SURVEY OF FISH AND GAME PROBLEMS IN NEVADA

BULLETIN No. 36

Nevada Legislative
Counsel Bureau

JANUARY 1959

Carson City, Nevada

SURVEY OF FISH AND GAME PROBLEMS IN NEVADA

BULLETIN No. 36

Nevada Legislative Counsel Bureau

JANUARY 1959

Carson City, Nevada

STATE PRINTING OFFICE CARSON CITY, NEVADA
JACK McCARTHY, STATE PRINTER
1959

LEGISLATIVE COMMISSION

B. Mahlon Brown	Senate Member
Charles D. Gallagher	Senate Member
Farrell L. Seevers	Senate Member
Walter Whitacre	Senate Member
Bruce Barnum	Assembly Member
Chester S. Christensen	Assembly Member
Marvin B. Humphrey	Assembly Member
Archie Pozzi, Jr.	Assembly Member

A. N. Jacobson	Legislative Auditor
J. E. Springmeyer	Legislative Counsel

FOREWORD

The Nevada Legislative Counsel Bureau is a fact-finding organization designed to assist legislators, State officers, and citizens in obtaining the facts concerning the government of the State, proposed legislation, and matters vital to the welfare of the people. The staff will always be nonpartisan and nonpolitical; it will not deal in propaganda, take part in any political campaign, nor endorse or oppose any candidates for public office.

The primary purpose of the Counsel Bureau is to assist citizens and officials in obtaining effective State government at a reasonable cost. The plan is to search out facts about government and to render unbiased interpretations of them. Its aim is to cooperate with public officials and to be helpful rather than critical. Your suggestions, comments, and criticisms will greatly aid in accomplishing the object for which we are all working—the promotion of the welfare of the State of Nevada.

TABLE OF CONTENTS

1957 SESSION, NEVADA LEGISLATURE

SENATE RESOLUTION NO. 20

Memorializing the Legislative Counsel Bureau to study fish and game management, policies, organization and fiscal matters in the State of Nevada, and problems incidental thereto.

Whereas, the 1947 Session of the Nevada Legislature enacted Chapter 101, Statutes of Nevada 1947, which provided for expanded fish and game management and regulation at the state level; and

Whereas, The 1947 law has been amended many times since its inception, thus pointing up the changes in the problems and viewpoints on fish and game matters through the years; and

Whereas, Total disbursements of the Fish and Game Commission have been increasing through the years as evidenced by the fact that total disbursements during the fiscal year 1949–1950 were $468,226 and total disbursements during the fiscal year 1955–1956 were $910,800; and

Whereas, Difference of opinion has arisen between various sportsmen and citizens of the state on fish and game management, policies and organization; and

Whereas, A special committee appointed by the Legislative Commission to study fish and game problems was handicapped by the fact that the time allotted was not sufficient to appraise the entire program; and

Whereas, It appears desirable that an adequate study be made of fish and game management, policies and organization, and problems incidental thereto; now, therefore, be it

Resolved by the Senate of the State of Nevada, That the Legislative Counsel Bureau be memorialized to study fish and game management, policies, organization and fiscal matters in the State of Nevada and the problems incidental thereto; and be it further

Resolved, That a report relative thereto be presented to the 1959 Session of the Nevada Legislature for study and consideration.

PREFACE

During the 1957 Session of the Nevada Legislature, the Senate adopted Senate Resolution No. 20 which required the Legislative Counsel Bureau to study fish and game management, policies, organization, and fiscal matters in the State of Nevada, and problems incidental thereto. The study programs of the Legislative Counsel Bureau are guided by the Legislative Commission, which is composed of four Senators and four Assemblymen. As a first step, the Legislative Commission appointed a committee of nine citizens and sportsmen, known as the Consultant Committee on Fish and Game, to determine sportsmen's viewpoints on these matters. The members of the Committee were Mr. Roger Teglia, Chairman, of Reno, Mr. Jack H. Burns of Yerington, Mr. Calvin J. Liles of Las Vegas, Mr. Paul P. Conlan of Austin, Mr. James Wood of Fallon, Mr. William P. Beko of Tonopah, Mr. Hugh M. White of Ely, Mr. Al Conelly of Babbitt, and Mr. William Milich of Lovelock.

