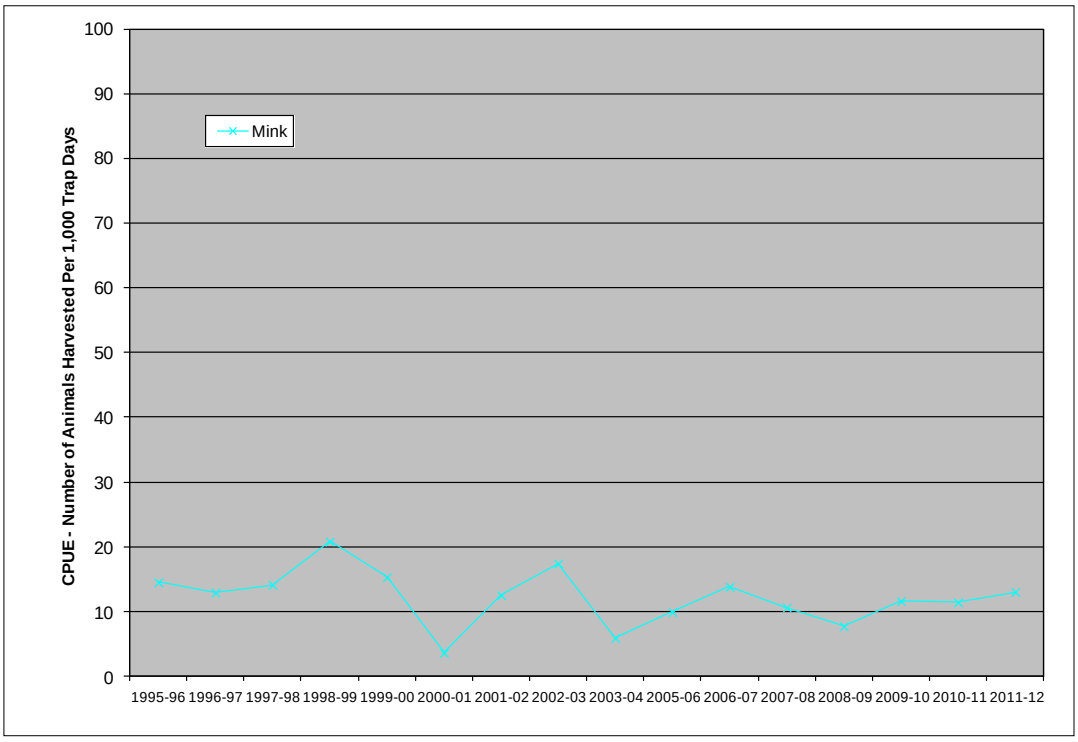

Figure 14. Statewide trend in mink harvest from CPUE, 1995-96 to 2011-12.

MARTEN

Marten are one of the five furbearers that are required to be reported, registered and pelt tagged so that the actual number of harvested animals is known. The statewide marten harvest continues to remain relatively stable, with an increasing harvest trend during the past several years including 2011-12 (Fig. 15). The 2011-12 harvest level of 1,083 marten was 9% above the 10-year average harvest and within the range of 711 to 1,141 over the past 10 years. The higher harvest in 2011-12 may correspond to a similar increase in pelt prices from the previous year (Table 9). Examining the trend in CPUE it appears harvest effort has decreased slightly on a statewide basis, indicating that fewer marten are being taken per unit of effort (Fig.16). Also, the distribution of the marten harvest is apparently shifting somewhat back to TD 1 in northwestern Montana as TD 2 and TD 3 in west central and southwestern Montana, respectively, remain similar to previous years (Fig. 15). Primary marten habitat is located almost exclusively on public lands.

Population monitoring for marten has consisted of analyzing harvest data and using the collection and analysis of biological data from the harvest sample through mandatory skull turn-in from trappers. However, marten skull collection was discontinued beginning with the 2008-09 season because of the difficulty in reconciling individual skulls to male/female categories for age data. The statewide trend in marten using CPUE appears to be a stable trend (Fig.16) and a comparison of marten CPUE with the other terrestrial species is presented in Fig 52. Although marten age data has not been available since 2006-07 season, the previous long-term trend in population parameters show an average of three juveniles per adult female (Fig. 17), a positive age structure bias to juveniles (Fig. 18), a stable sex ratio (Fig. 19), with a slight decrease in median age of adults and median age of total harvest at one and a half, indicating a strong proportion of juveniles in the population (Fig. 20). Again, these parameters indicate a relatively stable population that is likely maintaining itself on a statewide basis.

Table 9. Marten harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	868	315	131	4	5			1323	15.01	
1995-96	433	167	202	0	0			802	19.17	
1996-97	513	172	143	0	2			830	25.01	
1997-98	403	291	192	9	5			900	17.25	
1998-99	473	172	61	3	7			716		
1999-00	313	183	149	1	7			653	19.33	
2000-01	560	326	174	1	3			1064	19.95	
2001-02	359	220	266	0	0			845	18.71	
2002-03	419	241	390	3	0			1053	19.51	
2003-04	459	339	259	2	3			1062	20.51	
2004-05	290	374	560	3	21			1248	19.51	
2005-06	280	265	370	1	36			952	45.51	
2006-07	143	268	418	2	25			856	61.57	
2007-08	245	446	441	0	9			1141	77.29	
2008-09	170	366	282	0	26			844	37.58	
2009-10	99	402	192	0	18			711	47.76	
2010-11	184	363	333	0	52			932	61.98	
2011-12	353	420	308	2	1			1083	55.94	

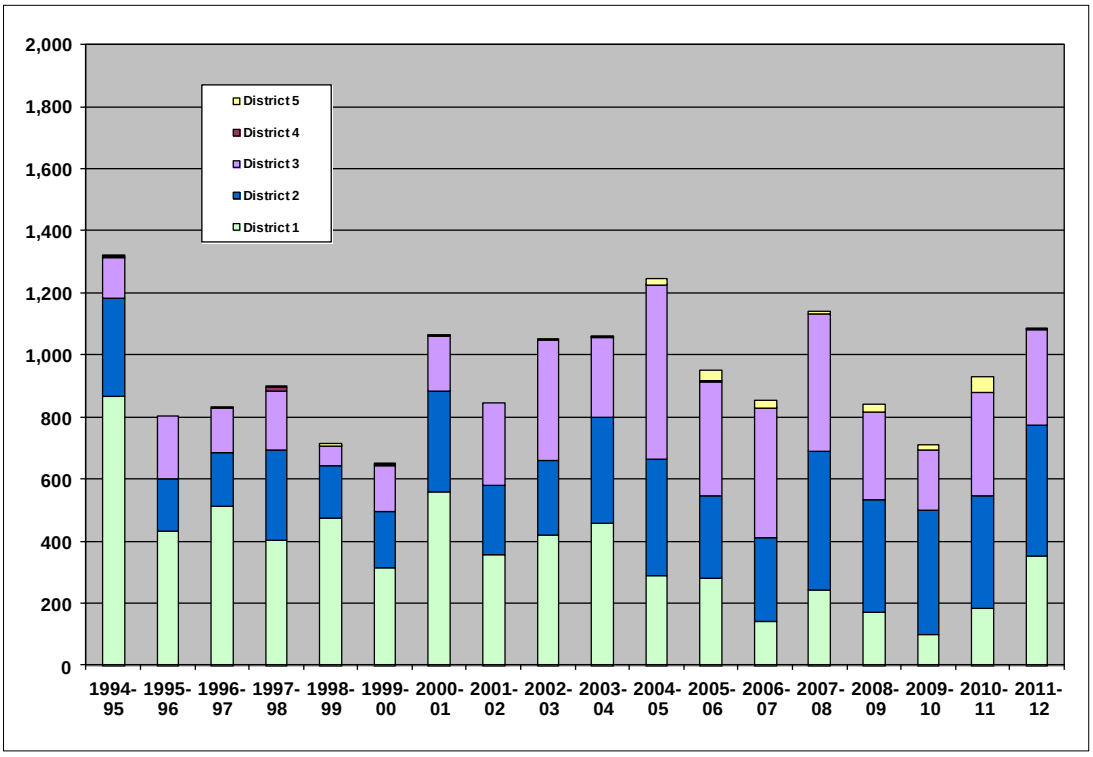

Figure 15. Statewide marten harvest by trapping district, 1994-95 to 2011-12.

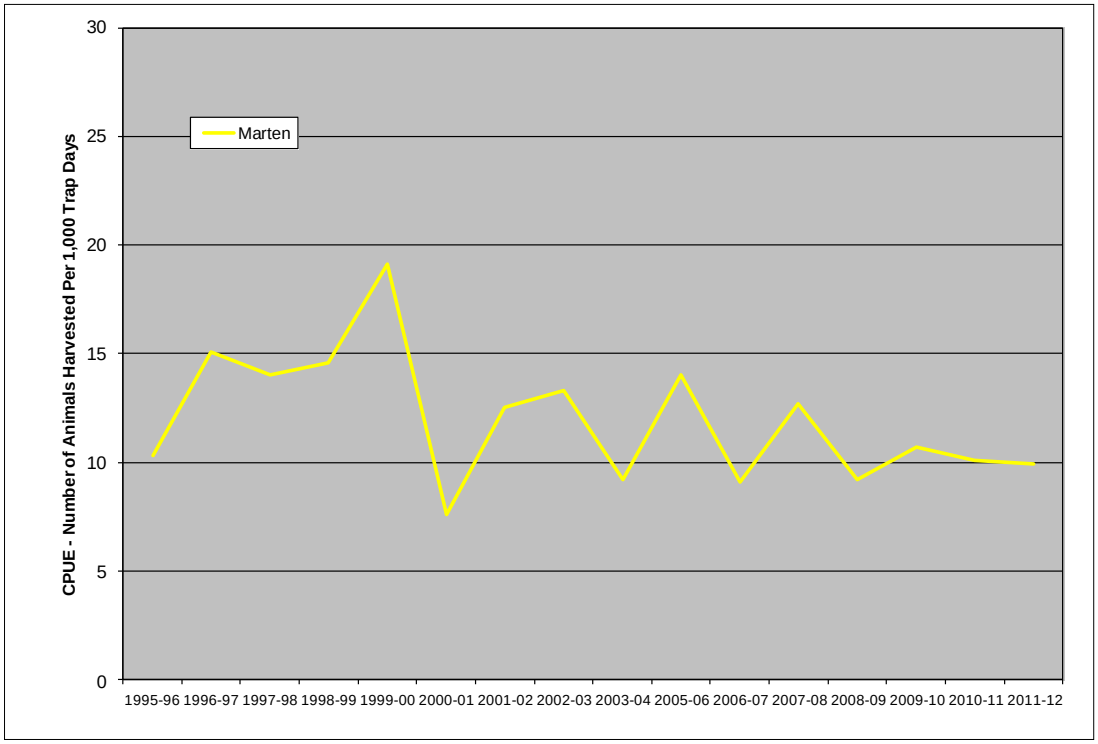

Figure 16. Statewide trend in marten harvest from CPUE, 1995-96 to 2011-12.

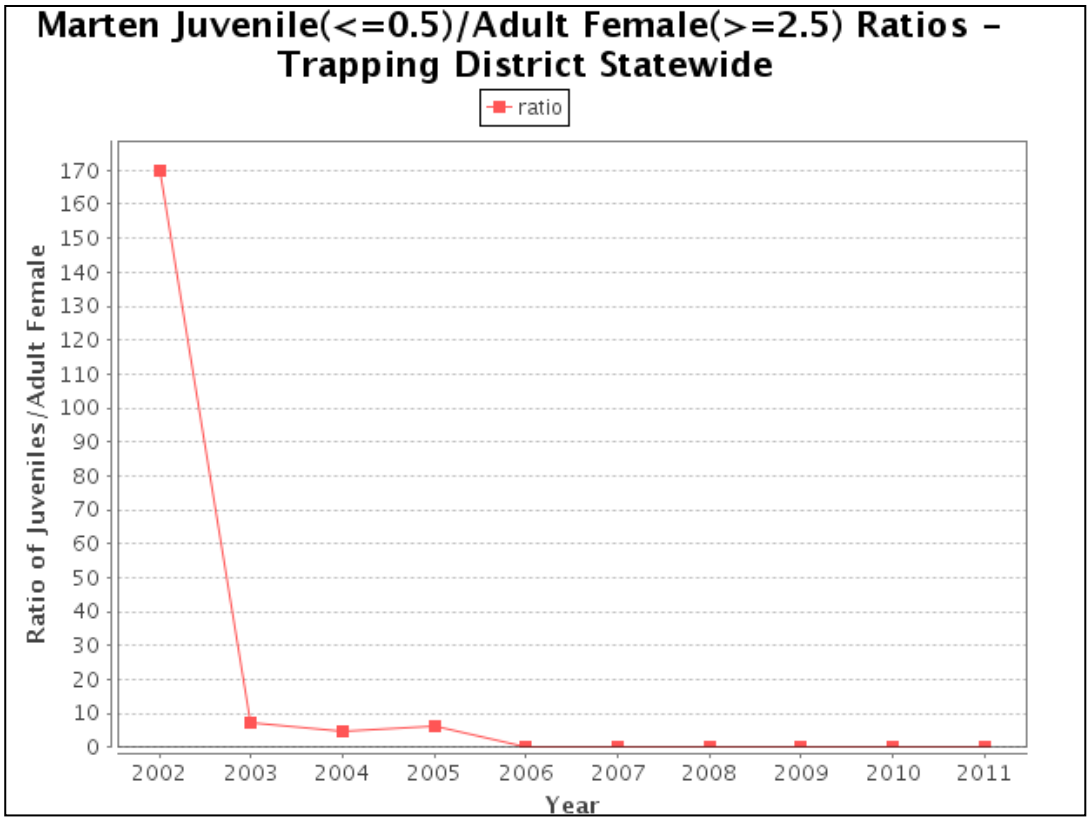

Figure 17. Marten population parameter of juveniles per adult female ratio, 2002-03 to 2011-12.

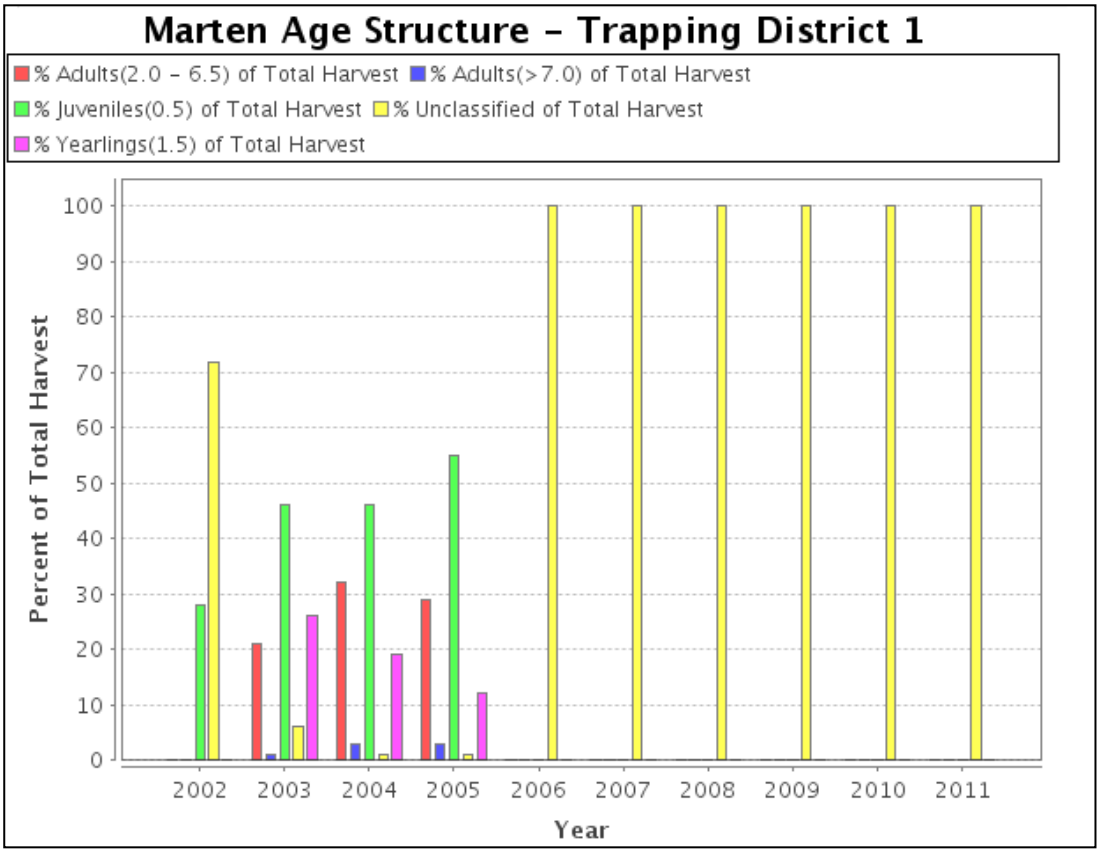

Figure 18. Marten population parameter of age structure, 2002-03 to 2011-12.

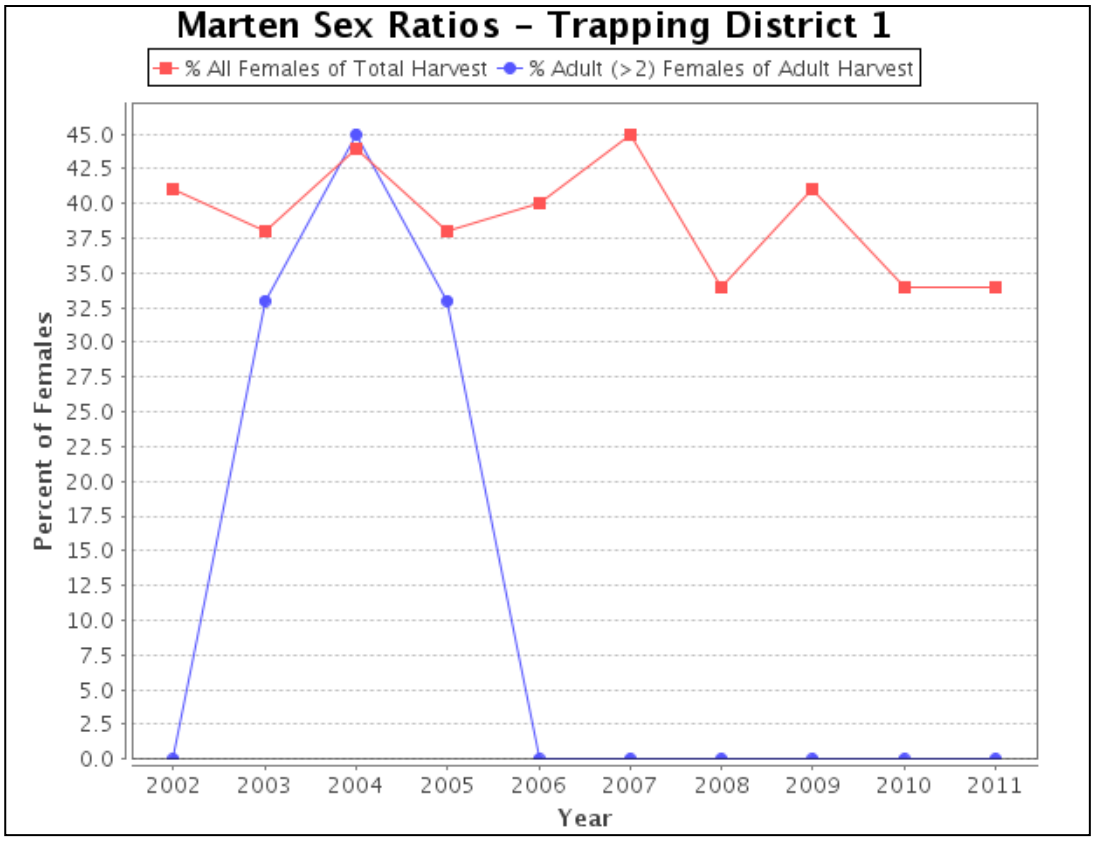

Figure 18. Marten population parameter of sex ratios, 2002-03 to 2011-12.

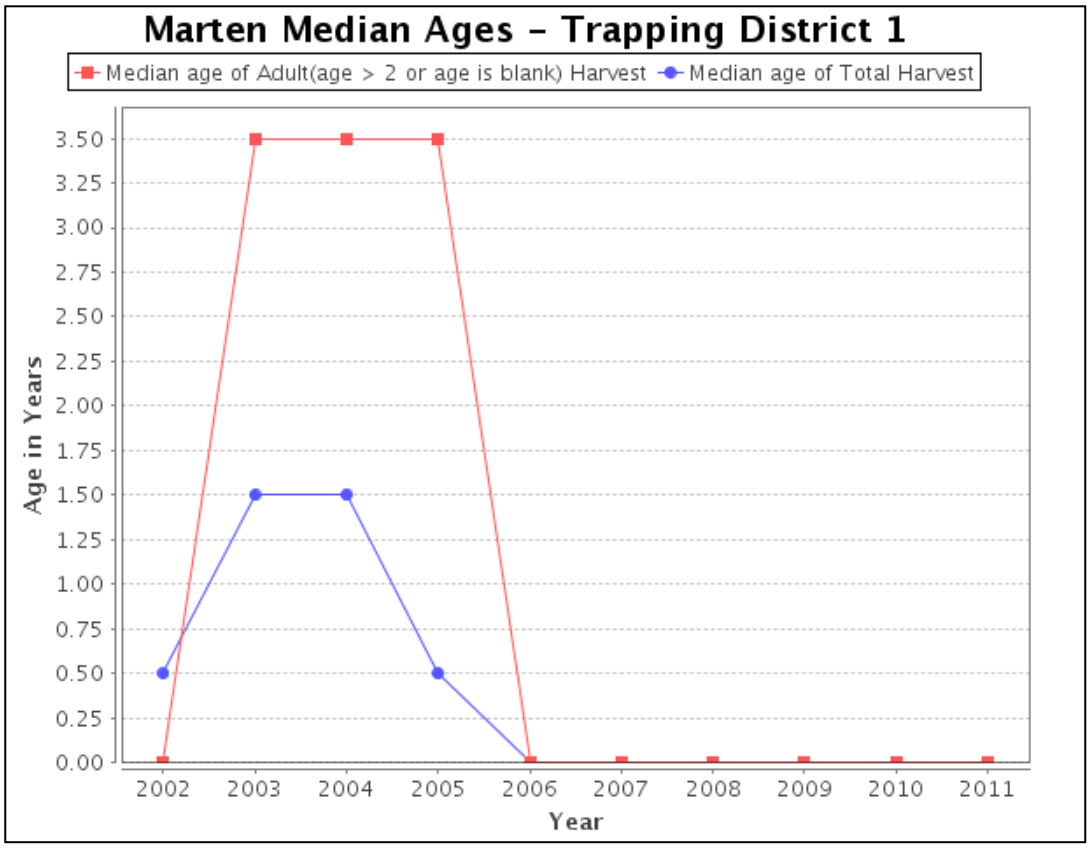

Figure 19. Marten population parameter of median ages, 2002-03 to 2011-12.