On November 25, 1957, the Legislative Commission defined the scope of work of the Consultant Committee, and charged the Committee with the primary duty of determining the opinions, viewpoints, and desires of the sportsmen of the State of Nevada on various fish and game problems. It was eventually determined that the best and most effective way of carrying out this assignment was by the use of a questionnaire. Although the Legislature appropriated no specific funds to make this study, expenses were paid out of the regular appropriation of the Legislative Counsel Bureau by deducting from some of the other projects and by using a portion of the sum of $19,500 that was appropriated to cover a variety of other studies.

It should be noted that, in order to carry out the Legislature's directive, much more than a questionnaire was involved. The Legislative Commission ordered that competent technical staff be employed to gather facts on the organization, administration, policies, and fiscal matters of the Fish and Game Commission. The Legislative Counsel Bureau contracted with Mr. Fred P. Cronemiller to direct the survey. A crew of five was employed, each one working individually on major sections of the study. These included Mr. Thomas L. Kimball, Director of the Colorado Game and Fish Commission; Dr. Paul R. Needham, Professor of Zoology (Fisheries), University of California; Dr. A. Starker Leopold, Professor of Zoology (Game Management), University of California; Eugene Lepley, Assistant Chief, Division of Operation (Business Management), U. S. Forest Service, San Francisco, California; and Everett E. Horn, Consultant to the California Wildlife Conservation Board and a widely known authority on waterfowl. A brief biography of each member of the crew precedes each section of the report.

In addition, Mr. Stuart B. Show prepared Chapter III of Part II, which is an abstract of the Gabrielson Report of 1951. Mr. Show served as Regional Forester of the California Region of the U. S. Forest Service for 20 years, and then became Forester in the Food and Agricultural Organization of the United Nations. He was a

co-author of the Wildlife Management Handbook for the aforesaid California Region, and senior author of the wildlife management section of U. S. Senate Document 199, the Western Range.

Also, Mr. Clyde N. Walker served as editor of the reports prepared by the survey crew. Mr. Walker is a member of the staff of the California Forest and Range Experiment Station, where he prepares periodic reports and edits drafts of bulletins and other publications issued by the staff.

Except for Chapter III of Part II, the sections for which no author is indicated were written by Mr. Cronemiller. Mr. Cronemiller ended his career with the U. S. Forest Service this year, retiring on January 31. He had spent many years in range work and in National Forest Administration, becoming Chief of the Division of Range and Wildlife Management in the California Region in 1935. In 1945 a separate Division of Wildlife Management was created, and he served as its Chief until his retirement. In the last 10 years he has worked in close cooperation with the California Department of Fish and Game on mutual problems and objectives. He worked actively with the Nevada Commission on the problems of the Washoe interstate deer herd and earlier worked on parts of what is now the Toiyabe National Forest. He also worked along the state line in Idaho and Utah.

His recent work has been in two major fields, one of fitting all of the uses of public lands together, including that of big game, and, second, that of attempting to preserve the trout fisheries in the development of many power and irrigation projects, acting as intermediary between the development agencies and companies and those interested in preserving recreation values.

The study is divided into two parts. Part I consists of an analysis of the questionnaires sent to all persons holding resident hunting and combined hunting-fishing licenses for the year 1958 by the Consultant Committee on Fish and Game and, secondly, the viewpoints and recommendations of the Consultant Committee.

Part II consists of 12 chapters prepared by the survey team directed by Mr. Cronemiller, along with major findings and recommendations of the survey team. The appendix material was also prepared by Mr. Cronemiller.

Copies of this study may be obtained without cost from the Nevada Legislative Counsel Bureau, Carson City, Nevada.

J. E. SPRINGMEYER,
Legislative Counsel.

SURVEY OF FISH AND GAME PROBLEMS IN NEVADA

PART I

REPORT AND RECOMMENDATIONS OF THE CONSULTANT COMMITTEE ON FISH AND GAME

THE QUESTIONNAIRE

Approximately 36,644 questionnaires were sent out to all persons holding resident hunting or combined hunting-fishing licenses for the current year. Of this number, it has been conservatively estimated by information received from several post offices that at least 8,000 of these questionnaires could not be delivered. The non-delivery was occasioned by the second-class method of mailing which does not provide for forwarding.

The table below indicated the total number of questionnaires received from the several counties of the State at the time of this preliminary report.

	Total number received
Churchill	599
Clark	1,910
Douglas	190
Elko	1,237
Esmeralda	38
Eureka	76
Humboldt	498
Lander	202
Lincoln	211
Lyon	502
Mineral	454
Nye	281
Ormsby	399
Pershing	248
Storey	37
Washoe	3,602
White Pine	597
Miscellaneous	14
State Totals	11,095

Some states have canvassed holders of such licenses, but have done so by mailing to every fifth or tenth name in the files. The survey conducted by Nevada included all persons on file who held licenses. The questionnaire was not mailed to those who held a current fishing

license, as the nature of the questions asked were related almost entirely to hunting. Questionnaires were not mailed to nonresident holders of current hunting or combination hunting-fishing licenses.

Of the 28,000 questionnaires which were estimated to have been actually delivered in the mails to holders of hunting licenses, over 11,000 were returned and tabulated. This represents a return of about 40 percent.

Subsequent pages contain the final state totals for each question and subquestion. In addition, there appears the percentage figures representing the proportion of answers which favored the selections made by the hunters.

SUMMARY OF COMMENTS ATTACHED TO FISH AND GAME QUESTIONNAIRES

The fish and game questionnaires which were mailed to those persons holding hunting, or combined hunting and fishing licenses, provided a space for general comments. There was no indication that the comments should be in regard to specific questions which were covered in the questionnaires.

Those who took advantage of the area left for general comments did not, as a rule, indicate by number the relationship of their comment to questions on the questionnaires. However, when a comment was made about a specific question it was not difficult, in most cases, to determine the relationship between the comment and one of the 21 questions.

One of the most interesting features of the comments made was the frequent reference to specific points about fish and game problems which were not touched upon by the questionnaire. This enabled us to obtain information on the thinking of hunters on a number of problems in addition to those covered. Also of interest were the very general comments about Fish and Game Commission policies and other aspects which gave indication of hunter thinking and reaction to hunting and fishing in Nevada.

The mechanical method employed in sorting out these comments and compiling a summary of them was as follows: First, it was necessary to type on individual index cards every comment made. It was necessary to use several cards for one questionnaire in the event the individual commented on a number of separate ideas. The Nevada State Prison furnished the labor for this part of the job, and were instructed to carefully note on each card the name of the county from which the separate comment originated. There were some lengthy discourses and complex series of comments made on some of the questionnaires. They were instructed to set aside any comments which were of this nature and these were broken down by the Legislative Counsel Bureau staff and typed on separate cards by the Bureau. The net result was 3,471 index cards, each containing a separate and distinct idea taken from the comment section of the questionnaire, and identified by county of origin.