FISHER

The fisher harvest has been managed through a trapper limit of one and quotas in trapping districts (TD) 1 and 2. Over time, conservative adjustments have been made to quota levels that were based on harvest rates, population parameters and snow track survey data. These previous changes have provided a sustainable trapper harvest that is conservatively matched with maintenance of the current fisher population size and distribution relative to available habitats. A predictive habitat model indicates that moderate to high suitability fisher habitats comprise approximately 6,504 mi^2 in west central and northwestern Montana, with TD 2 having over 50% more high suitability habitat than TD 1. A female sub-quota is also in place of 2 females to add an additional measure of protection for the reproductive segment of the population, to further insure harvest has no influence on statewide population status. Given fisher distribution relative to habitat availability, fisher habitat capacity appears to be correlated with similar levels of occupancy that is not impacted by a history of highly managed harvest. Fisher are one of the five furbearers that are required to be reported, registered and pelt tagged so the actual number of harvested animals is known. The statewide fisher harvest continues to remain very stable (Fig. 21). The 2011-12 harvest level of 7 fisher was at the 10-year average annual harvest level. Under a quota the harvest of 7 animals during the 2011-12 season was maintained even with higher pelt prices (Table 10).

Population monitoring of fisher consists of analyzing harvest data and using the collection and analysis of biological data from the harvest sample through mandatory carcass turn-in from trappers. The trend in fisher harvest effort using CPUE is a stable trend (Fig.22) and a comparison of fisher CPUE with the other terrestrial species is presented in Fig 52. Harvested fishers provide a small sample size, so the population parameters are do not allow a lot of interpretation. However, the small amount of data that is available appears to show that the population trend from these parameters is about two juveniles per adult female (Fig. 23), a mixed age structure with a good representation of juveniles in most years (Fig. 24), a low female sex ratio in most years (Fig. 25), with a higher than expected median age of adults and expected median age of the total harvest (Fig. 26).

Table 10. Fisher harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	3	5						8		10
1995-96	0	2						2		10
1996-97	2	4						6		7
1997-98	1	6						7		7
1998-99	2	6						8		7
1999-00	0	5						5		7
2000-01	0	7						7	28.62	7
2001-02	2	5						7	25.12	7
2002-03	2	5						7	25.01	7
2003-04	2	6						8	28.11	7
2004-05	0	7						7	28.25	7
2005-06	3	6						9	35.01	7
2006-07	2	5						7	74.31	7
2007-08	1	5						6	87.51	7
2008-09	1	6						7	42.83	7
2009-10	1	5						6	50.08	7
2010-11	1	7						8	47.58	7
2011-12	2	5						7	74.99	7

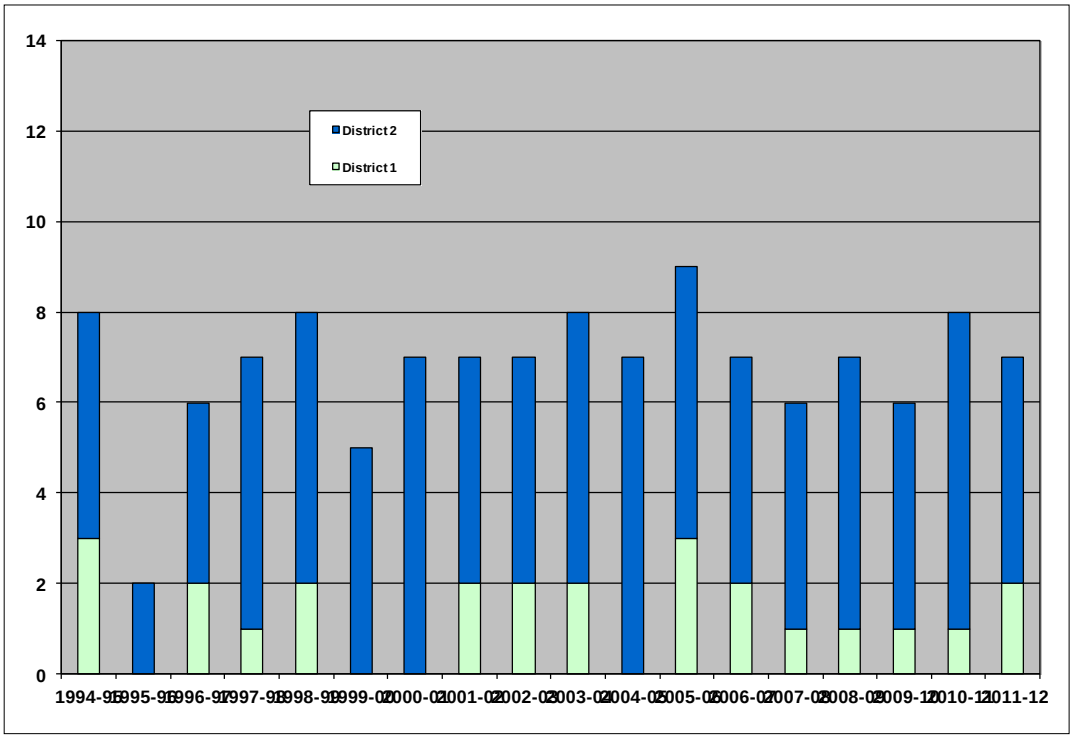

Figure 21. Statewide fisher harvest by trapping district, 1994-95 to 2011-12.

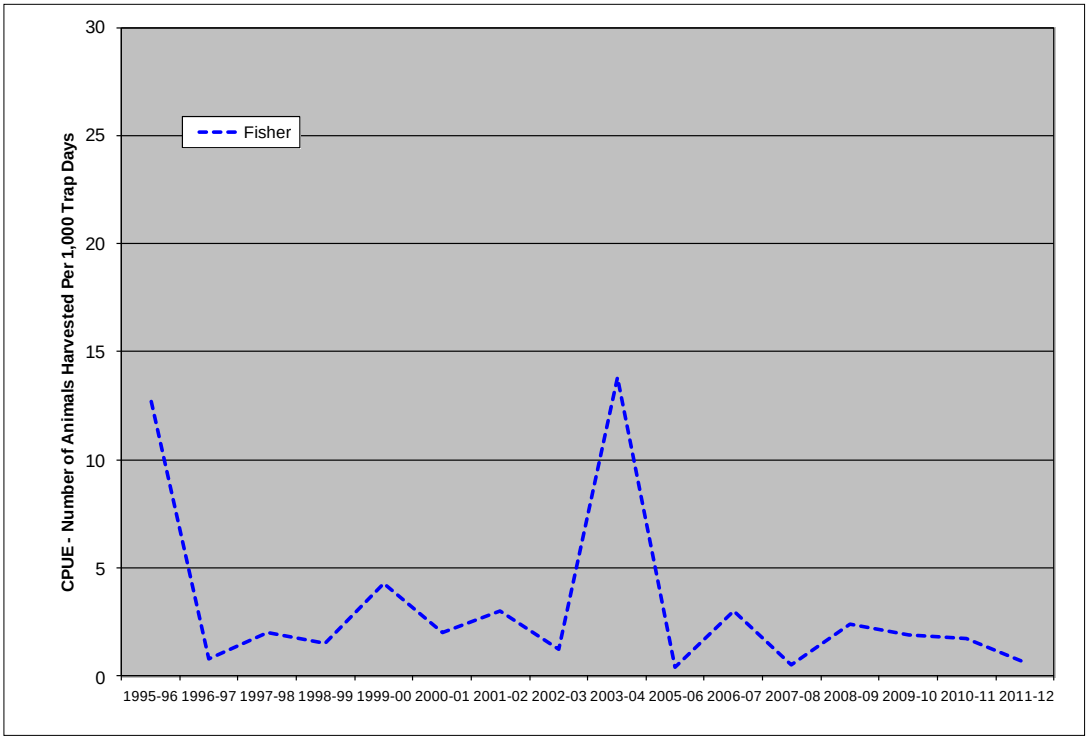

Figure 22. Statewide trend in fisher harvest from CPUE, 1995-96 to 2011-12.

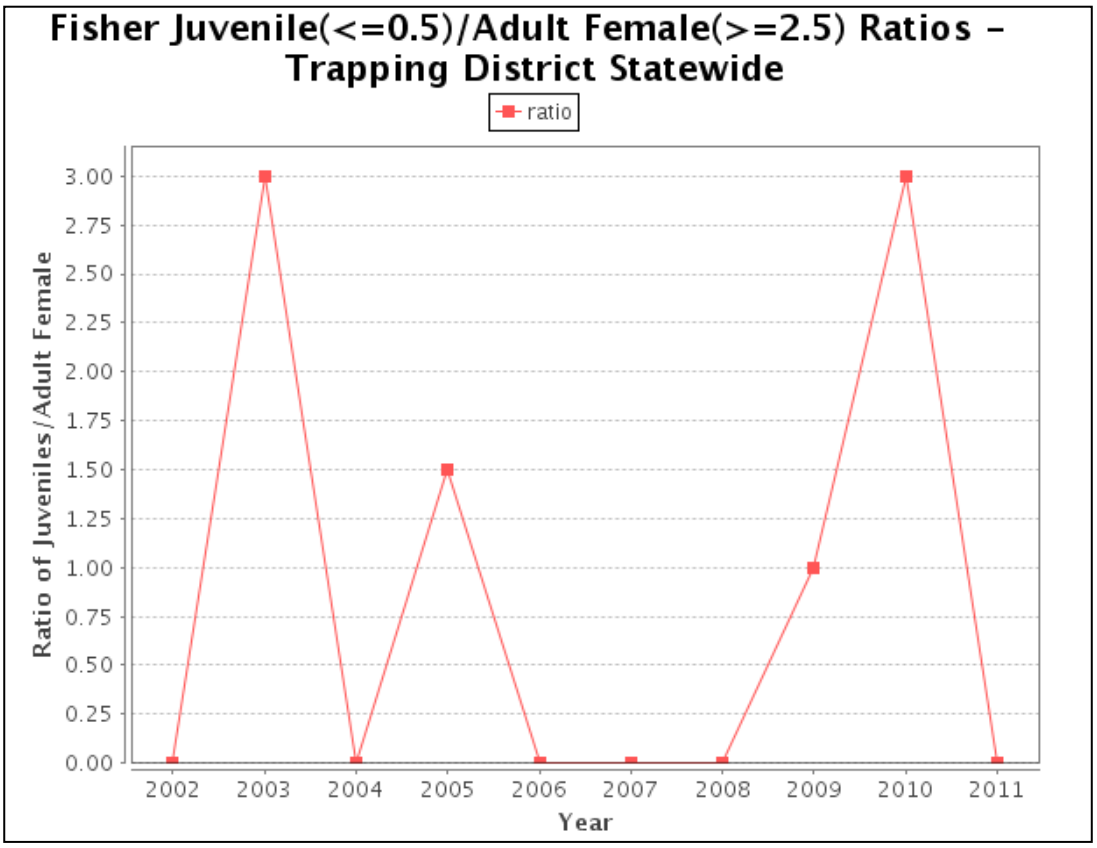

Figure 23. Fisher population parameters of juveniles per adult female ratio, 2002-03 to 2011-12.

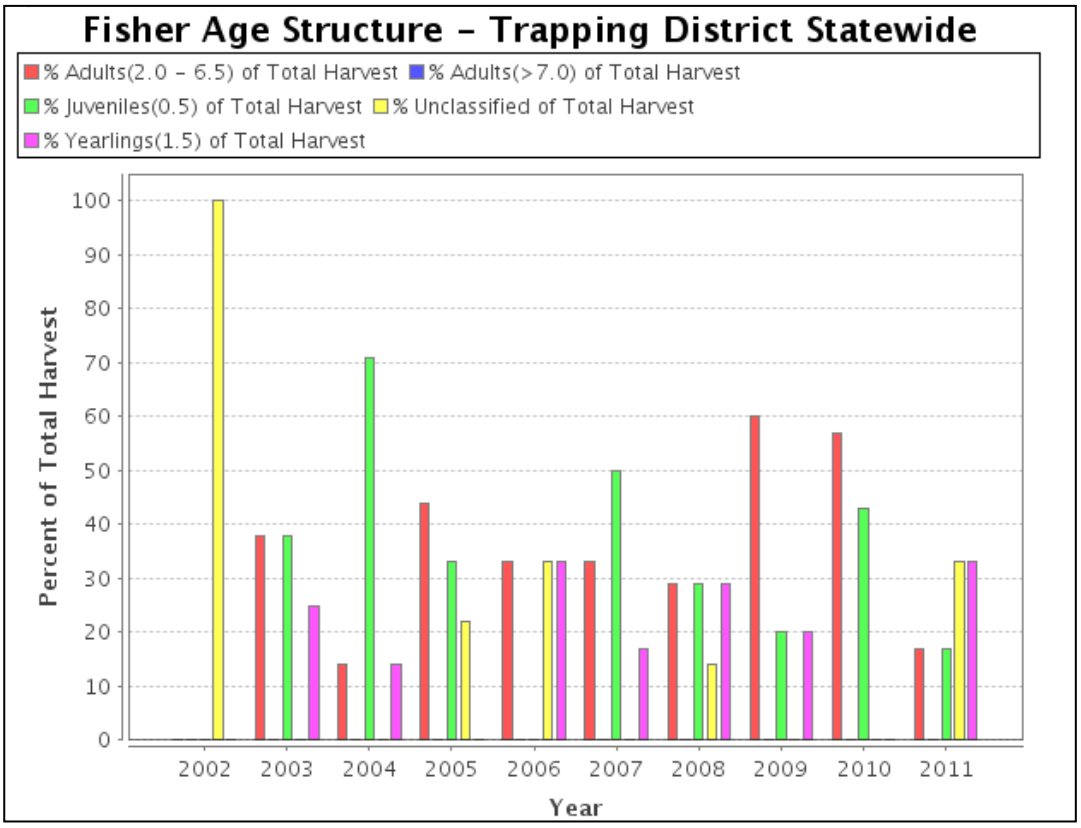

Figure 24. Fisher population parameter of age structure, 2002-03 to 2011-12.

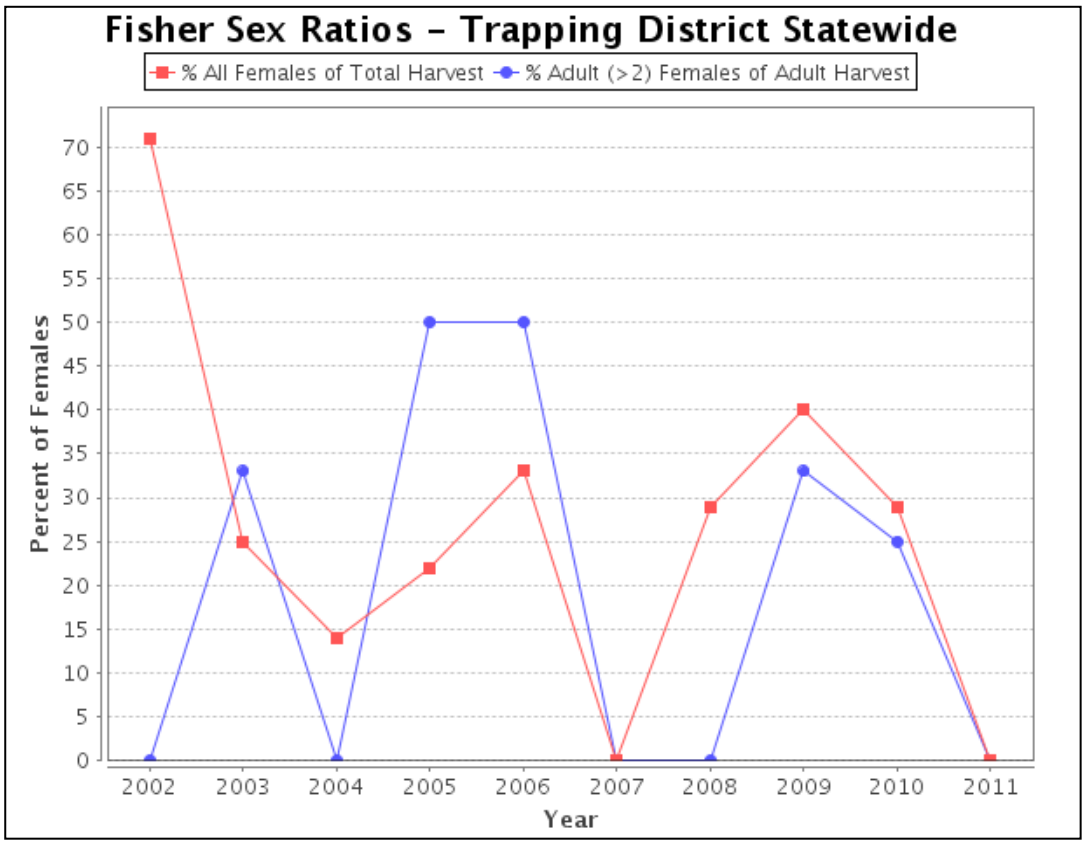

Figure 25. Fisher population parameter of sex ratios, 2002-03 to 2011-12.

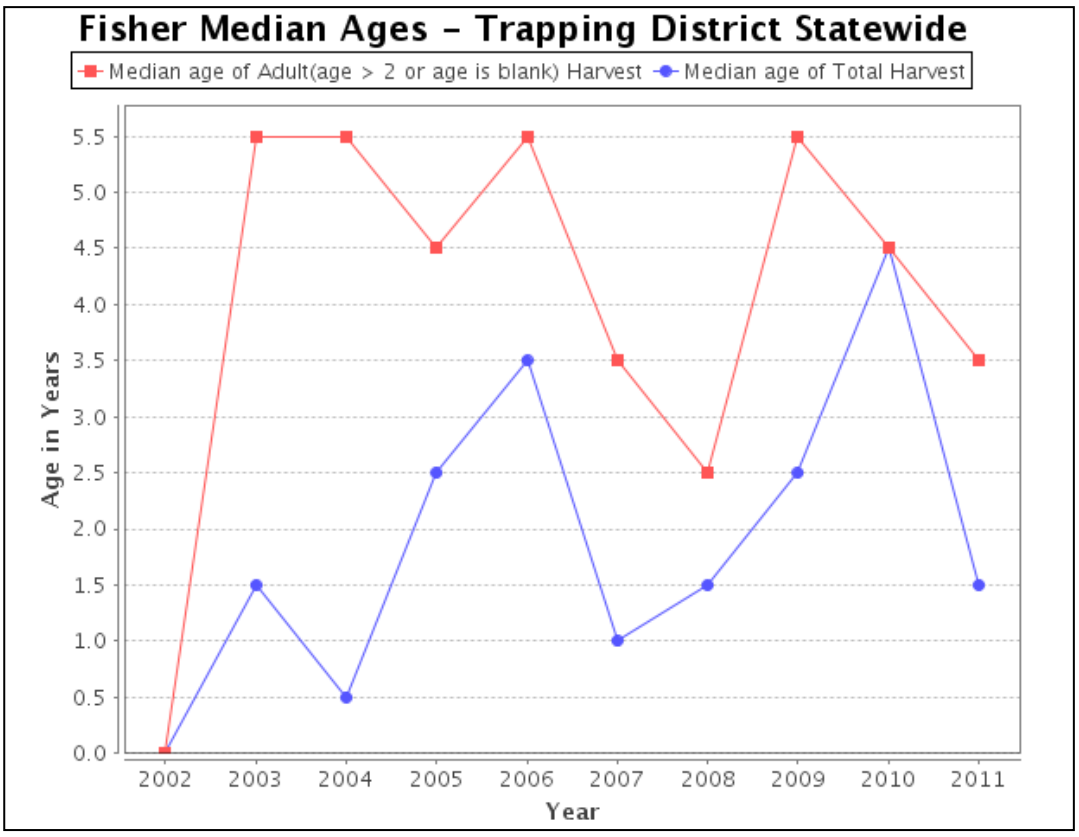

Figure 26. Fisher population parameter of median ages, 2002—03 to 2011-12.

WOLVERINE

Since wolverines were first classified as a state furbearer in the late 1970s, harvest was regulated by a one wolverine per trapper limit. Wolverines were considered to be recovered in Montana from a low point in the 1930s and now occupied the western third of the state. A study in the mid-1970s found that wolverines were at relatively high densities in the South Fork of the Flathead River drainage. State harvest during a 30-year period was considered stable and somewhat self-regulating with an average of 10.5 wolverine harvested annually (range 2 - 22 per year) during the period. However, recent research on the species has provided new information regarding wolverine ecology, better defined wolverine habitat, examined genetic relationships, survival, and landscape connectivity. FWP's furbearer program provided funds and logistical support to these studies. Research results were used to develop a habitat model for Montana with corresponding population numbers and estimated sustainable harvest rates which were considered sustainable at a more regulated level. Therefore, FWP changed trapping regulations to reflect emerging information and additional data from wolverine research that suggested more conservative quota levels were appropriate. Quotas were adjusted to associate quota levels with the three largest intact ecosystems in the state (Northern Continental Divide, Bitterroot-Idaho and Greater Yellowstone) and to recognize the lower population sizes in insular mountain ranges in the central portion of Montana.. Further analysis tied to genetic make-up of the state's wolverine population, the issue of maintaining population connectivity, and recognizing the core population areas of the three major ecosystems led to additional regulation changes. These most recent adjustments included delineating four wolverine management units (WMUs) with the three major ecosystems having reduced quotas for a statewide total of 5 animals and a central Montana WMU with a quota of zero to promote population connectivity between the three major ecosystems in the state where harvest is allowed. Managing the WMU /quota system has maintained biologically sound harvest opportunity for trappers that does not jeopardize conservation of the species.

Wolverines are one of five furbearers that are required to be reported, registered and pelt tagged so that the actual number of harvested animals is known (Table 11). The statewide wolverine harvest continues to remain stable (Fig. 27). Conservative quotas implemented beginning with the 2008-09 season were reflected in the harvest of two wolverines during the 2011-12 season, which was 75% below the 10-year average harvest. This restrictive quota system has achieved the management goal of redistributing and lowering the wolverine harvest in the state. Harvest of wolverine is considered independent of pelt prices (Table 10). Examining the trend in CPUE it appears harvest effort has been relatively stable to more recently declining on a statewide basis, indicating that less wolverine are being taken per unit of effort, which would be expected (Fig.28).

Population monitoring for wolverine consists of analyzing harvest data and using the collection and analysis of biological data from the harvest sample through mandatory carcass turn-in from trappers. The statewide trend in wolverine using CPUE is a stable to declining trend (Fig.28) and a comparison of wolverine CPUE with the other terrestrial species is presented in Fig 52. The harvest sample of wolverine provides only a very small sample size, so population parameters are more difficult to interpret. However, the long-term trend in population parameters have showed about .5 juveniles per adult female (Fig. 29), a mixed age structure with a relatively continuous representation of juveniles (Fig. 30), about a 50% female sex ratio (Fig. 31), with a median age of adults higher than the median age of the total harvest (Fig. 32).

Table 11. Wolverine harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	2	1	5	1	0			9		
1995-96	5	2	4	1	0			12	200.01	
1996-97	6	0	3	2	1			12		
1997-98	1	5	6	3	0			15		
1998-99	0	2	2	5	0			9		
1999-00	0	0	3	1	0			4		
2000-01	1	6	4	2	0			14	212.94	
2001-02	1	0	9	0	0			10	225.01	
2002-03	2	2	8	2	1			15	225.01	
2003-04	1	2	3	2	2			10	275.01	
2004-05	3	1	6	1	0			11	275.01	12
2005-06	0	4	4	2	1			11	300.01	12
2006-07	2	0	5	2	0			9	217.85	12
2007-08	2	1	5	1	0			9	280.35	10
2008-09	2	0	0	2	0			4	254.67	5
2009-10	1	1	1	0	0			3	211.42	5
2010-11	0	3	1	0	0			4	253.15	5
2011-12	0	2	0	0	0			2	319.67	5

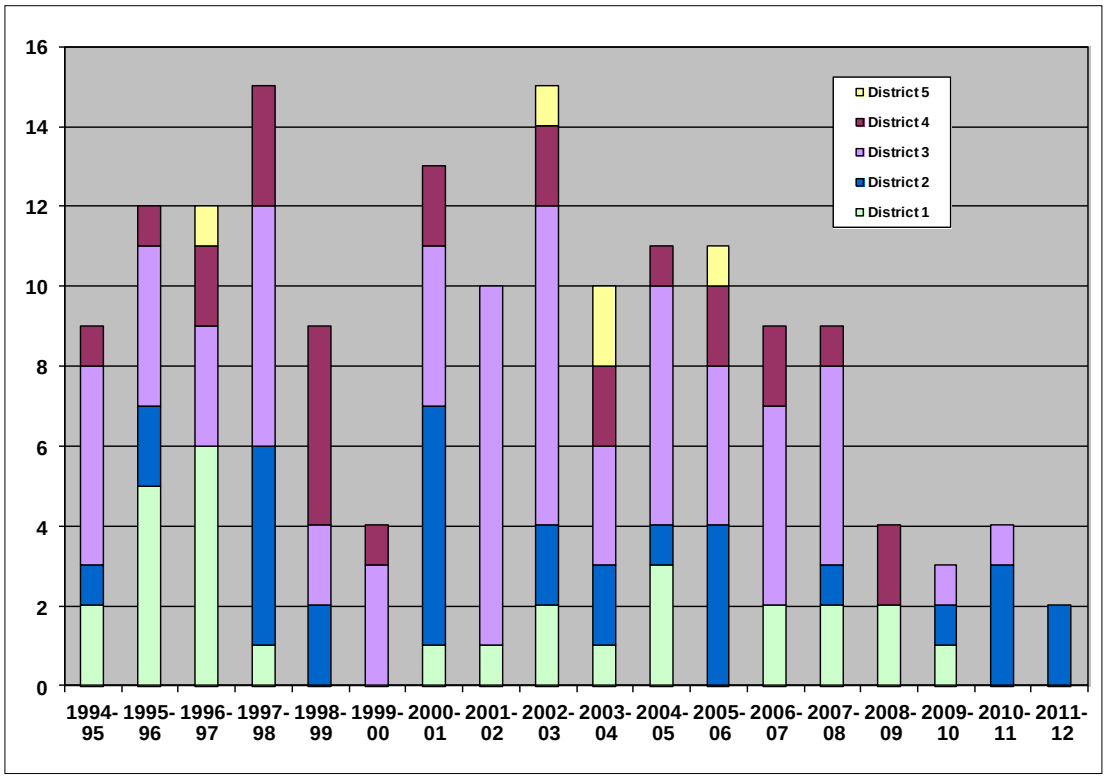

Figure 27. Statewide wolverine harvest by trapping district, 1994-95 to 2011-12.

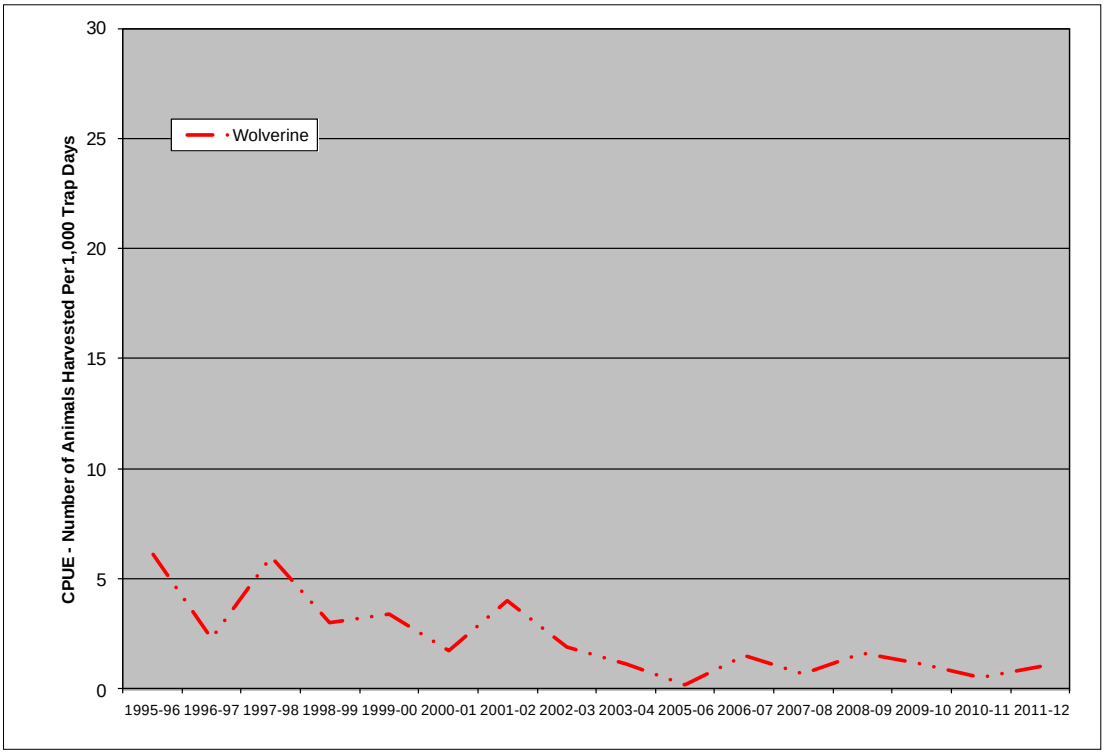

Figure 28. Statewide trend in wolverine harvest from CPUE, 1995-96 to 2011-12.

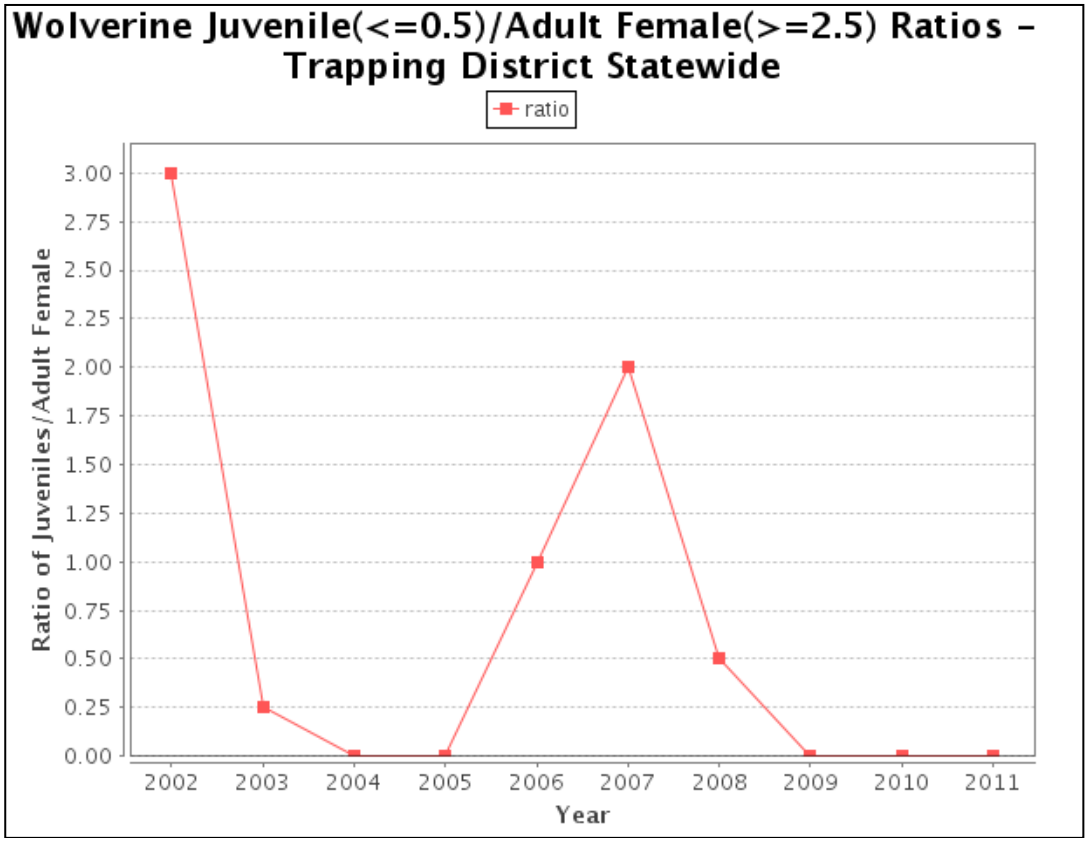

Figure 29. Wolverine population parameter of juveniles per adult female ratio, 2002-03 to 2011-12.

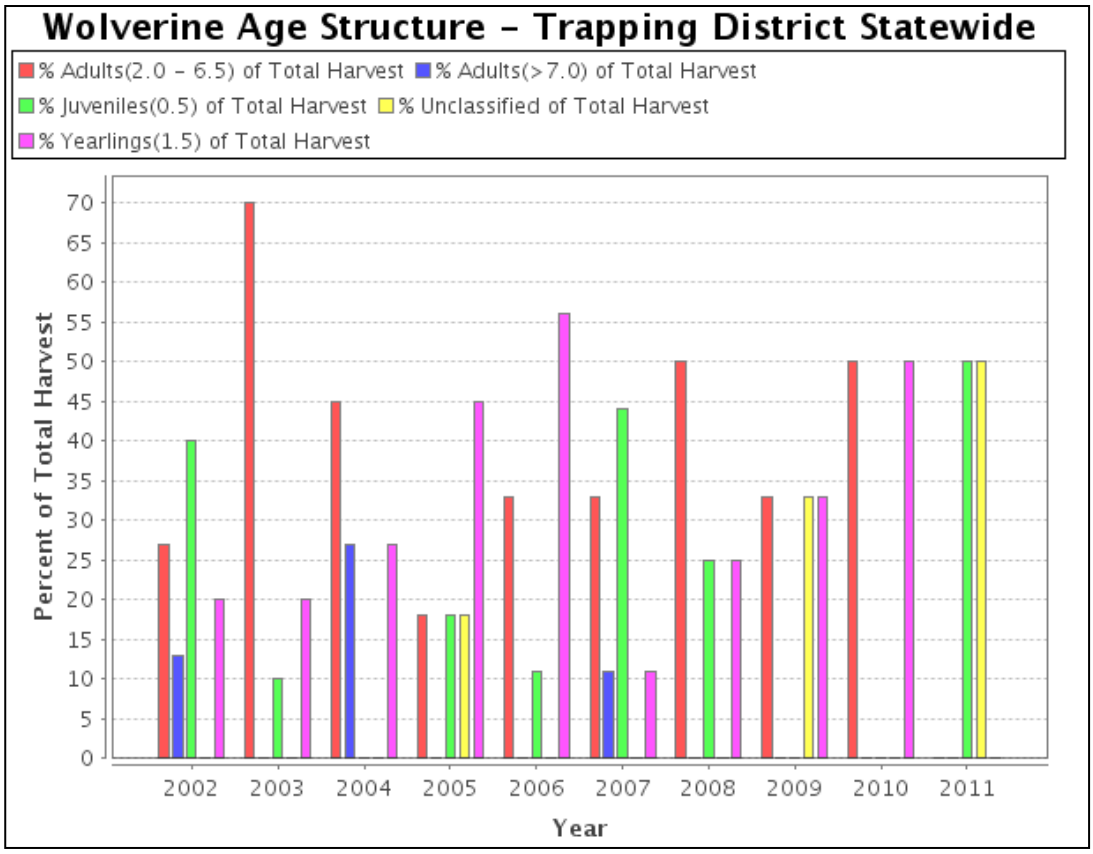

Figure 30. Wolverine population parameter of age structure, 2002-03 to 2011-12.

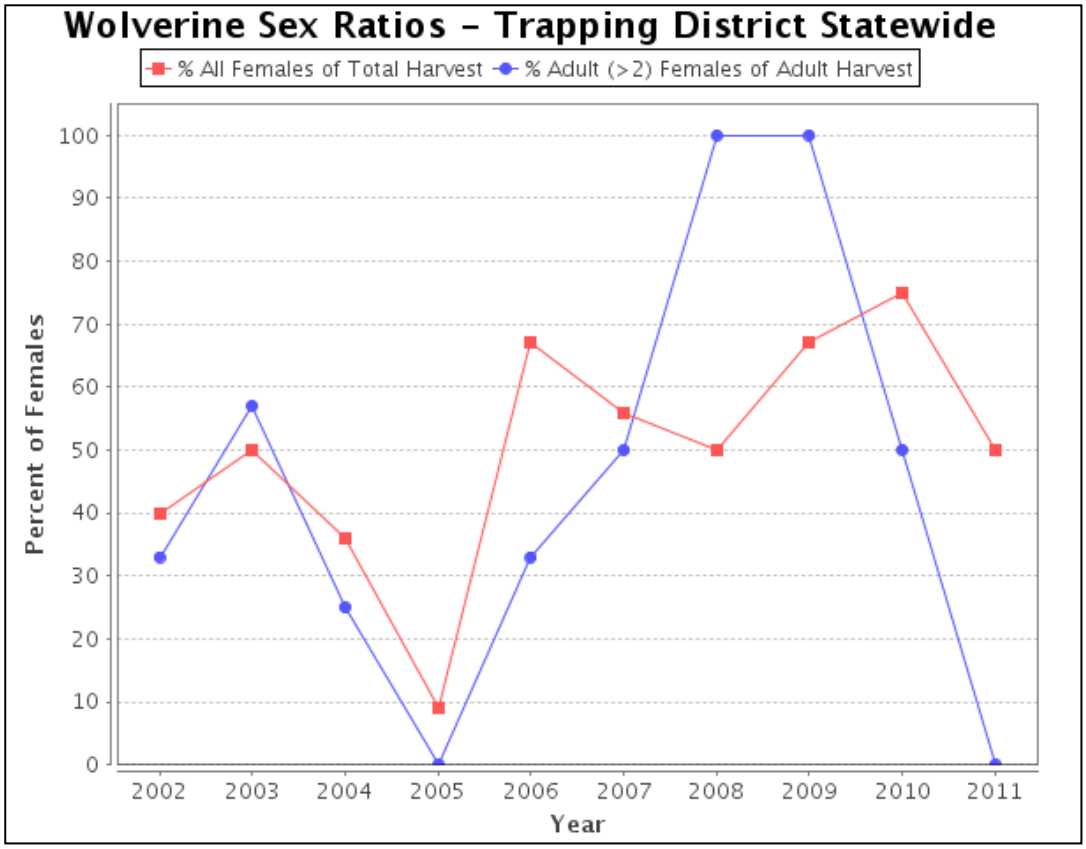

Figure 31. Wolverine population parameter of sex ratios, 2002-03 to 2011-12.

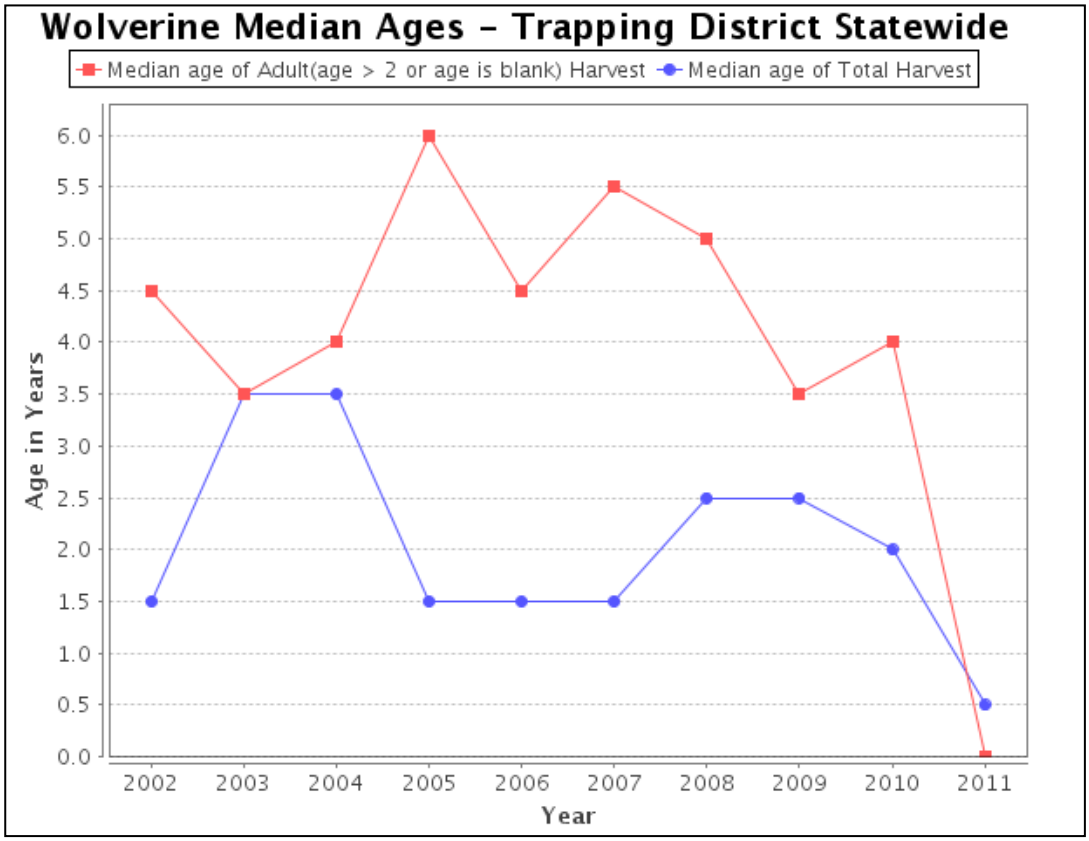

Figure 32. Wolverine population parameter of median ages, 2002-03 to 2011-12.

BOBCAT

Bobcats are one of five furbearers that are required to be registered and pelt tagged so that the actual number of harvested animals is known (Table 12). The bobcat harvest has been always been managed through trapping district (TD) quotas with changes in trapper limits or removal of trapper limits in some districts. In the late 1990s trapper limits were increased in response to low trapper interest in bobcats because of relatively low pelt prices (Table 12) and later removed in the eastern districts (TD 4 – 7). Trapper limits were retained in the western three TDs (TD 1-3) but have varied in the trapper limit number depending on trapper interest to distribute harvest more equitable. Adjustments in bobcat quotas have been used as a management tool to maintain healthy bobcat populations while providing opportunity and flexibility to harvest bobcat by the trapping community. As bobcat populations in the state have increased over time along with trapper interest, TD quotas have generally increased proportionately. The statewide total quota has increased from 1,415 in 1994-95 to 2,480 in 2008-09 and 1,925 during the 2011-12 season (Table 12). The bobcat harvest has increased from 1,052 in 1994-95 to 2,428 in 2008-09 and 1975 in 2011-12 (Fig. 33). Pelt prices have jumped dramatically beginning with the 2003-04 season and continue to remain at a high level through 2011-12 (Table 12). Examining the trend in CPUE it appears harvest effort has been stable to slightly declining, indicating that fewer bobcat are being taken per unit of effort (Fig.34).