	State	Churchill	Clark	Douglas	Elko	Esmeralda	Eureka	Humboldt	Lander	Lincoln	Lyon	Mineral	Nye	Ormsby	Pershing	Storey	Washoe	White Pine
1. At the present time, one member of the Fish and Game Commission is elected from each of the seventeen counties of the State.																		
a. Would you prefer the present number of seventeen Commissioners? (82%)	7992	476	1385	141	929	34	64	425	167	175	405	343	217	274	191	27	2272	461
OR																		
b. Would you prefer a smaller number of Commissioners? (18%)	1770	81	322	23	156	2	4	28	15	15	50	60	39	77	24	4	806	59
c. Would you prefer the election of the Commissioners? (85%)	7260	407	1295	100	304	26	55	338	136	150	329	296	173	245	163	24	2314	399
OR																		
d. Would you prefer that the Commissioners be appointed by the Governor? (15%)	1302	73	266	19	92	4	4	37	6	10	53	52	31	59	19	1	512	63
2. There are in each county of the State, three persons appointed by the county commissioners as members of the county game management boards. The State Fish and Game Commission and the county game management boards jointly determine open and closed season dates and types of seasons. The county boards alone determine where fish and game are planted. Generally speaking and in actual practice, the county boards determine nonresident quotas in given counties with the approval of the State Commission.																		
a. Would you favor retaining this system of dual control?																		
Yes (88%)	8766	510	1590	140	1012	35	60	418	165	168	429	401	230	262	213	22	2611	494
No (12%)	1236	51	205	9	123	....	2	37	16	22	26	21	16	63	12	2	588	40
b. If you favor retaining this system of dual control, should open seasons and nonresident quotas be set by:																		
(1) County game management boards? (58%)	5555	358	778	103	730	....	45	383	129	146	285	243	157	182	153	19	1414	398
OR																		
(2) The State Fish and Game Commission? (42%)	3969	169	912	42	388	11	15	80	39	37	158	178	79	130	52	6	1533	137
3. Would you favor increased legislative control of the expenditures of the Fish and Game Commission?																		
Yes (54%)	5136	307	780	98	534	10	25	214	76	100	216	204	121	202	113	18	1820	292
No (46%)	4384	233	857	69	541	22	30	205	105	81	203	180	116	143	80	12	1277	226
4. Would you favor having hunting and fishing licenses issued on a July to June fiscal year basis, rather than on a calendar year basis, as at present?																		
Yes (59%)	6071	335	1110	112	517	15	24	206	92	112	291	281	117	242	128	23	2146	313
No (41%)	4182	224	683	59	630	22	36	232	86	85	165	143	135	121	90	7	1201	257
5. Approximately 7,000 free hunting and fishing licenses are issued each year to persons over 60 years of age who have been residents of the State of Nevada for 10 years, and to Indians.																		
a. Would you favor abolishing free license privileges for such persons over 60 years of age?																		
Yes (15%)	1576	79	125	57	193	10	5	60	27	25	68	63	41	70	34	6	632	78
No (85%)	9152	504	1665	127	1021	28	69	421	170	180	412	385	233	323	200	26	2872	506
b. Would you favor abolishing free license privileges for Indians?																		
Yes (36%)	3794	281	427	80	510	19	28	182	69	81	239	183	102	184	83	12	1120	188
No (64%)	6815	302	1438	103	692	18	47	296	125	116	232	263	168	197	140	19	2299	364
c. If you favor *retaining* free license privileges, do you believe that the Legislature should appropriate public funds to offset the expense of providing fish and game for such persons over 60 years of age and for Indians?																		
Yes (64%)	5667	302	1124	79	528	24	25	225	88	92	234	266	158	182	114	14	1899	305
No (36%)	3234	193	526	60	453	7	30	193	86	85	165	126	74	133	71	12	924	94
6. Full-priced adult hunting and fishing licenses are required at 16 years of age. Would you favor combination juvenile hunting and fishing licenses, costing a nominal sum but not exceeding 50 cents, for juveniles of 12 to 16 years of age, thus enabling them to obtain game tags without buying adult licenses at full price, and encouraging responsibility and respect for game laws?																		
Yes (66%)	7020	408	1249	130	788	25	54	322	111	135	331	309	192	234	138	15	2169	404
No (34%)	3585	179	519	56	415	10	16	166	83	70	155	131	79	153	93	16	1274	164