The statewide trend in bobcat using CPUE is declining slightly (Fig.34) and a comparison of bobcat CPUE with the other terrestrial species is presented in Fig 52. Population monitoring for bobcat consists of analyzing harvest data and the collection and analysis of biological data from the harvest sample through mandatory skull turn-in from trappers to extract a tooth to determine age. Population parameters show a recent upward trend in juveniles per adult female (Fig. 35), an older age structure (Fig. 36), less than a 50% female sex ratio (Fig. 37), and an increasing trend in the median age of the total harvest (Fig. 38). Again, these parameters indicate a stable to a somewhat declining population trend on a statewide basis.

Table 12. Bobcat harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	148	117	121	145	157	75	289	1052	81.75	1415
1995-96	169	113	105	105	109	12	149	762	75.42	1440
1996-97	166	108	133	174	165	45	250	1041	124.05	1440
1997-98	167	158	139	163	191	40	348	1206	95.25	1490
1998-99	173	159	134	133	197	68	229	1093	85.51	1490
1999-00	199	170	145	184	212	91	410	1411	98.67	1510
2000-01	222	168	128	173	230	86	391	1398	106.05	1630
2001-02	244	178	173	177	267	121	542	1702	135.25	1730
2002-03	201	146	199	193	315	135	597	1786	203.01	1805
2003-04	210	182	229	211	356	88	507	1783	280.25	1880
2004-05	225	172	218	312	424	135	628	2114	325.01	2030
2005-06	230	158	291	287	392	122	721	2201	345.01	2255
2006-07	243	177	294	320	426	91	677	2228	257.33	2255
2007-08	264	182	314	316	489	100	724	2389	449.45	2355
2008-09	258	184	292	298	503	71	822	2428	281.35	2480
2009-10	248	108	203	214	487	42	465	1767	346.54	2275
2010-11	278	113	216	245	406	26	360	1644	411.84	2175
2011-12	259	104	275	311	308	91	627	1975	426.31	1925

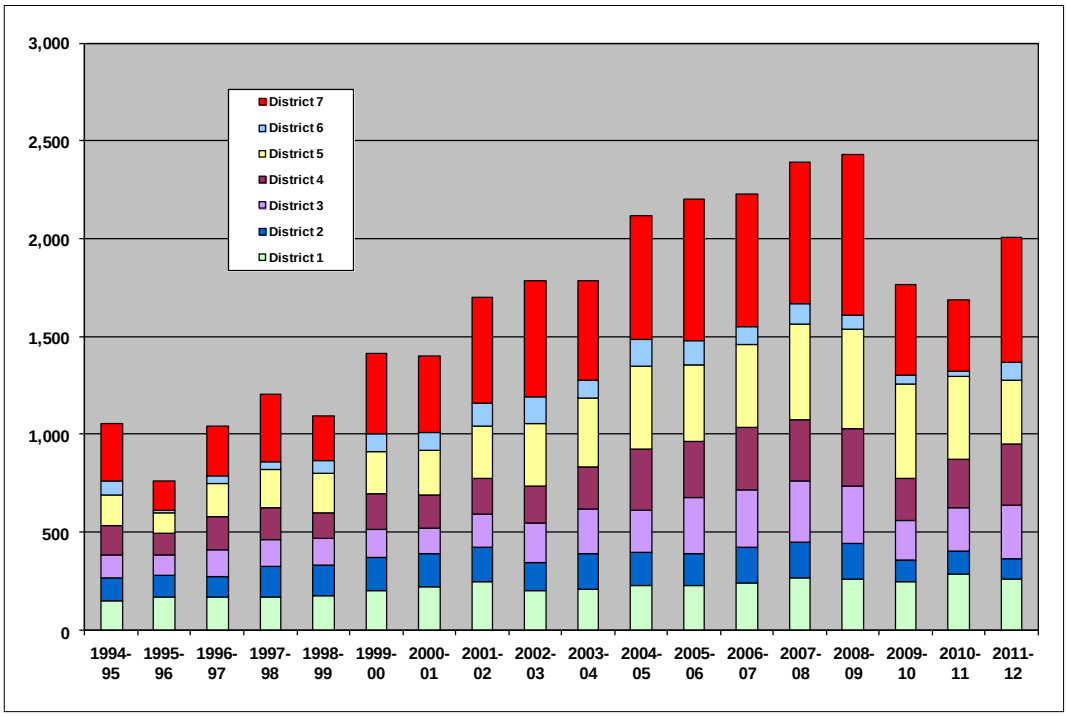

Figure 33. Statewide bobcat harvest by trapping district, 1994-95 to 2011-12

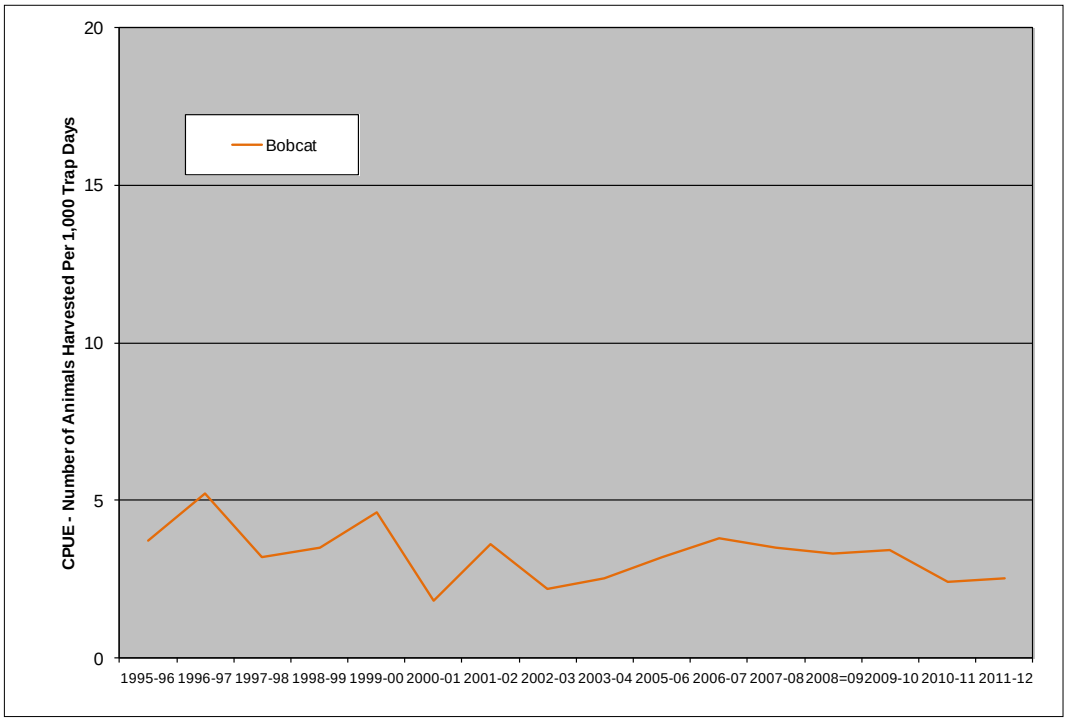

Figure 34. Statewide trend in bobcat harvest from CPUE, 1995-96 to 2011-12.

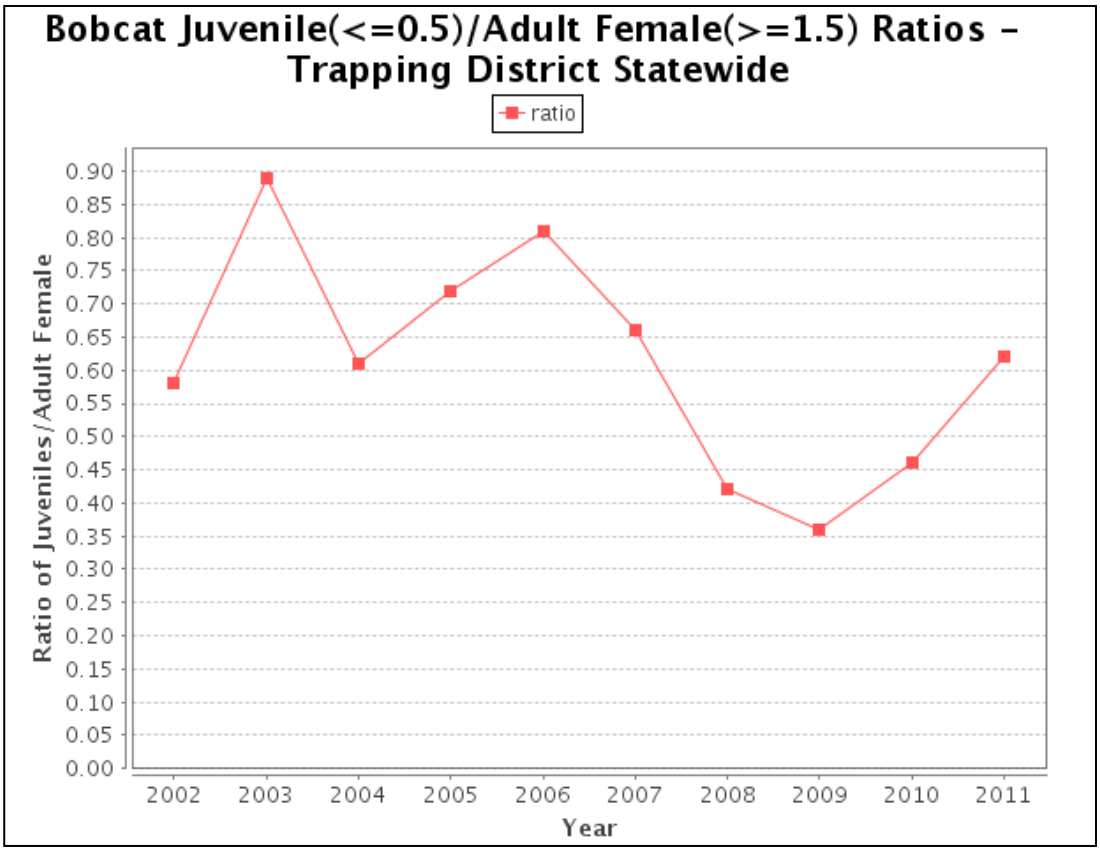

Figure 35. Bobcat population parameter of juvenile per adult female ratios, 2002-03 to 2011-12.

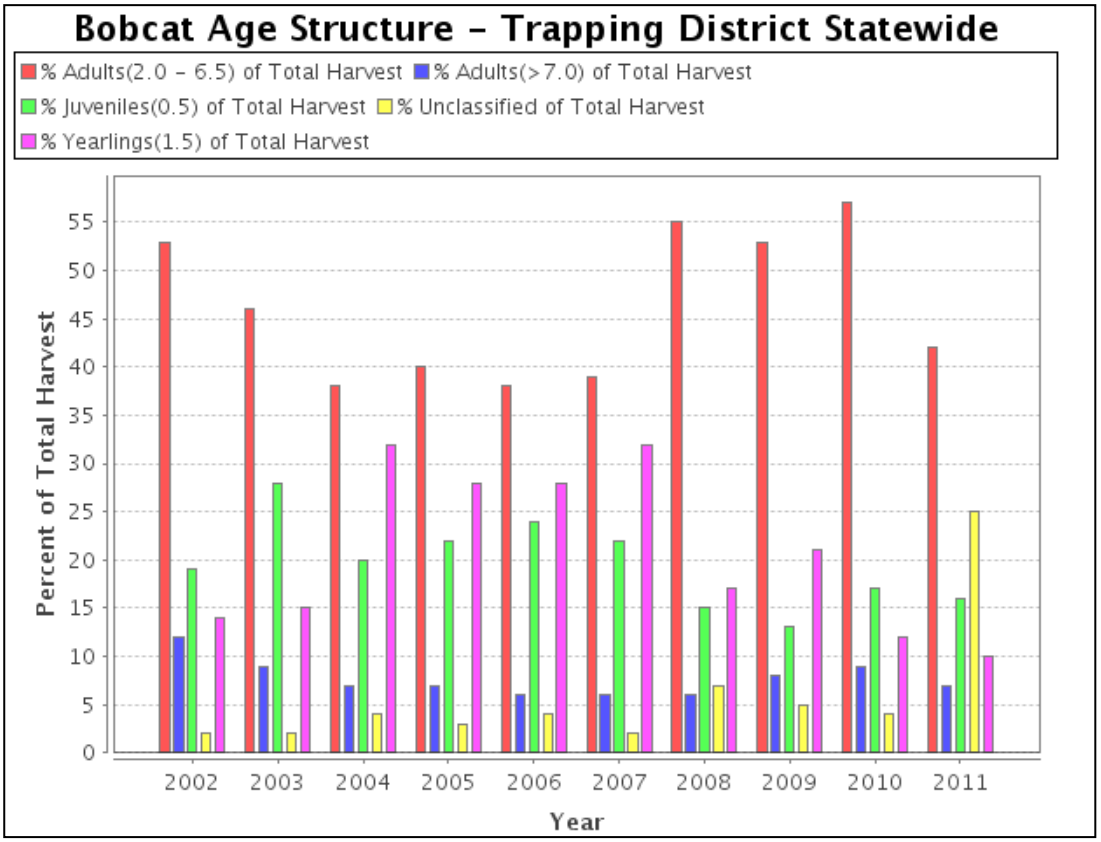

Figure 36. Bobcat population parameter of age structure, 2002-03 to 2011-12.

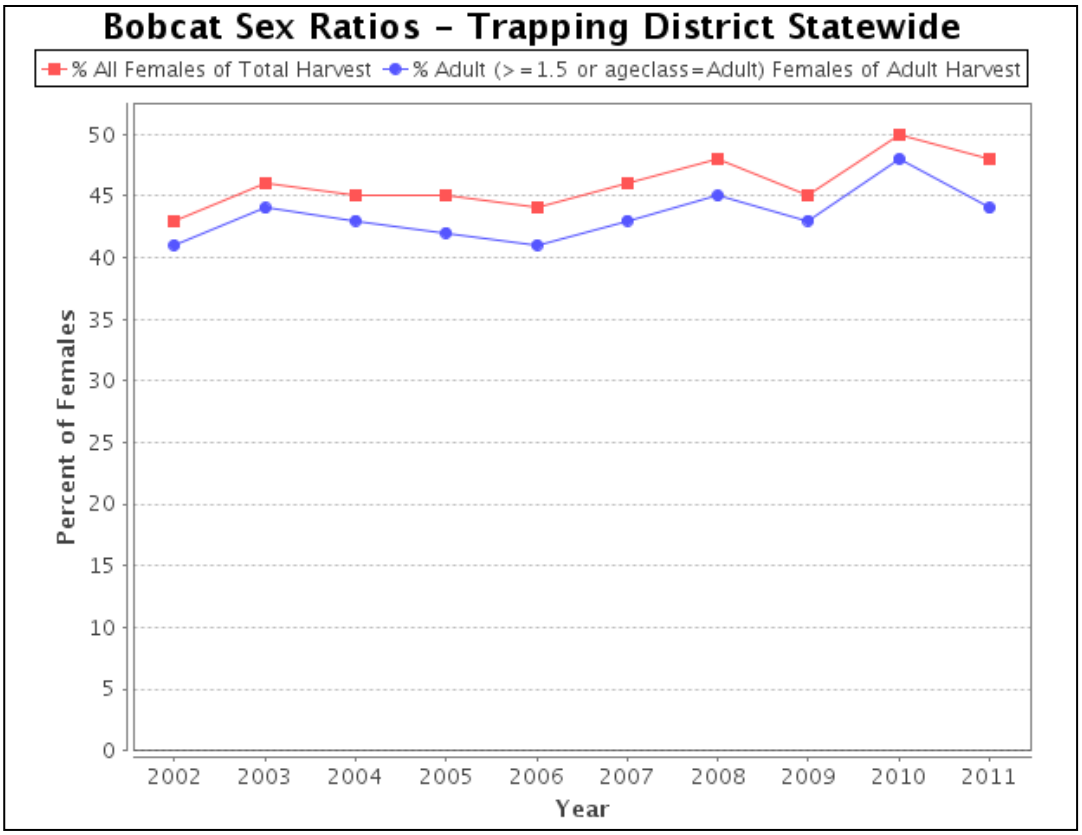

Figure 37. Bobcat population parameter of sex ratios, 2002-03 to 2011-12.

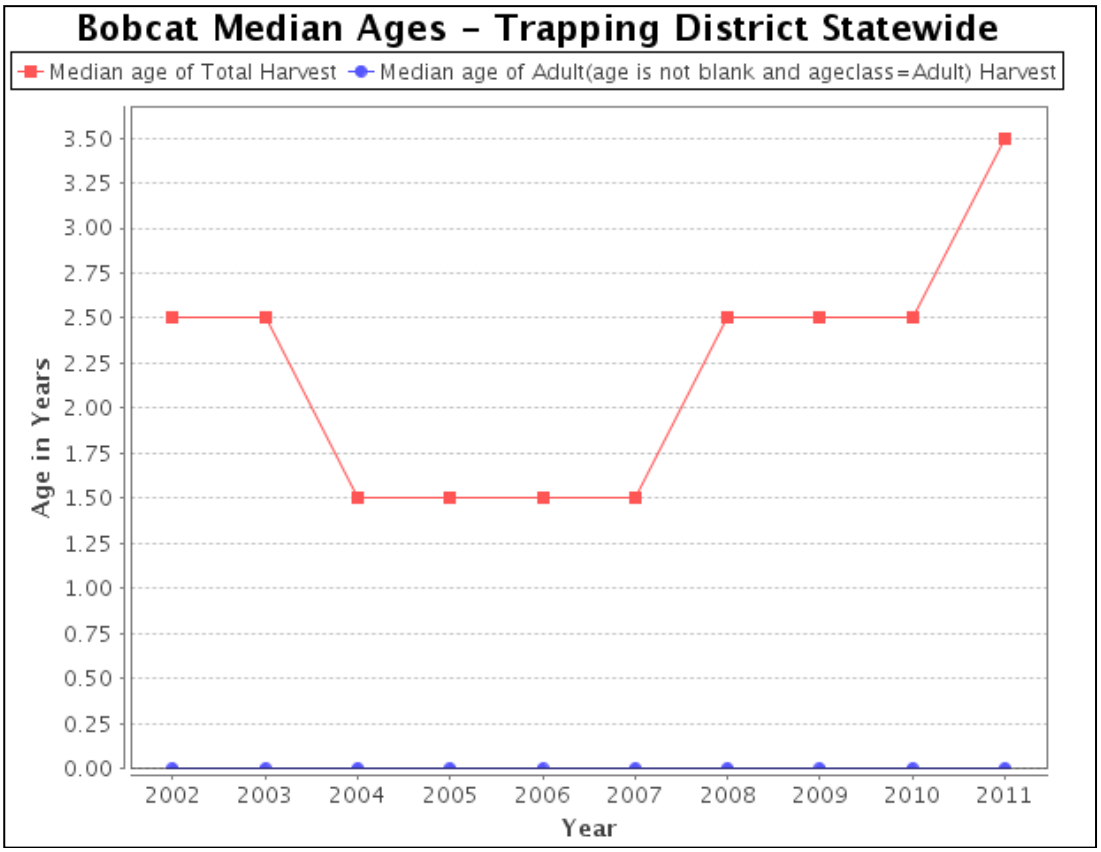

Figure 38. Bobcat population parameter of median ages, 2002-03 to 2011-12.

WEASEL

The statewide weasel harvest continues to remain relatively stable, although generally at a lower level during the past decade within a range of 200 to 500 animals with some years below or above this level (Table 13). The majority of weasel taken over most years is in northwestern Montana's trapping district (TD) 1 (Fig. 39). The estimated 2011-12 statewide harvest of 342 animals was 6% below the 10-year average harvest, along with average pelt prices (Table 13). Despite the moderate harvest, average pelt prices offered for 2011-12 were higher than a decade ago.

Examining the trend in CPUE it appears harvest effort has generally increased over the past two years, indicating that more weasels are being taken per unit of effort (Fig.40). Population monitoring activities for weasel are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered stable to increasing. A comparison of CPUE for weasel with the other classified predator species is shown in Fig. 53.

Table 13. Weasel harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	286	222	161	109	5	19	0	802	2.66	
1995-96	264	53	24	0	2	0	0	343	1.75	
1996-97	217	16	154	618	8	4	79	1094	1.83	
1997-98	123	54	153	56	0	0	0	386	1.01	
1998-99	144	48	9	42	3	0	0	246		
1999-00	211	86	24	155	0	0	3	480		
2000-01	87	11	19	42	0	0	8	167	1.51	
2001-02	75	7	14	4	0	0	0	100	2.01	
2002-03	248	124	32	0	0	0	0	405	3.01	
2003-04	88	164	51	13	3	0	3	321	3.01	
2004-05									3.01	
2005-06	118	77	9	27	12	0	0	243	3.01	
2006-07	213	161	79	35	12	0	3	503	4.96	
2007-08	185	45	21	12	3	0	0	310	5.69	
2008-09	45	76	6	0	0	0	0	175	4.02	
2009-10	54	24	8	13	0	3	0	121	4.07	
2010-11	164	84	181	13	3	3	3	488	3.13	
2011-12	199	105	15	6	0	15	3	342	3.16	

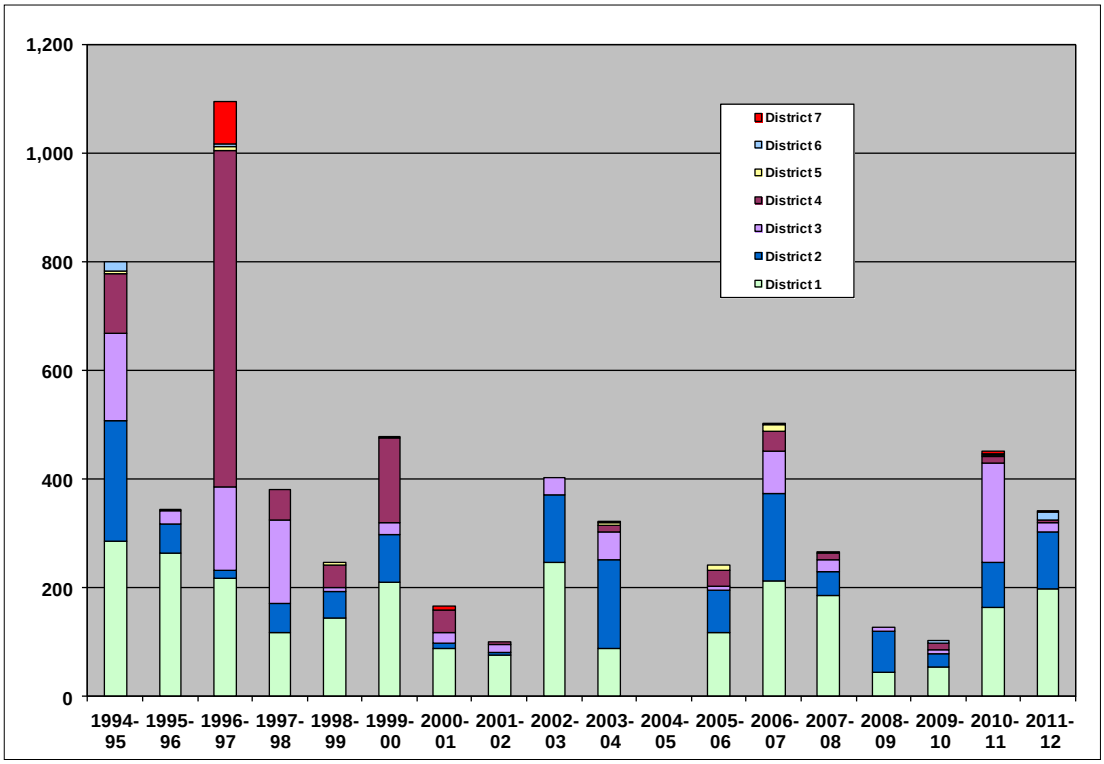

Figure 39. Statewide weasel harvest by trapping district, 1994-95 to 2011-12.