	State	Churchill	Clark	Douglas	Elko	Esmeralda	Eureka	Humboldt	Lander	Lincoln	Lyon	Mineral	Nye	Ormsby	Pershing	Storey	Washoe	White Pine
7. A system of low-cost tags purchased by the hunter would limit the number of game birds taken by one hunter per year, even during long open season. Also, this would provide the hunter who travels a long distance, the opportunity of obtaining his season limit within a short period. Would you like to see such a system in effect for:																		
a. Sage grouse?																		
Yes (57%)	5466	227	1164	103	595	18	27	154	41	90	224	218	108	194	90	12	1890	305
No (43%)	4204	292	431	56	500	19	36	300	141	89	224	181	117	163	128	14	1315	193
b. Chukars?																		
Yes (52%)	4982	208	1062	94	496	17	17	128	33	89	220	201	111	180	67	12	1742	296
No (48%)	4551	327	440	71	538	19	46	328	148	89	223	201	109	174	147	15	1474	197
c. Geese (dark species)?																		
Yes (54%)	5334	176	1242	71	478	17	21	135	46	79	234	212	130	202	70	18	1926	272
No (46%)	4539	352	507	85	524	14	37	303	116	90	241	184	115	192	132	9	1417	216
8. Are you in favor of the acquisition (Purchase or Lease) by the Fish and Game Commission of real property for:																		
a. Waterfowl production and hunting?																		
Yes (80%)	8013	349	1515	144	717	33	39	278	125	143	395	351	168	322	140	22	2775	487
No (20%)	2034	194	219	34	341	1	22	161	52	41	88	69	63	55	78	7	540	67
b. Access to streams, lakes and hunting and fishing areas?																		
Yes (82%)	8057	379	1482	131	749	30	35	305	119	146	394	346	173	316	138	27	2808	472
No (18%)	1825	155	238	39	304	1	28	145	59	37	90	68	57	54	76	3	403	65
c. Wildlife refuges?																		
Yes (81%)	8037	353	1538	139	796	30	29	283	121	163	377	359	184	294	148	26	2744	447
No (19%)	1864	170	190	32	286	....	31	161	56	29	74	50	46	65	65	6	527	72
d. Lands for big game management purposes?																		
Yes (74%)	7295	312	1434	123	775	30	28	222	107	124	315	317	160	235	119	19	2460	507
No (26%)	2607	211	277	42	382	1	32	216	64	59	143	88	73	107	89	12	753	53
9. Should land acquired by the Fish and Game Commission from private owners for game management purposes remain on the tax rolls?																		
Yes (43%)	4374	302	628	83	563	11	41	226	123	118	260	180	134	166	104	7	1167	254
No (57%)	5849	244	1135	95	608	25	22	230	68	79	210	250	114	196	112	22	2138	296
10. Do you believe that the harvesting of does is essential to proper deer management?																		
Yes (71%)	7339	381	1588	143	915	27	45	295	143	124	348	333	164	245	150	15	2071	346
No (29%)	2938	163	195	33	251	8	19	169	45	74	121	87	90	124	70	17	1257	210
11. When necessary to properly harvest, stabilize, or reduce a particular deer herd in a designated area, would you prefer:																		
a. An either sex season? (43%)	4367	232	767	65	487	17	29	178	74	75	223	212	104	133	89	13	1428	236
OR																		
b. A given antlerless quota in addition to the regular season? (35%)	3495	176	456	76	310	13	28	189	62	77	133	97	79	152	80	14	1330	223
OR																		
c. Both? (22%)	2245	126	598	35	378	6	15	73	48	44	112	107	62	63	47	....	437	90
12. Should a limit be placed on the number of deer tags that one person may obtain in one year?																		
Yes (89%)	9325	500	1501	162	1046	36	67	403	153	167	413	380	201	340	220	28	3186	511
No (11%)	1118	65	282	16	169	....	5	42	37	24	52	60	50	34	14	4	212	50
a. How many?																		
One tag (26%)	2132	99	226	24	135	8	22	142	30	43	96	105	59	85	45	18	865	128
Two tags (57%)	4720	266	800	76	602	23	24	198	73	80	212	163	96	166	109	5	1580	255
Three tags (13%)	1114	80	253	21	112	1	5	10	22	22	48	57	16	35	21	2	363	45
Four tags (3%)	277	30	71	9	29	2	....	2	1	4	6	12	4	5	2	....	81	18
Five or more tags (1%)	108	7	32	3	6	....	....	....	3	2	2	10	4	4	....	....	32	2
13. On nonresident deer hunters—																		
a. Do you favor the present practice of limiting the number of nonresident deer hunters, and directing them into the areas where resident hunters are not adequately harvesting the number of available deer? (74%)	7870	419	1468	149	910	35	51	308	153	136	394	336	193	299	152	13	2424	425
OR																		
b. Do you favor an unlimited number of nonresident deer hunters? (4%)	447	34	109	10	43	2	4	13	4	19	22	16	9	12	14	1	103	30
OR																		
c. Do you favor the total exclusion of nonresident deer hunters? (22%)	2380	125	295	18	245	1	20	145	40	46	66	89	62	68	62	18	952	125