Figure 40. Statewide trend in weasel harvest from CPUE, 1995-96 to 2011-12.

SKUNK

The statewide skunk harvest continues to remain stable, and within a general range of 1,000 to 3,000 animals with some years below or above this level (Table 14). The majority of skunk taken over most years is in the central and southern portions of Montana in trapping districts (TD) 4 and 5 (Fig. 41). The estimated 2011-12 statewide harvest of 1,735 animals was 28% below the 10-year average harvest, despite a higher than average pelt price (Table 14). Despite a lower harvest than the previous several years, the pelt prices offered for 2011-12 of $7.30 were well above the average over the last decade.

Examining the trend in CPUE it appears harvest effort declined significantly during the 2011-12 season, indicating that fewer skunks are being taken per unit of effort (Fig.42). Population monitoring activities for skunk are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered to be declining after an increasing trend over previous years. A comparison of CPUE for skunk with the other classified predator species is shown in Fig. 53.

Table 14. Skunk harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	69	194	336	222	532	579	1287	3219	3.41	
1995-96	75	198	167	89	401	162	619	1784	6.15	
1996-97	142	169	638	260	705	539	929	3382	3.86	
1997-98	102	138	573	394	445	281	749	2682	2.85	
1998-99	84	246	345	342	306	15	228	1567		
1999-00	7	90	238	780	1015	0	632	2762		
2000-01	72	213	445	175	361	163	141	1570	3.73	
2001-02	46	182	578	442	71	150	146	1616	5.01	
2002-03	40	224	421	248	154	100	235	1422	7.01	
2003-04	167	177	616	397	493	937	210	2996	5.51	
2004-05									7.01	
2005-06	195	145	652	492	252	296	293	2325	6.51	
2006-07	99	187	251	503	477	44	371	1933	4.04	
2007-08	27	209	161	442	152	510	471	2599	5.27	
2008-09	48	113	180	361	643	0	299	1845	4.02	
2009-10	107	53	212	1407	447	27	112	2717	2.34	
2010-11	51	294	267	2567	464	48	113	3975	2.11	
2011-12	32	120	292	140	436	117	597	1735	7.30	

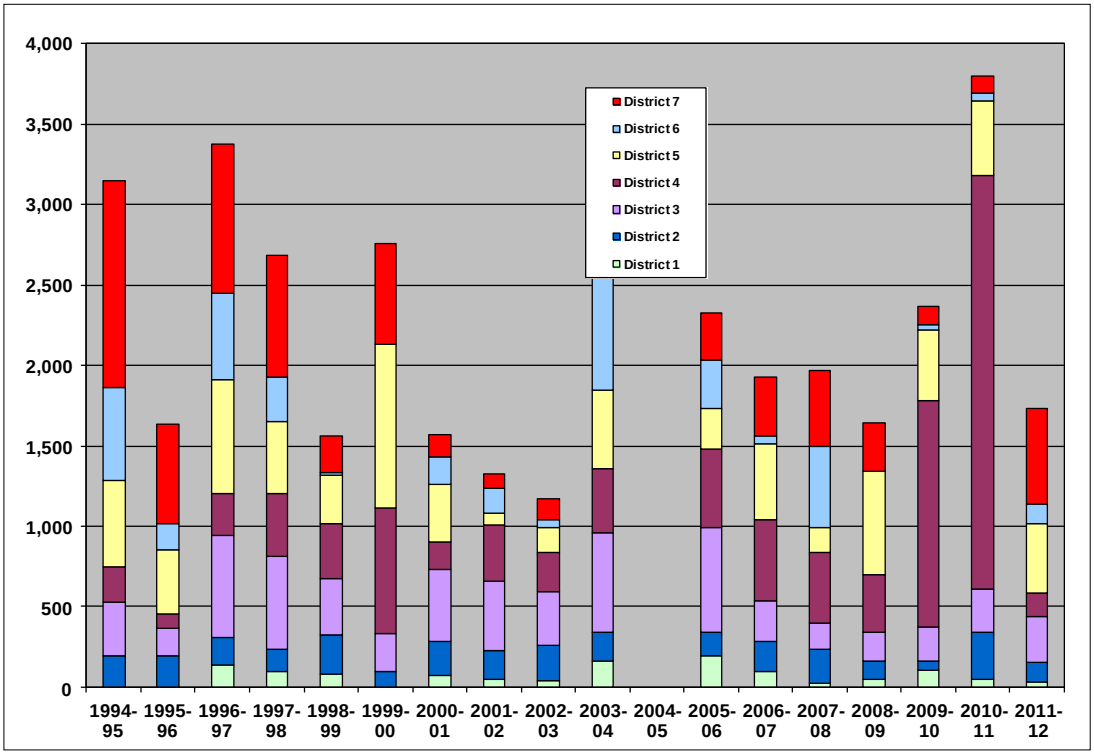

Figure 41. Statewide skunk harvest by trapping district, 1994-95 to 2011-12.

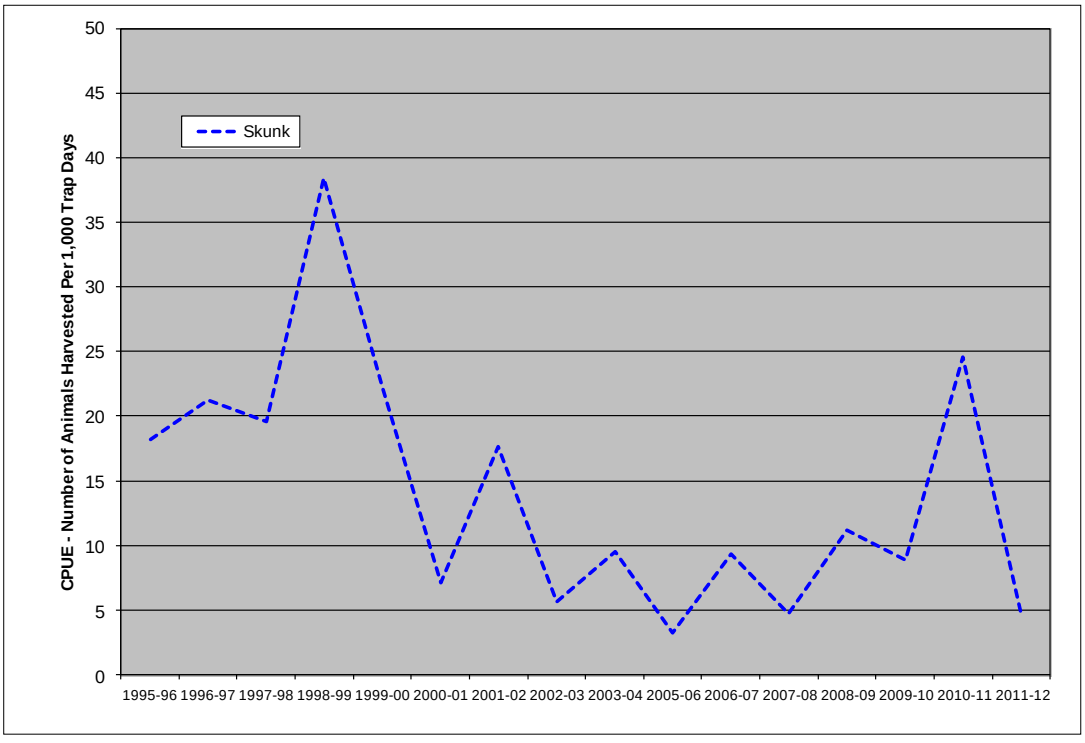

Figure 42. Statewide trend in skunk harvest from CPUE, 1995-96 to 2011-12.

COYOTE

The statewide coyote harvest increased dramatically during the 2011-12 season from both trapping and hunting (Table 15). The majority of coyotes taken over most years are in eastern Montana's trapping district s (TD) 4, 5, 6 and 7 (Fig. 43). The estimated 2008-09 statewide harvest of 16,398 animals was 36% above the 10-year average harvest, along with a better than average pelt price of $77.30 (Table 15). This average coyote pelt prices offered for 2011-12 was the highest reported in the past 18 years.

Examining the trend in CPUE it appears harvest effort has generally remained the same, indicating that the relative number of coyotes are being taken per unit of effort (Fig.40) which may indicate, also looking at the harvest, that there is an increase in the number of trappers and/or hunters. Population monitoring activities for coyote are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered stable. A comparison of CPUE for coyote with the other classified predator species is shown in Fig. 53.

Table 15. Coyote harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	284	851	1774	2112	1227	788	3034	10079	20.61	
1995-96	312	728	991	1216	1197	389	624	5495	19.46	
1996-97	189	1193	1594	2953	1445	925	1055	9354	24.68	
1997-98	524	1424	2163	2496	1493	821	1588	10510	17.15	
1998-99	267	874	1387	1486	688	453	904	6059		
1999-00	514	798	1429	3142	1526	1060	2651	11134	22.06	
2000-01	167	593	1483	1836	1563	559	2988	9303	18.93	
2001-02	114	745	2086	2211	774	1783	2004	9726	23.71	
2002-03	175	971	1452	1357	567	3386	2817	10725	30.71	
2003-04	306	1046	2311	3198	1485	1632	2309	12286	28.51	
2004-05									30.71	
2005-06	278	823	1291	1650	569	2431	2346	9412	38.51	
2006-07	433	789	1485	2269	1058	2713	2137	10886	43.36	
2007-08	197	546	1200	1716	451	2286	1946	9723	37.91	
2008-09	387	437	494	1453	494	827	1780	6969	30.71	
2009-10	193	396	544	651	571	153	1112	9048	35.29	
2010-11	485	661	464	1764	1135	677	2203	8489	73.16	
2011-12	292	605	1243	4660	1834	3487	4276	16398	77.3	

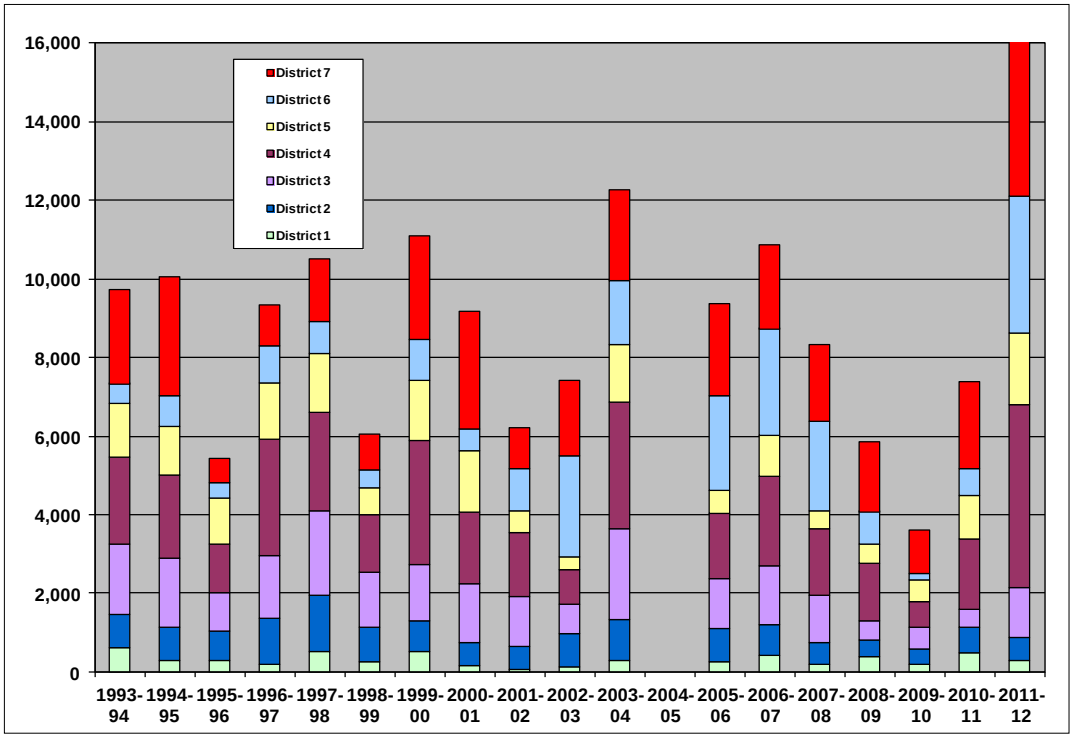

Figure 43. Statewide coyote harvest by trapping district, 1994-95 to 2011-2012.

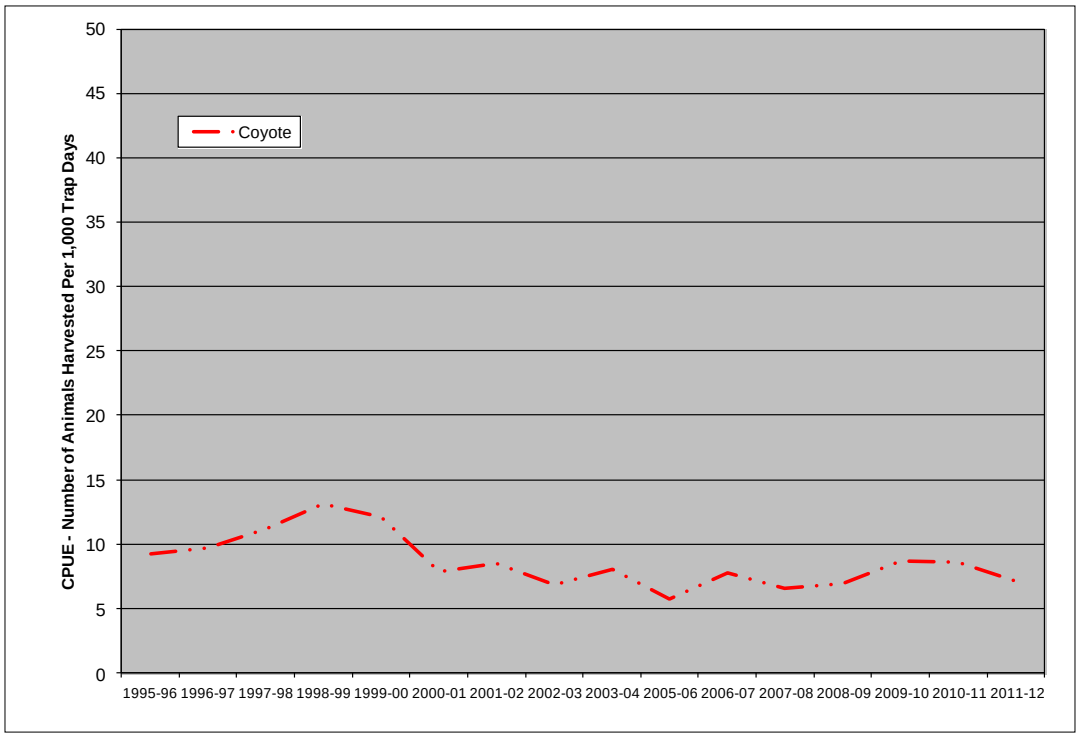

Figure 44. Statewide trend in coyote harvest from CPUE, 1995-96 to 2011-12.

RED FOX

The statewide fox harvest increased during the 2011-12 season following a general declining harvest over the past 18 years (Table 16). The majority of fox taken over most years is across all trapping districts (TD) except TD 1 (Fig. 45). The estimated 2011-12 statewide harvest of 2,469 animals was only 14% above the 10-year average harvest, despite the highest pelt price in 18 years of 57.49 (Table 16

Examining the trend in CPUE it appears harvest effort has generally been stable with a decrease during 2011-12, indicating that fewer fox are being taken per unit of effort (Fig.46). Population monitoring activities for red fox are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered as declining. The comparison of CPUE for fox with the other unclassified nongame species is shown in Fig. 54.

Table 16. Fox harvest, pelt price, and harvest quota if applicable, 1994-95 to 2011-12.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	19	284	1133	738	2039	691	1963	6872	15.33	
1995-96	73	280	498	411	1267	181	790	3573	18.58	
1996-97	87	402	898	1795	909	677	996	5764	17.74	
1997-98	54	355	1327	795	898	307	1074	4810	12.72	
1998-99	27	210	321	495	438	129	534	2156		
1999-00	10	414	701	842	483	494	684	3629		
2000-01	19	243	521	608	293	270	240	2201	16.24	
2001-02	7	478	770	735	364	435	285	3074	22.65	
2002-03	8	483	523	380	216	364	577	2552	24.01	
2003-04	23	465	434	523	296	68	248	2056	20.01	
2004-05									21.51	
2005-06	38	358	178	509	145	569	670	2473	25.01	
2006-07	55	380	465	409	441	757	655	3164	20.84	
2007-08	45	164	248	266	227	155	277	1862	22.49	
2008-09	20	234	130	367	265	56	299	1695	21.59	
2009-10	16	195	166	80	335	16	129	1471	22.34	
2010-11	113	377	167	162	232	59	156	1418	24.37	
2011-12	29	541	333	328	450	196	591	2469	57.49	

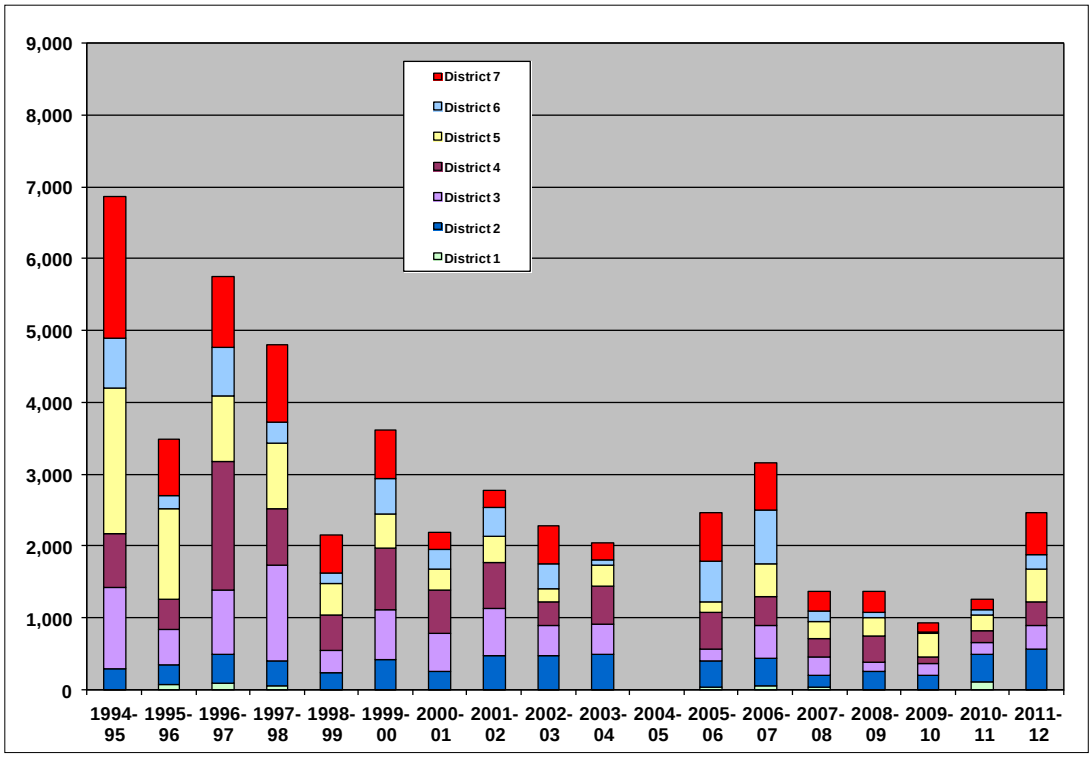

Figure 45. Statewide red fox harvest by trapping district, 1994-95 to 2011-12.

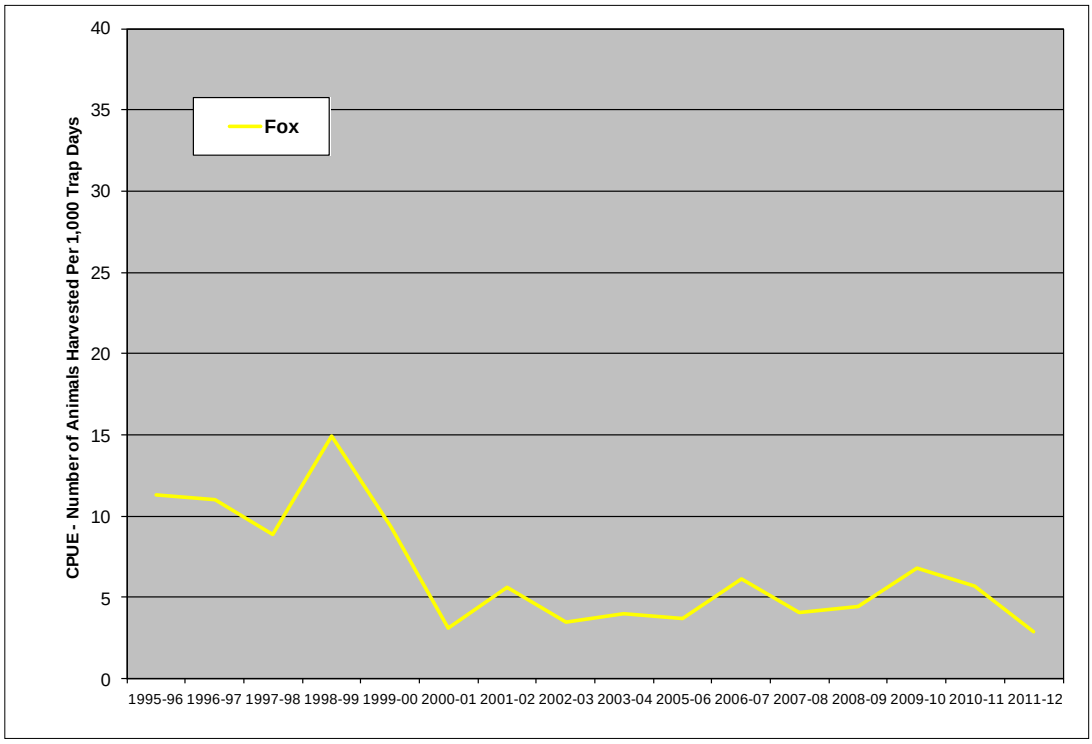

Figure 46. Statewide trend in red fox harvest from CPUE. 1995-96 to 2011-12.

RACCOON

The statewide raccoon harvest had been declining but has increased in recent years, and jumped substantially during the 2011-12 season relative to previous years (Table 17). The majority of raccoon harvested by trapping or hunting over most years is in southern Montana's trapping districts (TD) 3, 5 and to a lesser degree TD 7 (Fig. 47). The estimated 2011-12 statewide harvest of 6,409 animals was 30% above the 10-year average harvest, even with only a better than average pelt price of $19.45 (Table 17).

Examining the trend in CPUE it appears harvest effort has declined in the past couple of years, indicating that fewer raccoon are being taken per unit of effort (Fig.48). Population monitoring activities for raccoon are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered as declining. However, with a higher raccoon harvest level in 2011-12 and only average pelt prices, this may also be an indication of increased interest in trapping and/or hunting for raccoons. A comparison of CPUE for raccoon with the other unclassified nongame species is shown in Fig. 54.

Table 17. Raccoon harvest, pelt price, and harvest quota if applicable, 1994-95 to 2008-09.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	64	220	627	520	1724	272	965	4392	9.31	
1995-96	41	111	205	728	2335	471	795	4687	10.97	
1996-97	220	189	1012	1807	3547	976	1465	9216	15.26	
1997-98	61	338	1146	1422	2363	706	921	6956	14.67	
1998-99	144	198	871	736	1855	129	267	4200		
1999-00	69	200	977	908	1661	394	735	4944		
2000-01	11	205	1057	342	2091	281	399	4387	10.02	
2001-02	29	307	1484	485	1337	289	1273	5203	19.31	
2002-03	62	283	939	410	1160	380	1427	4662	11.01	
2003-04	78	258	1008	371	1869	904	1447	5936	11.51	
2004-05									11.01	
2005-06	121	154	1146	524	1125	500	814	4540	11.51	
2006-07	108	240	889	532	1517	266	816	4368	22.05	
2007-08	60	161	421	555	1277	358	651	4506	33.22	
2008-09	39	99	711	717	1343	70	307	4052	17.86	
2009-10	37	155	268	171	1037	145	137	4099	18.02	
2010-11	75	285	359	372	1294	89	218	3201	18.5	
2011-12	73	322	1141	503	2989	380	1000	6409	19.45	

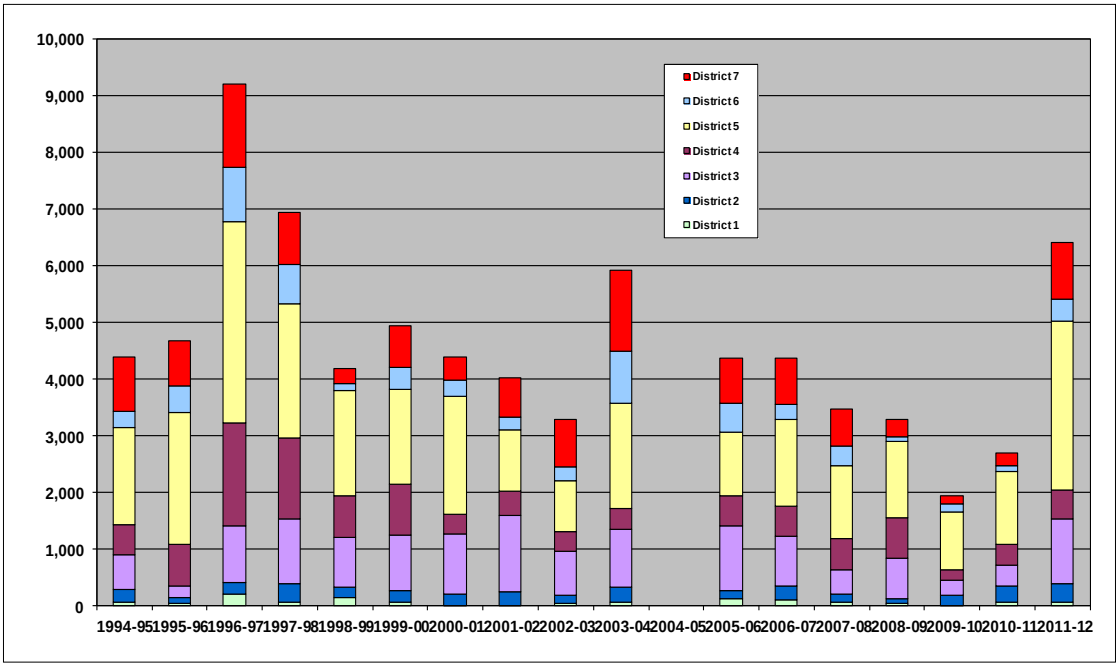

Figure 47. Statewide raccoon harvest by trapping district, 1994-95 to 2011-12.

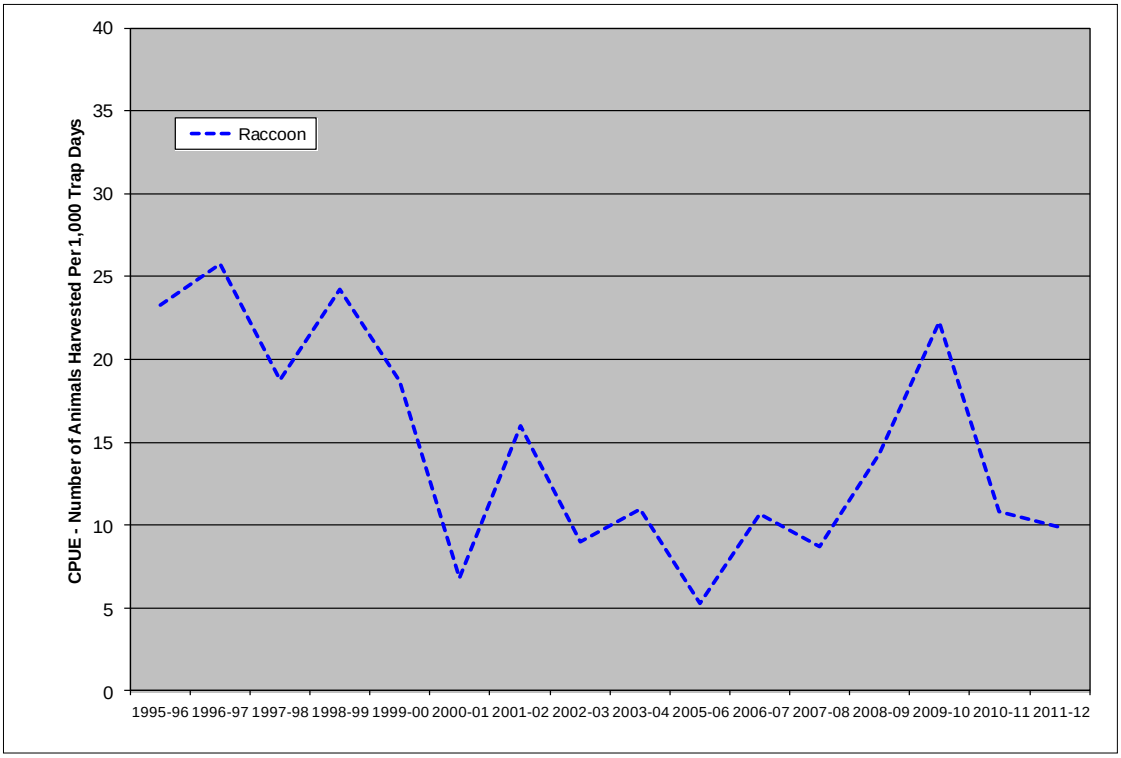

Figure 48. Statewide trend in raccoon harvest from CPUE, 1995-96 to 2011-12.

BADGER

The statewide badger harvest has been relatively inconsistent over the years with low harvest numbers during several previous years and then a significant increase during the 2011-12 season (Table 18). The majority of the badgers taken over most years are in north central and southeastern Montana's trapping districts (TD) 4 and 7 (Fig. 49). The estimated 2011-12 statewide harvest of 1,474 animals was 30% above the 10-year average harvest, along with a better than average pelt price of $38.61 (Table 18). This higher harvest follows several years of lower than average harvest levels despite generally good pelt prices.

Examining the trend in CPUE it appears harvest effort has been stable to slightly increasing, indicating that a relatively stable number of badger are being taken per unit of effort (Fig. 50). Population monitoring activities for badger are based completely on harvest survey data, with CPUE considered to be an indicator of relative population trend, which could be considered as stable to slightly increasing. A comparison of CPUE for badger with the other unclassified nongame species is shown in Fig. 54.

Table 18. Badger harvest, pelt price, and harvest quota if applicable, 1994-95 to 2008-09.

Year	TD 1	TD 2	TD 3	TD 4	TD 5	TD 6	TD 7	State	Pelt Price	Quota
1994-95	12	17	114	289	26	135	338	931	11.87	
1995-96	2	2	85	280	29	5	85	491	10.01	
1996-97	4	4	102	1260	24	157	268	1819	11.19	
1997-98	0	5	174	563	38	146	146	1071	11.73	
1998-99	0	3	51	87	9	42	69	261		
1999-00	7	3	166	400	21	41	352	991		
2000-01	8	15	114	209	30	84	38	498	15.98	
2001-02	4	4	160	360	57	82	75	742	18.51	
2002-03	13	24	229	378	27	116	224	1012	21.51	
2003-04	8	20	361	765	336	66	232	1788	23.01	
2004-05									23.51	
2005-06	3	39	187	394	122	113	308	1166	27.51	
2006-07	0	32	269	178	190	324	336	1330	27.57	
2007-08	3	27	72	173	54	95	286	871	42.61	
2008-09	0	6	42	51	25	0	169	643	24.81	
2009-10	5	24	5	27	16	27	45	450	72.56	
2010-11	5	48	40	65	48	51	151	609	24.12	
2011-12	3	12	237	714	12	284	213	1474	38.61	

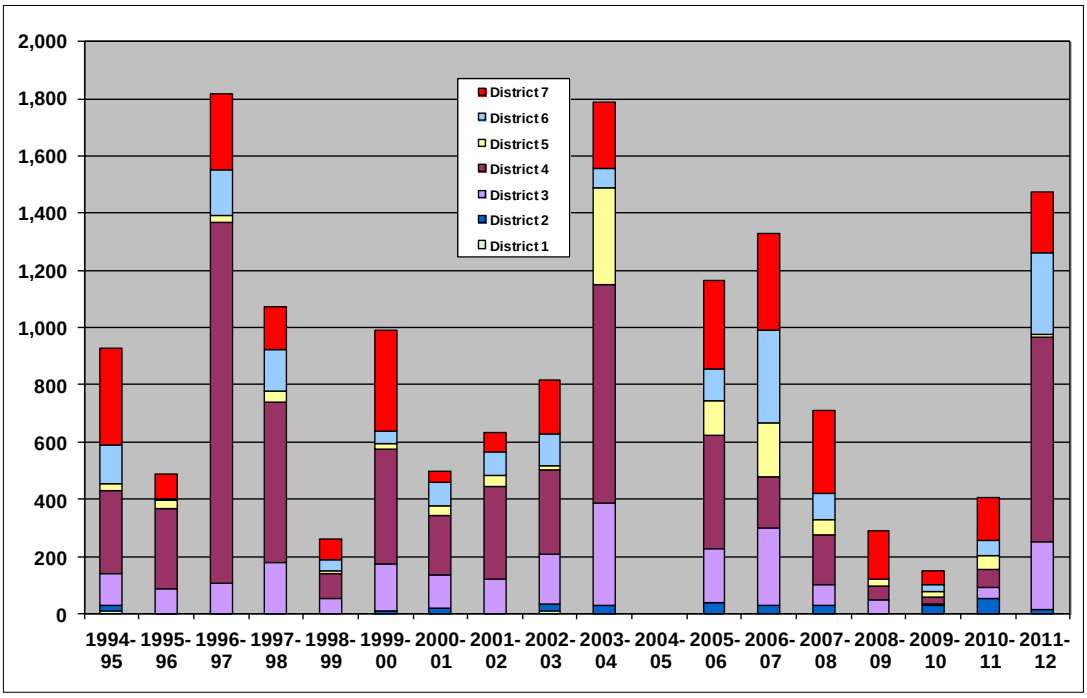

Figure 49. Statewide badger harvest by trapping district, 1994-95 to 2011-12.

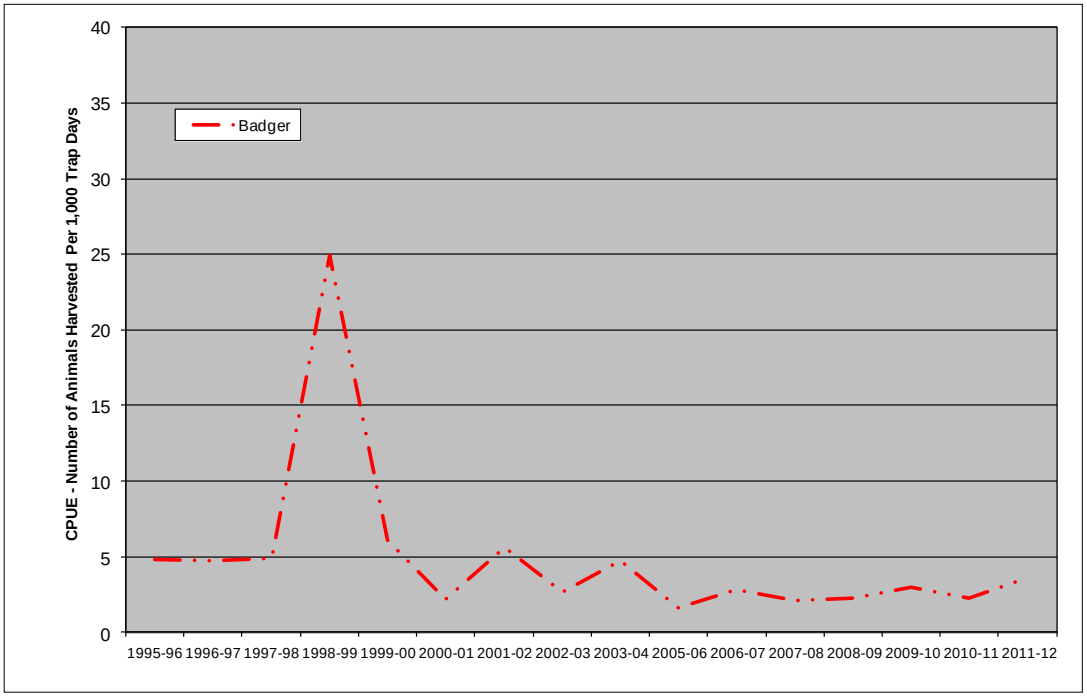

Figure 50. Statewide trend in badger harvest from CPUE, 1995-96 to 2011-12.

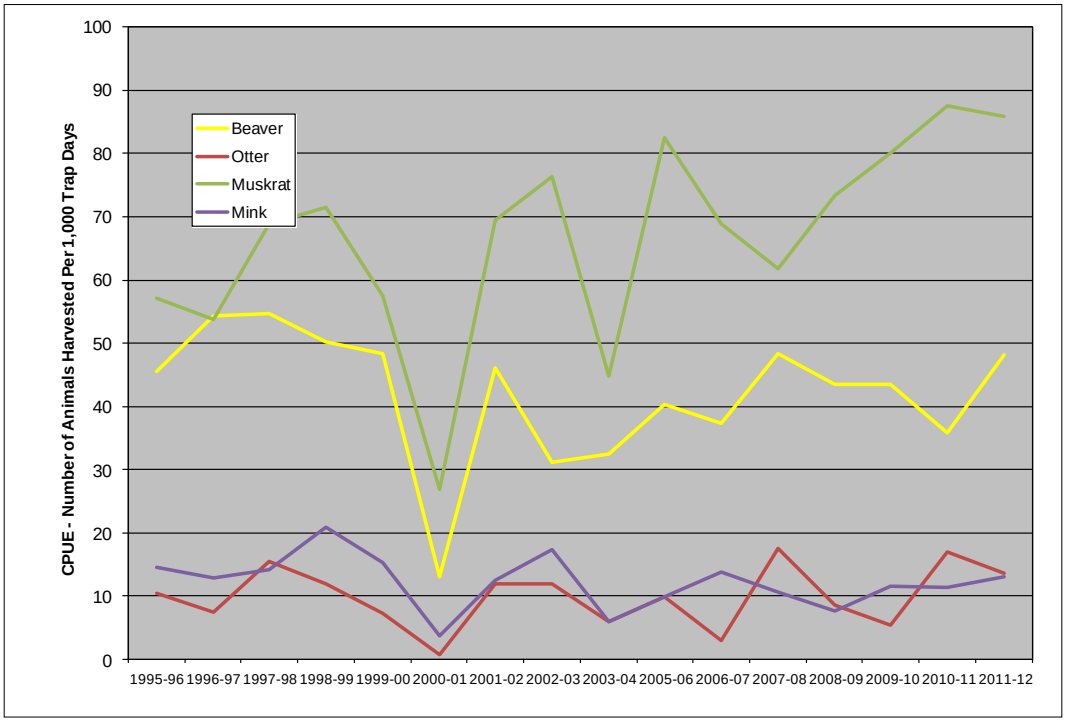

Figure 51. Statewide harvest trend comparison of species group from CPUE, 1995-96 to 2011-12.

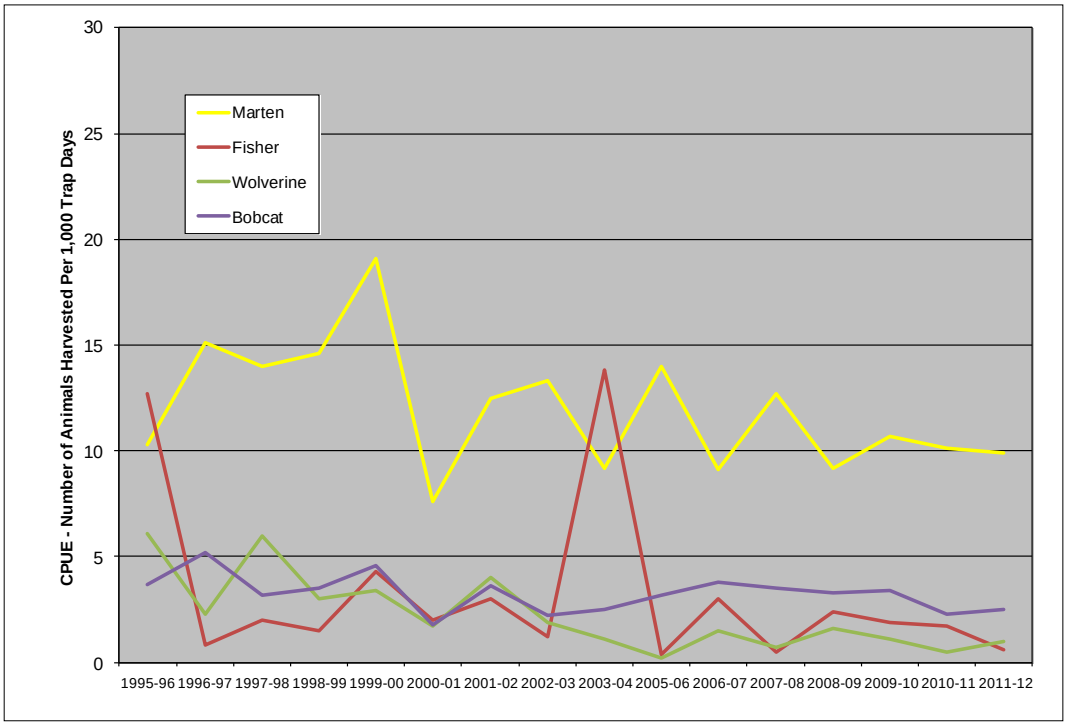

Figure 52. Statewide harvest trend comparison of species group from CPUE, 1995-96 to 2011-12

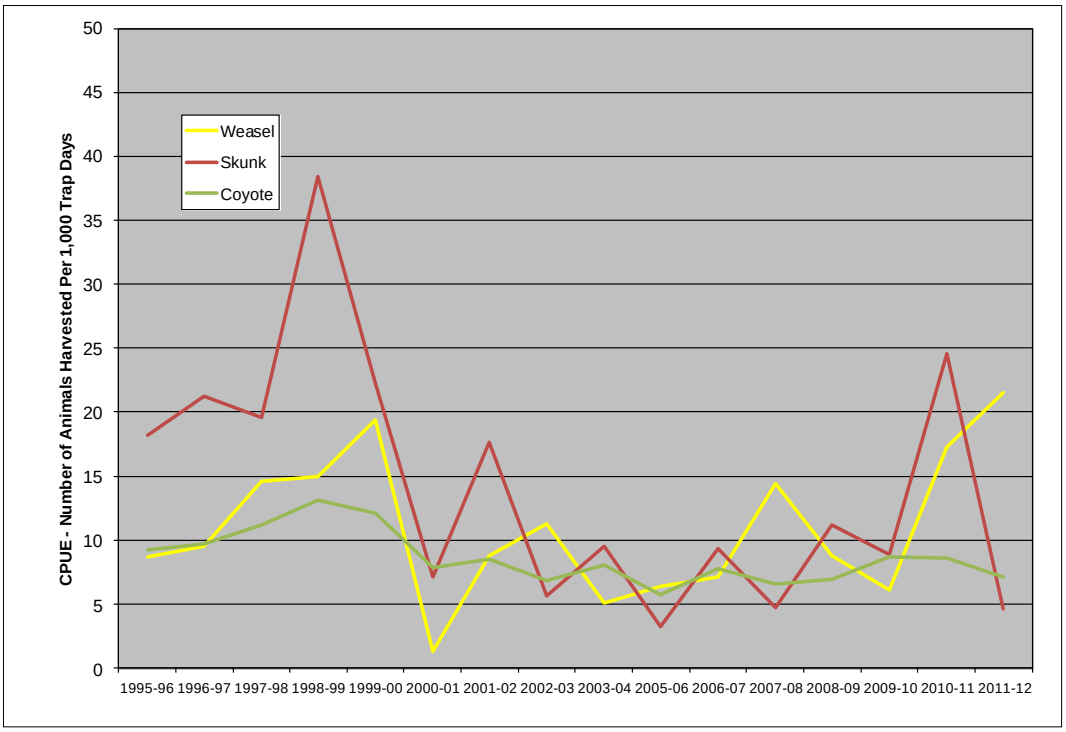

Figure 53. Statewide harvest trend comparison of species group from CPUE, 1995-96 to 1011-12.