	State	Churchill	Clark	Douglas	Elko	Esmeralda	Eureka	Humboldt	Lander	Lincoln	Lyon	Mineral	Nye	Ormsby	Pershing	Storey	Washoe	White Pine
14. The Fish and Game Commission has adopted a program of planting full grown pheasants at a cost of approximately $3 per bird. At the present time, the Commission is authorized by law to charge a fee of 25 cents per tag to partially offset the cost of the program. The hunting areas are located for the most part in five western counties.																		
a. Are you in favor of this pheasant planting program?																		
Yes (79%)	7660	375	1550	141	712	29	40	298	107	144	338	325	198	296	163	23	2516	400
No (21%)	1997	167	153	19	342	6	14	130	65	47	103	65	37	59	51	3	625	106
b. Should pheasant hunters obtain free tags? (14%)	1329	120	120	16	84	....	9	93	16	22	116	60	21	47	53	7	507	37
OR																		
c. Should pheasant hunters pay a fee of 25 cents per tag? (57%)	5353	283	1022	105	468	21	20	202	74	82	251	266	126	214	93	11	1833	275
OR																		
d. Should pheasant hunters pay the entire cost of the program? (29%)	2712	94	508	33	470	9	30	116	72	85	66	76	90	73	53	2	736	197
15. On an experimental basis, year-round fishing seasons have been established on most of the waters of the State of Nevada. Would you favor year-round fishing on:																		
a. Lakes and ponds?																		
Yes (85%)	8797	501	1685	149	908	34	55	356	161	179	411	412	246	345	196	20	2660	470
No (15%)	1544	68	136	21	250	2	10	111	24	21	61	27	18	43	45	9	580	116
b. Streams and rivers?																		
Yes (67%)	6916	385	1349	106	806	33	60	231	170	146	310	288	200	241	148	15	2020	398
No (33%)	3463	180	438	56	361	3	8	230	19	53	169	150	64	140	95	15	1329	152
16. On fish and game contests—																		
a. Should the Fish and Game Commission be authorized by law to prohibit or control game contests in the State of Nevada?																		
Yes (60%)	6174	306	1010	114	835	32	41	291	85	119	261	218	145	222	128	19	2035	308
No (40%)	4118	235	777	55	317	4	26	175	101	72	204	190	98	142	91	11	1372	243
b. Should the Fish and Game Commission be authorized by law to prohibit or control fish contests in the State of Nevada?																		
Yes (54%)	5362	262	843	99	700	29	36	243	75	98	237	89	117	203	98	14	1928	285
No (46%)	4637	271	887	64	434	4	30	219	99	88	220	208	112	150	105	13	1470	257
17. What kind of game do you prefer to hunt?																		
a. Big game—																		
Deer (91%)	9333	505	1604	159	1018	35	66	417	174	183	403	371	245	342	211	30	3037	520
Antelope (1%)	142	7	11	4	8	....	3	5	....	1	....	8	3	3	3	....	68	18
Elk (6%)	656	25	130	7	104	1	3	35	12	16	37	29	9	7	11	....	188	42
Mountain Sheep (1%)	97	1	32	....	12	1	....	6	1	1	3	2	4	2	3	....	19	10
b. Waterfowl—																		
Ducks (74%)	6778	317	1122	109	711	29	37	311	134	141	277	222	169	242	159	19	2419	350
Geese (26%)	2353	176	515	41	247	9	17	90	27	30	117	149	49	90	43	4	605	143
c. Upland game—																		
Pheasants (33%)	3089	238	630	88	166	5	4	63	10	43	214	170	39	136	56	6	1087	133
Chukars (30%)	2885	200	66	24	298	16	35	288	130	17	107	116	95	85	135	17	1203	50
Sage Grouse (19%)	1774	43	114	16	499	6	26	82	30	50	49	53	59	45	16	....	405	278
Doves (5%)	500	17	172	6	48	5	....	3	1	9	16	22	14	20	4	....	125	35
Quail (13%)	1216	35	641	21	27	4	....	12	1	59	25	22	13	47	2	2	280	23
18. Were you checked by a game warden in 1957?																		
Yes (48%)	5112	239	1022	48	567	18	23	208	123	109	218	232	117	147	90	7	1600	335
No (52%)	5643	343	865	138	637	18	47	245	78	99	258	207	151	248	157	26	1951	170
19. Do you belong to a local sportsmen's organization?																		
Yes (22%)	2299	121	397	50	367	12	16	122	60	54	87	76	62	142	62	5	485	180
No (78%)	8378	456	1487	136	823	23	53	357	135	149	385	360	216	250	177	23	2940	395
20. Would you favor a curtailment of expenditures and scope of the information and Education Program of the Fish and Game Commission?																		
Yes (33%)	3319	243	348	58	420	2	29	159	72	63	148	110	102	132	81	11	1144	194
No (67%)	6610	329	1411	123	706	28	29	266	115	131	303	313	144	227	125	20	2000	334
21. Would you favor the abolition of the Nevada Fish and Game Commission and the return of control of fish and game to the individual counties of the State?																		
Yes (20%)	2121	116	135	31	371	5	20	133	60	72	99	49	103	87	81	11	514	229
No (80%)	8589	463	1738	150	826	25	46	347	134	129	383	385	172	289	156	24	2965	350

NOTE: The state totals for the answers to the questions do not include the (14) miscellaneous questionnaires which were received.

Having finished the mechanical part of the project, it became necessary to summarize, by county, these various comments. This was done by sorting the index cards into categories by the nature of comment, then reading each comment to find out the trend of thinking on a specific point. Where only a very few comments were received on a point the point was not considered. However, where several comments were received on the specific point, that issue became a statement on the summary. Where the point was controversial, and there were comments both pro and con, these were weighed and the statement on the summary was worded to indicate the majority feeling on the issue. In general, the smaller number of comments received from a county, the more attention was paid to just a few comments on a specific issue. If just a few comments were made on a point which was obviously of a high degree of importance, discretion was used and a summary statement was incorporated for that issue. The number in parenthesis after the name of each county indicates the total number of comments from that county.

Summary of Comments

Esmeralda (8)—

Harvesting of does open to question.
Closer restrictions on deer tags, only one to a hunter.

Storey (14)—

Against holding game contests.
Against holding special hunts.
Tighter control or elimination of out-of-state hunters.
Generally critical of Fish and Game Commission.

Eureka (16)—

More attention to fish planting in the county.
Free licenses for Indians—a frequent comment.
Questioned the desirability of harvesting does.

Lander (43)—

Raise fee for nonresident hunters.
More attention to fish planting in the county.
Criticism of out-of-state hunters; place greater limitations on them.
Request more and better game law enforcement.
Favor present 17-man Commission.
Strongly critical of Fish and Game Commission.