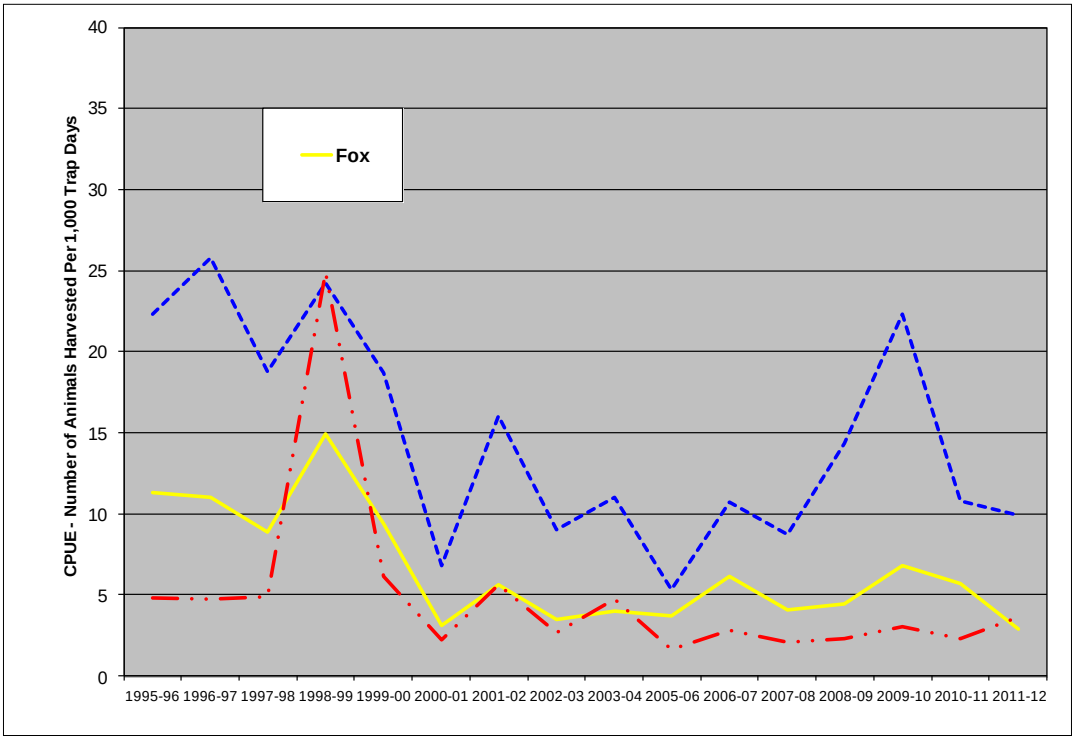

Figure 54. Statewide harvest trend comparison of species group from CPUE, 1995-96 to 2011-12.

Table 19. Statewide furbearer snow track survey results, NW & SW Montana (Trapping Districts 1-4).

Year	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Routes	29	29	23	26	22	24	25	14	19	13
Replicates	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-2	1-3	1-2
Miles	966.7	922.9	544.6	718.5	637.4	746.6	689.1	321.8	550.7	283.4
Hares	11,716	10,694	5,519	8,815	7,188	6,581	6,209	3,701	4,643	3,272
Squirrels	3,462	6,496	2,548	2,355	2,360	1,970	2,802	1,803	1,955	1,657
Marten	363	556	173	246	262	258	305	217	357	256
Fisher	0	3	3	1	0	17	13	0	11	2
Wolverine	15	54	5	21	22	16	21	2	11	5
Lynx	321	287	98	204	223	264	100	100	95	3
Bobcat	118	49	95	89	77	49	86	56	74	24
Lion	31	14	13	34	14	44	31	31	24	6
Weasel	924	754	508	615	600	794	353	219	685	285
Coyote	1,007	914	895	961	820	410	760	379	744	410

Table 20. Statewide species track detection rates (tracks/100 miles), NW & SW Montana (Trapping Districts 1-4).

Year	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Hares	1,211.9	1,158.7	1,013.4	1,226.8	1,127.7	881.5	901.0	1,150.1	843.1	1,154.5
Squirrels	358.1	703.8	467.8	327.7	370.2	263.8	406.6	560.2	355.0	584.6
Marten	37.5	60.2	31.7	34.2	41.1	34.5	44.2	67.4	64.8	90.3
Fisher	0.0	0.3	0.5	0.1	0.0	2.3	1.8	0.0	2.0	0.3
Wolverine	1.5	5.8	0.9	2.9	3.4	2.1	3.0	0.6	2.0	1.8
Lynx	33.2	31.1	18.0	28.4	34.9	35.3	14.5	31.1	17.2	1.0
Bobcat	12.2	5.3	17.4	12.4	12.1	6.5	12.4	17.4	13.4	8.5
Lion	3.2	1.5	2.4	4.7	2.2	5.9	4.5	9.6	4.3	2.1
Weasel	95.5	81.7	93.2	85.6	94.1	54.9	51.2	68.0	124.4	100.6
Coyote	104.1	99.0	164.3	133.7	128.6	106.3	110.2	117.7	135.1	144.7

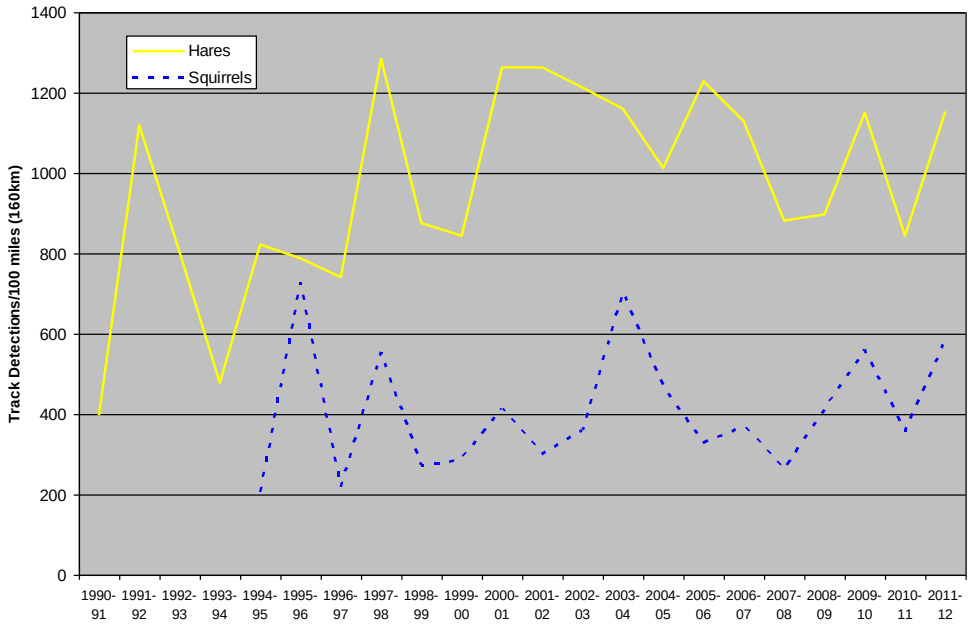

Figure 55. Statewide (TD's 1-4) species track detection rates (tracks/100 miles), 1990-91 to 2011-12.

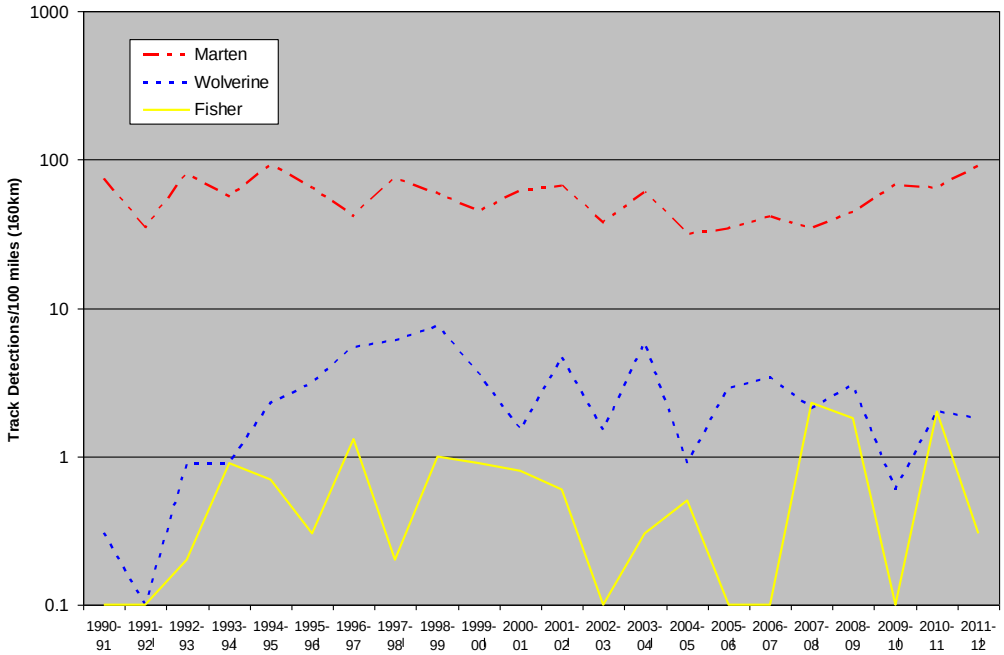

Figure 56. Statewide (TD's 1-4) species track detection rates (tracks/100 miles), 1990-91 to 2011-12.

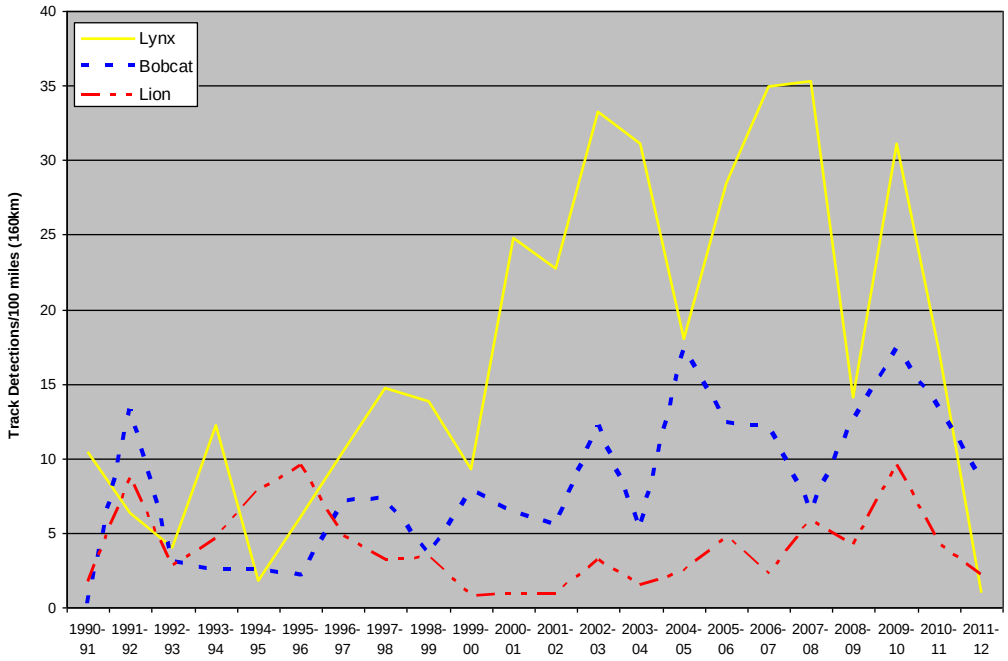

Figure 57. Statewide (TD's 1-4) species track detection rates (tracks/100 miles), 1990-91 to 2011-12.

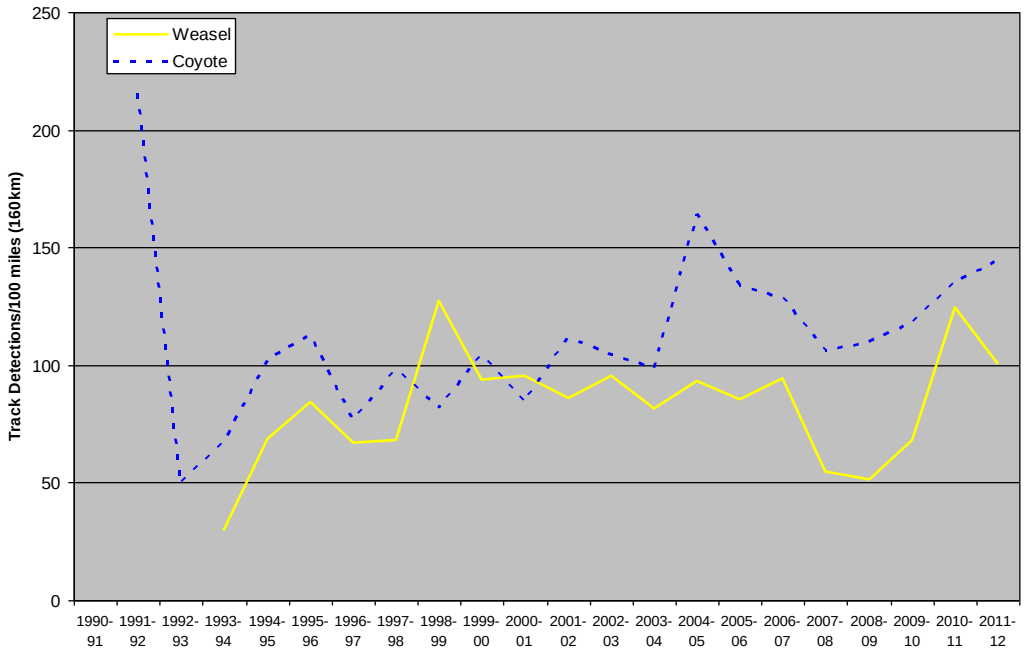

Figure 58. Statewide (TD's 1-4) species track detection rates (tracks/100 miles), 1990-91 to 2011-12.

Montana FWP Furbearer Program Related Bibliography in Chronological Order

Wright, P.L. **1947**. The sexual cycle of the male long-tailed weasel (*Mustela frenatal*). J. Mammalogy 28(4):343-352.

Townsend, J.E. **1952**. A study in beaver ecology in western Montana with special reference to movements. M.S. thesis. Montana State University, Bozeman, MT. 44 p. (J. Mammalogy 34(4):459-479).

Townsend, J.E. **1954**. Beaver bank accounts. Montana Wildlife. 4(1):16-17.

Greer, K.R. **1953**. Yearly food habits of the river otter in the Thompson Lakes region, northwestern Montana, as indicated by scat analysis. M.S. thesis. Montana State University, Bozeman, MT 30 p. (Amer. Mid. Naturalist 54(2):299-313).

Lechleitner, R.R. **1953**. An analysis of same age criteria in a domestic and a wild population of mink (*Mustela vison*). M.S. thesis. University of Montana, Missoula, MT. 60 p. (J. Mammalogy 35(4):496-503).

Quick, H.F. **1953**. Wolverine, fisher, and marten studies in a wilderness region. Transactions of North American Wildlife Conference 18:512-533.

Casagranda, L.G. **1955**. A study of beaver-waterfowl relations in the mountainous area of Beaverhead County, Montana. M.S. Thesis. Montana State University, Bozeman, MT. 33 p.

Hawley, V.D. **1955**. The ecology of the marten in Glacier National Park. M.S. thesis. University of Montana, Missoula, MT. 131 p. (J. Mammalogy 38(2):174-184; J. Wildl. Mgmt. 26(1):55-74).

Newby, F.E. and P.L. Wright. **1955**. Distribution and status of the wolverine in Montana. Journal of Mammology 36:248-253.

Newby,F.E. **1956**. Fur production in Montana. Montana Wildlife. 6(1):7-13.

Quick, H.F. **1956**. Effects of exploitation on a marten population. J. Wildl. Manage. 20:267-274.

Hawley, V.D., and F.E. Newby. **1957**. Marten home ranges and population fluctuations. J. Mamm. 38:174-184.

Mitchell, J.L. **1957**. A study of mink movements and populations on the lower Madison River, Montana. M.S. thesis. Montana State University, Bozeman, MT. 19 pp.

Newby, F.E. **1957**. Marten population status. Pages 63-70 in Completion report project W-49-R-6. Montana Fish and Game Department, Helena, MT.

Weckwerth, R.P. **1957**. The relationship between the marten population and the abundance of small mammals in Glacier National Park. M.S. thesis. University of Montana, Missoula, MT 76 p. (J. Wildl. Mgmt 26(1):55-74; J. Wildl. Mgmt 27(1):93-98).

Newby, F.E. **1958**. A new approach to predator management in Montana. Montana Wildlife. August, pgs. 22-27.

Adams, L. **1959**. An analysis of a population of snowshoe hares in northwestern Montana. Ecology Monograph 29(2):141-170.

Jonkel, C.J. **1959**. An ecological and physiological study of pine marten. M.S. thesis. University of Montana, Missoula, MT. 81 p. (J. Wildl. Mgmt. 27(1):93-98).

Newby, F.E. **1960**. Unpublished records. Montana Fish and Game, Helena, Montana.

Hawley, V.D. **1960**. Fisher are returned to Montana forests. Montana Wildlife, July 1960: 16-18.

Mitchell, J.L. **1961**. Mink movements and populations on a Montana river. Journal of Wildlife Management 25(1):48-54.

Weckwerth, R.P., and V.D. Hawley. **1962**. Marten food habits and population fluctuations in Montana. J. Wildl. Manage. 26:55-74.

Jonkel, C.J. and R.P. Weckworth. **1963**. Sexual maturity and implantation of blastocysts in the wild pine marten. Journal of Wildlife Management 27:93-98.

Newby, F.E. and J.J. McDougal. **1964**. Range extension of the wolverine in Montana. Journal of Mammology. 45:485-487.

Weckwerth, R.P., and P.L. Wright. **1968**. Results of transplanting fishers in Montana. J. Wildl. Manage. 32(4):977-979.

Mitchell, J., K. Greer, and R. Weckwerth. **1971**. Furbearers. Pages 197-205 in Mussehl, T.W. and F.W. Howell, editors. Game management in Montana. Montana Fish and Game Department, Helena, MT. 238 pp.

Mitchell, J. and K. Greer. **1971**. Predators. Pages 206-217 in Mussehl, T.W. and F.W. Howell, editors. Game management in Montana. Montana Fish and Game Department, Helena, MT. 238 pp.

Moore, R.E. and N.S. Martin. **1980**. A recent record of swift fox (*Vulpes velox*) in Montana. J. Mamm. 61:161.

Schladweiler, P. **1980**. The effects of coyotes on big game populations in Montana. Montana Dept. Fish and Game, Job Final Report, Fed. Aid Project. W-120-R-11. 78 pp.

Burnett, G.W. **1981**. Movements and habitat use of the American marten in Glacier National Park, Montana. M.S. Thesis. University of Montana, Missoula, MT. 130 pp.

Greer, K.R., and D. Palmisciano. **1981**. Wildlife investigations laboratory job progress report. Appendix 2: bobcat carcasses from the registered trapping harvest for 1978-80. Fed. Aid Wildl. Restoration Proj. W-120-R-12. Montana Dept. Fish, Wildlife and Parks, Bozeman, MT 14 pp.

Hash, H.S. **1981**. Ecology of the bobcat in a coniferous forest environment in western Montana. Fed Aid Wildl. Restoration Proj. W-120-R-12, Project 3, Job 1. Montana Dept. Fish, Wildlife and Parks, Helena, MT. 13 p.

Hornocker, M.G. and H.S. Hash. **1981**. Ecology of the wolverine in northwestern Montana. Canadian Journal of Zoology 59:1286-1301.

Knowles, P.R. **1981**. Habitat selection, home range size, and movements of bobcats in northcentral Montana. M.S. Thesis. Univ. of Montana, Missoula.

Hash, H.S. **1982**. Statewide population studies, distribution, and habitat use of bobcat, Canada lynx, otter, wolverine, marten, and fisher. Fed. Aid Wildl. Job Prog. Rep. W-120-R-13. Montana Dept. Fish, Wildlife and Parks, Helena.

Zackheim, H. **1982**. Ecology and population status of the river otter in southwestern Montana. M.S. Thesis. University of Montana, Missoula. 100 p.

Swenson, J.E., S.J. Knapp, P.R. Martin, and T.C, Hinz. **1983**. Reliability of aerial cache surveys to monitor beaver population trends on prairie rivers in Montana. Journal Wildlife Management 47(3):697-703.

Hamlin, K.L., S.J. Riley, D. Pyrah, A.R. Dood, and R.J. Mackie. **1984**. Relationships among mule deer fawn mortality, coyotes, and alternative prey species during summer. J. Wildl. Manage. 48:489-499.

Pyrah, D. **1984**. Social distribution and population estimates of coyotes in north-central Montana. J. Wildl. Mgmt. 48(3):679-690.

Smith, D.S. **1984**. Habitat use, home range and movements of bobcats in western Montana. M.S. Thesis. University of Montana, Missoula.

Brainard, S.M. **1985**. Ecology of the bobcat in a coniferous forest environment in western Montana. M.S. Thesis. University of Montana, Missoula, MT 58 p.

Knowles, P.R. **1985**. Home range size and habitat selection of bobcats (*Lynx rufus*) in north-central Montana. Canadian Field-Nat. 99:6-12.

Giddings, B.J. **1986**. Home range size, movements and habitat use by bobcats in a prairie rangeland environment. M.S.Thesis. Montana State University, Bozeman. 62 p.

Bissell, G.N. and R. Bown. **1987**. Effects of water level fluctuations on aquatic furbearer distribution, abundance, and habitat in the northern Flathead Valley. Final Report. Montana Dept. Fish, Wildlife and Parks, Kalispell

Hash, H. **1987**. Wolverine. Pages 574-585 in Novak, M., J.A. Baker, M.E. Obbard, and B. Malloch, editors. Wild furbearer management and conservation in North America. Ministry of Natural Resources, Toronto, Ontario, Canada.

Risdahl, G.L. **1988**. Ecology and reproduction of bobcats in southeastern Montana during a period of low lagomorph density. M.S. Thesis. Montana State University, Bozeman.

Easter-Pilcher, A. **1990**. Cache size as an index to beaver colony size in northwestern Montana. Wildlife Society Bulletin 18:110-113.

Giddings, B.J., G.L. Risdahl, and L.R. Irby. **1990**. Bobcat habitat use in southeastern Montana during periods of high and low lagomorph abundance. Prairie Naturalist 22(4):249-258.

Dronkert-Egnew, A.E. **1991**. River otter population status and habitat use in northwestern Montana. M.S. Thesis. University of Montana, Missoula. 112 p.

Fager, C. **1991**. Harvest dynamics and winter habitat use of the pine marten in southwest Montana. M.S. Thesis. Montana State University, Bozeman, MT. 73 p.

FaunaWest Wildlife Consultants. **1991**. An ecological and taxonomic review of the swift fox (*Vulpes velox*) with special reference to Montana. Montana Dept. Fish, Wildlife and Parks, Helena, MT. 49 pp.

FaunaWest Wildlife Consultants. **1991**. A bibliography of literature and papers pertaining to the swift and kit foxes. Montana Dept. Fish, Wildlife and Parks, Helena, MT. 49 pp.

Roy, K.D. **1991**. Ecology of reintroduced fishers in the Cabinet Mountains of northwestern Montana. M.S. Thesis. University of Montana, Missoula, MT

Waller, A.J. **1992**. Seasonal use of river otters in northwestern Montana. M.S. Thesis. University of Montana, Missoula. 75 p.

Bergman, H.L., M.J. Szumski, and D.J. Dziak. **1993**. Final Report: Exposure to and injury from environmental metal contamination on semi-aquatic mammals in the upper Clark Fork River, Montana. Red Buttes Environmental Biology Laboratory, Univ. of Wyoming, Laramie.

Heinemeyer, K.S. **1993**. Temporal dynamics in the movements, habitat use, activity and spacing of reintroduced fishers in northwestern Montana. M.S. thesis. Univ. of Montana, Missoula. 158 p.

Kujala, Q.J. **1993**. Winter habitat selection and habitat status of pine marten in southwest Montana. M.S. thesis. Montana State Univ., Bozeman. 58 p.

Vore, J. **1993**. Guidelines for the reintroduction of beaver into southwest Montana streams. Montana Dept. Fish, Wildlife and Parks, Helena, MT. 34 p.

Coffin, K.W. **1994**. Population characteristics and winter habitat selection by pine marten in southwest Montana. M.S. thesis. Montana State Univ., Bozeman. 94 p.

Giddings, B. and C.J. Knowles. **1995**. The current status of swift fox in Montana. Pages 101-120 *in* Allen, S.H., J.Whitaker-Hoagland, and E. Dowd-Stukel, editors. Report of the swift fox conservation team. North Dakota Game and Fish Dept., Bismark, ND.170 pp.

Giddings, B. **1996**. Distribution and investigations of swift fox in Montana. Pages 25-29 *in* Luce, B. and F. Lindsey, editors. Annual report of the swift fox conservation team. Wyoming Game and Fish Dept., Lander, WY. 110 pp.

Aune, K.E., and P. Schlandweiler. **1997**. Age, sex structure, and fecundity of the American marten. Pages 61-77 in G. Proulx, H.N. Harestad, and P.M. Woodard, *eds*. Martes: Taxonomy, Ecology, and Management. The Provincial Museum of Alberta, Edmonton, Alberta, Canada.

Coffin, K.W., Q.J. Kujala, R.J. Douglas, and L.R. Irby. **1997**. Interactions among marten prey availability, vulnerability, and habitat structure. Pages 199-210 in G. Proulx, H.N. Harestad, and P.M. Woodard, *eds*. Martes: Taxonomy, Ecology, and Management. The Provincial Museum of Alberta, Edmonton, Alberta, Canada.

Kahn, R., L. Fox, P. Horner, B. Giddings, and C. Roy. **1997**. Conservation Assessment and conservation strategy for swift fox in the United States. Colorado Division of Wildlife, Denver, CO. 54 p.

Zimmerman, A.L. and B. Giddings. **1997**. Preliminary findings of swift fox studies in Montana. Pages 27-44 in Giddings, B., editor. Swift fox conservation team annual report. Montana Fish, Wildlife and Parks, Helena, MT. 105 pp.

Zimmerman, A.L. **1998**. Reestablishment of swift fox in north central Montana. M.S. Thesis. Montana State University, Bozeman. 44 pp.

Giddings, B. **1999**. Swift fox management activities in Montana. Pages 18-22 in Roy, C., editor. 1998 swift fox conservation team annual report. 107 pp.

Giddings, B. **2000**. Montana swift fox management activities. Pages 191-201 in Schmitt, G.C., editor. Swift fox conservation team 1999 annual report. New Mexico Dept. of Game and Fish, Santa Fe, NM. 201 pp.

Cegelski, C. **2001**. An evaluation of genetic diversity, gene flow, and population genetic structure among wolverine (*Gulo gulo*) populations in the Rocky Mountains. M.S. Thesis. University of Idaho, Moscow, Idaho. 67 p.

Giddings, B. **2001**. Montana swift fox management activities. Pages 40-44 in Schmitt, G.C. and B. Oakleaf, editors. Swift fox conservation team 2000 annual report. New Mexico Dept. of Game and Fish, Santa Fe, NM. 103 pp.

Moehrenschlager, A., and C. Moehrenschlager. **2001**. Census of swift fox (*Vulpes velox*) in Canada and northern Montana: 2000-2001. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 24. Edmonton, AB. 21 p.

Coffin, K., C. Fager, Q. Kujala, L. Irby, and R. Douglas. **2002**. Winter ecology of American marten in southwestern Montana. Montana Fish, Wildlife and Parks, Wildlife Division, Technical Bulletin, Fed. Aid Project W-100-R. Helena, MT. 54 p.

Giddings, B. **2002**. Montana swift fox management activities, 2001-2002. Pages 48-52 in Peek, M.S., editor. Swift fox conservation team 2001 annual report. Kansas Dept. of Wildlife and Parks, Emporia, KS. 120 pp.

Cegelski, C.C., L.P. Waits, and N.J. Anderson. **2003**. Assessing population structure and gene flow in Montana wolverines (*Gulo gulo*) using assignment-based approaches. Molecular Ecology 12, 2907-2918.

Dowd-Stukel, E., C. Slivinski, and B. Giddings. **2003**. A design for species restoration – development and implementation of a conservation assessment and conservation strategy for swift fox in the United States. In Sovada, M.A. and L.Carbyn, editors. The swift fox: ecology and conservation of swift foxes in a changing world. Canadian Plains Research Center, University of Regina, Regina, Saskatchewan. 250 pp.

Giddings, B. **2003**. Management activities for swift fox in Montana. Pages 10-13 in Grenier, M., editor. Swift fox conservation team 2002 annual report. Wyoming Game and Fish Dept., Lander, WY. 73 pp.

Knowles, C.J., P.R. Knowles, B. Giddings, and A.R. Dood. **2003**. The historic and recent status of the swift fox in Montana. In Sovada, M.A. and L.Carbyn, editors. The swift fox: ecology and conservation of swift foxes in a changing world. Canadian Plains Research Center, University of Regina, Regina, Saskatchewan. 250 pp.

Kolbe, J.A., J.R. Squires, and T.W. Parker. **2003**. An effective box trap for capturing lynx. Wildlife Society Bulletin 31(4):1-xxx.

Vinkey, R.S. **2003**. An evaluation of fisher (*Martes pennanti*) introductions in Montana. M.S. Thesis. University of Montana, Missoula, Montana. 97 p.

Zimmerman, A.L., L. Irby, and B. Giddings. **2003**. The status and ecology of swift foxes in north-central Montana. In Sovada, M.A. and L.Carbyn, editors. The swift fox: ecology and conservation of swift foxes in a changing world. Canadian Plains Research Center, University of Regina, Regina, Saskatchewan. 250 pp.

Squires, J.R., K.S. McKelvey, and L.F. Ruggiero. **2004**. A snow-tracking protocol used to delineate local lynx, *Lynx Canadensis*, distributions. Canadian Field-Naturalist 118(4):583-589.

Ausband, D.E. **2005**. Assessing the success of swift fox reintroductions on the Blackfeet Indian Reservation, Montana. M.S. Thesis. University of Montana, Missoula, MT. 52 pp.

Giddings, B. and R. Rauscher. **2005**. Monitoring population status of swift fox in Montana. Pages 29-33 in Grenier, M. and H. Whitlaw, editors. Swift fox conservation team 2003 annual report. Wyoming Game and Fish Dept., Lander, WY. 108 pp.

Kolbe, J.A. **2005**. The effects of snowmobile trails on coyote movements within lynx home ranges. M.S. Thesis. University of Montana, Missoula, MT. 35 pp.

Ulizio, T.J. **2005**. A noninvasive survey method for detecting wolverine. M.S. Thesis. University of Montana, Missoula, MT. 56 pp.

Ausband, D.E. and E.A. Ausband. **2006**. Notes: observations of interactions between swift fox and American badger. Prairie Naturalist 38(1):63-64.

Giddings, B**. 2006**. Swift fox monitoring activities in Montana. Pages 7-9 in Stuart, J.N. and S. Wilson, editors. Swift fox conservation team annual report for 2004. New Mexico Dept. of Game and Fish, Santa Fe, NM. 86 pp.

McKelvey, K.S., J. Von Kienast, K.B. Aubry, G.M. Koehler, B.T. Maletzke, J.R. Squires, E.L. Lindquist, S. Loch, and M.K. Schwartz. **2006**. DNA analysis of hair and scat collected along snow tracks to document the presence of Canada lynx. Wildlife Society Bulletin:461-455

Moehrenschlager, A., and C. Moehrenschlager. **2006**. Population census of reintroduced swift fox (*Vulpes velox*) in Canada and northern Montana: 2005/2006. Centre for Conservation Research Report No. 1. Calgary Zoo, Calgary, Alberta, Canada. 32 p.

Moehrenschlager, A., S. Alexander, and T. Brichieri-Colombi. **2006**. Habitat suitability and population viability analysis for reintroduced swift foxes in Canada and northern Montana. Centre for Conservation Report No. 2, Calgary, Alberta, Canada. 30 pp.

Vinkey, R.S., M.K. Schwartz, K.S. McKelvey, K.R. Foresman, K.L. Pilgrim, B.J. Giddings, and E.C. LoFroth. **2006**. When reintroductions are augmentations: The genetic legacy of fishers (*Martes pennanti*) in Montana. Journal of Mammalogy, 87(2):265-271.

Ulizio, T.J., J.R. Squires, D. Pletscher, M.K. Schwartz, J. Claar, and L.F. Ruggiero. **2006**. The efficacy of obtaining genetic-based identifications from putative wolverine snow tracks. Wildlife Society Bulletin 34:1326-1332.

Aubry, K.B., K.S. McKelvey, and J.P. Copeland. **2007**. Distribution and broadscale habitat relations of the wolverine in the contiguous United States. Journal of Wildlife Management 71(7):2147-2158.

Ausband, D.E. and K.R. Foresman. **2007**. Swift fox reintroductions on the Blackfeet Indian Reservation, Montana, USA. Biological Conservation 136:423-430.

Ausband, D.E. and K.R. Foresman. **2007**. Dispersal, survival, and reproduction of wild-born, yearling swift foxes in a reintroduced population. Canadian Journal of Zoology 85:185-189.

Brock, B.L., R.M. Inman, K.H. Inman, A.J. McCue, M.L. Packila, and B. Giddings. **2007**. Broad-scale wolverine habitat in the conterminous Rocky Mountain states. Pages 21-53 in Cumulative Report. Greater Yellowstone Wolverine Program, Wildlife Conservation Society. Bozeman, MT. 128 pp.

Giddings, B**. 2007**. Monitoring resident swift fox populations during 2005 and 2006 in Montana. Pages 9-15 in Dowd Stukel, E. and D.M. Fecske, editors. Swift fox conservation team report for 2005-2006. South Dakota Dept. Game, Fish and Parks, Pierre, SD.97 pp.

Inman, R.M., K.H. Inman, A.J. McCue, and M.L. Packila. **2007**. Wolverine Harvest in Montana: Survival rates and spatial considerations for harvest management. Pages 85-97 in Cumulative Report. Greater Yellowstone Wolverine Program, Wildlife Conservation Society. Bozeman, MT. 128 pp.

Kolbe, J.A., J.R. Squires, D.H. Pletscher, and L.F. Ruggiero. **2007**. The effects of snowmobile trails on coyote movements within lynx home ranges. Journal of Wildlife Management 71(5):000-000.

Kolbe, J.A. and J.R. Squires. **2007**. Circadian activity patterns of Canada lynx in western Montana. Journal of Wildlife Management 71(5):000-000.

Squires, J.R., J.P. Copeland, T.J. Ulizio, M.K. Schwartz, and L.F. Ruggiero. **2007**. Sources and patterns of wolverine mortality in western Montana. Journal of Wildlife Management 71(7):2213-2220.

Squires, J.R. and L.F. Ruggiero. **2007**. Winter prey selection of Canada lynx in northwestern Montana. Journal of Wildlife Management 71:310-315.

Anderson, N.J. and K.E. Aune. **2008**. Fecundity of female wolverine in Montana. Intermountain Journal of Sciences. Vol. 14, No. 1-3:17-30.

Copeland, J.P. and R.E. Yates. **2008.** Wolverine population assessment in Glacier National Park: Comprehensive summary update. USDA Forest Service, Rocky Mountain Research Station, Missoula, MT. 15 pp.

Giddings, B. **2008**. Swift fox populations in Montana, 2007. Pages 5-7 in Krueger, B. and M. Ewald, editors. Swift fox conservation team report for 2007. Wyoming Game and Fish Dept., Laramie, WY. 70 pp.

Kudray, G.M., and T. Schemm. **2008**. Wetlands of the Bitterroot Valley: Change and ecological functions. Montana Natural Heritage Program. Prepared for Montana Dept. Environmental Quality, Helena, MT. 32 p.

Squires, J.R., N.J. DeCesare, J.A. Kolbe and L.F. Ruggiero. **2008**. Hierarchical den selection of Canada lynx in western Montana. Journal of Wildlife Management 72:1497-1506.

Giddings, B. **2009**. Montana annual swift fox report, pages 17-20 in Isakson, P. editor. Swift fox conservation team: Report for 2008. North Dakota Game and Fish Dept., Bismarck, ND. 67 p.

Inman, R.M., M.L. Packila, K.H. Inman, B. Aber, R. Spence, and D. McCauley. **2009**. Greater Yellowstone Wolverine Program, Progress Report-December 2009. Wildlife Conservation Society, North America Program, General Report, Bozeman, Montana.

Rauscher, R.L. **2009**. Fort Peck Indian Reservation swift fox translocation report. Montana Fish, Wildlife and Parks, Region Six, Glasgow, MT. 5 pp.

Schwartz, M.K., J.P. Copeland, N.J. Anderson, J.R. Squires, R.M. Inman, K.S. McKelvey, K.L. Pilgrim, L.P. Watts, and S.A. Cushman. **2009**. Wolverine gene flow across a narrow climatic niche. Ecology 90(11):3222-3232.

Sovada, M.A., R.O. Woodward, and L.D. Igl. **2009**. Historical range, current distribution, and conservation status of the swift fox, *Vulpes velox*, in North America. The Canadian Field-Naturalist Vol. 123: 346-367.

Tremain, K.M. **2009**. Assessing climate induced range shifts in bobcats (*Lynx rufus*) in the northern Rockies. M.S. Thesis. Columbia University, New York, NY. 73 pp.

Squires, J.R., N.J. DeCesare, J.A. Kolbe, and L.F. Ruggiero. **2010**. Seasonal resource selection selection of Canada lynx in managed forests of the Northern Rocky Mountains. Journal of Wildlife Management 74:1648-1660.

Dowd Stukel, E., editor. **2011**. Conservation assessment and conservation strategy for swift fox in the United States – 2011 update. South Dakota Game, Fish and Parks, Pierre, SD. 98 pp.

Giddings, B. **2011**. Montana 2009 and 2010 swift fox report. Pages 13-17 in Bly, K. , editor. Swift fox conservation team: report for 2009-2010. World Wildlife Fund, Bozeman, MT and Montana Fish, Wildlife and Parks, Helena, MT.

Inman, R.M., M.L. Packila, K.H. Inman, A.J. McCue, G.C. White, J. Persson, B.C. Aber, M.L. Orme, K.L. Alt, S.L. Cain, J.A. Fredrick, B.J. Oakleaf, and S.S. Sartorius. **2011**. Spatial Ecology of wolverines at the southern periphery of distribution. Journal of Wildlife Management, Research Article 9999:1-15

Inman, R.M, B.L. Brock, K.H. Inman, S.S. Sartorius, B.C. Aber, B. Giddings, S.L. Cain, M.L. Orme, J.A. Fredrick, B.J. Oakleaf, K.L. Alt, E. Odell, and G. Chapron. **2011**. Developing a spatial framework and conservation priorities for a wolverine metapopulation.

Magoun, A.J., C.D. Long, M.K. Schwartz, K.L. Pilgrim, R.E. Lowell, and P. Valkenburg. **2011**. Integrating motion-detection cameras and hair snags for wolverine identification. Journal of Wildlife Management 75(3):731-739.

Newton, D.E. **2011**. Northern river otter population assessment and connectivity in western Montana. M.S. Thesis. University of Montana, Missoula, MT. 57 pp.

Alexander, J.L. **2012**. Swift fox distribution and population connectivity in eastern Montana. M.S. Thesis. St. Cloud State University, St. Cloud, MN. 74 pp.

Inman, R.M, M.L. Packila, K.H. Inman, A.J. McCue, G.C. White, J. Persson, B.C. Aber, M.L. Orme, K.L. Alt, S.L. Cain, J.A. Fredrick, B.J. Oakleaf, and S.S. Sartorious. **2012**. Spatial ecology of wolverines at the southern periphery of distribution. Journal of Wildlife Management 76(4):778-792.

Newton, D. and K.R. Foresman. **2012**. Status of Northern river otters in the Upper Clark Fork River. Report to Montana Natural Resource Damage Program and Montana , Fish, Wildlife and Parks. 40 pp.

Inman, R.M., A.J. Magoun, J. Persson, and J. Mattisson. **2012**. The wolverine's niche: Linking reproductive chronology, caching, competition, and climate. Journal of Mammalogy 93(3):634-644.

Squires, J.R., L.E. Olson, D.L. Turner, N.J. DeCesare, and Jay Kolbe. **2012**. Estimating detection probability for Canada lynx *lynx canadensis* using snow-track surveys in the northern Rocky Mountains, Montana, USA. Wildlfe Biology 18:215-224.

Giddings, B. **2013**. Swift fox monitoring and management in Montana. Pages 9-11 in Stratman, M.R., editor. Swift fox conservation team: report for 2011-2012. Colorado Division of Parks and Wildlife. Fort Collins, CO.

Inman, R.M. **2013**. Wolverine ecology and conservation in the western United States. PhD Thesis No. 2013:4. Swedish University of Agricultural Sciences, Uppsala, Sweden.

Newbury, R.K. **2013**. Behavioral ecology of the bobcat in a region with deep winter snows. University of British Columbia, Okanagan, B.C. 181 pp.

Squires, J.R., N.J. DeCesare, L.E. Olson, J.A. Kolbe, M. Hebblewhite, and S.A. Parks. **2013**. Combining resource selection and movement behavior to predict corridors for Canada lynx at their southern range periphery. Biological Conservation 157:187-195.