Douglas (57)—

Examinations or tests, before issuing hunting license to prove proper gun handling.
Against encouragement of juvenile hunting licenses.
Special hunts only when definite proof of excess game.
Prohibition of game contests.
Opposition to private gun clubs.
Evenly divided on support and lack of support of Fish and Game Commission.

Pershing (58)—

Divided opinion on job game wardens are doing.
Divided opinion on relaxation of juvenile hunting provisions.
Favor free Indian game licenses.
Shorter seasons on game birds.
Close areas planted to fish for a time after planting—too many following the fish trucks.
Limit deer tags to only one or two.
Some support for doe kill.
General criticism of Fish and Game Commission outweighed favorable comment.

Lincoln (63)—

Plant pheasants and close season for awhile.
Plant more fish.
Close streams after planting of fish.
Deer season too long.
Eliminate game contests.
More control of out-of-state hunters.
Heavy comment on necessity for more and better game wardens.
Criticism of game wardens using State cars for private use.
Return to county control, generally critical of Fish and Game Commission.
Information and Education Program called "propaganda."

Nye (69)—

Favor charging Indians for hunting licenses.
Close stream after fish stocking.
Divided on pheasant planting program.
Against game contests.
Too many nonresident hunters.
Closer correlation between deer tags and available game.
Game wardens not aware of laws.
Favorable comment greater than unfavorable comment in regard to Fish and Game Commission.

Mineral (113)—

Favor free licenses for those over 60.
No special privileges for Indians obtaining licenses.
Pheasant planting with reservations on the cost, hunters to pay.
Close stream, after stocking, for a period of time; no all-year fishing.
Limit of one or two deer tags per person.
Favor doe kill and relieve areas overpopulated with them.
Raise nonresident hunting license—several suggestions that fee be made similar to a nonresident fee employed in their own state.
Abolish contests or provide close supervision of hunts by wardens.
Need more and better enforcement of game laws.
Slightly weighted on comments critical of Fish and Game policies.

White Pine (114)—

Suggestions that juveniles be required to pass test for a hunting license and/or be accompanied by an adult.
Evenly divided on Indian, and over 60, free licenses.

Criticism strong in regard to high license fees for fishing and hunting.

Requests for quail plants.

Heavy request for fish planting in county, feel they are neglected.

New breeding stock for elk herds.

Equal division on doe harvesting.

Concern over small deer herds, request tighter control over tags issued.

Considerable comment over nonresident questions, critical of liberal policies for nonresidents.

Criticism of game wardens—spotlight hunting not controlled.

Request for more county control over game matters.

Some criticism of waste of funds by Fish and Game Commission.

Humboldt (143)—

Requests for beaver control, destroying watershed—several requests.

License fees too high.

Indians should pay for licenses.

Plant more fish, especially 7–8-inch; close stream after planting.

Opposition to pheasant planting.

Equally divided on game bird tags.

Concern over juvenile licenses—necessity of tests, etc.

Cut down on nonresident hunting and raise fees.

Favored doe season in the county.

Widespread on number of deer tags per person.

Considerable request to eliminate game contests.

Requests for more law enforcement.

Criticism of overhead costs in Fish and Game Commission.

Lyon (173)—

Felt the questionnaire was good and appreciated opportunity to have a say.

Divided opinion on acquisition of real property by Fish and Game Commission.

Majority comments for license fee for Indians.

Favored persons over 60 years to have free licenses.

Favored planting of pheasants *but* control over time of planting and protection factors.

Majority feel pheasant tags unnecessary, license high enough to cover cost.

Juvenile privileges for hunting *if* pass test, have training accompanied by an adult.

Doe harvest in limited numbers, preference for end-of-season kill, leave to technicians.

Limit nonresident deer tags, limit them to antlerless deer, charge reciprocal costs.

People with resident licenses found in out-of-state licensed cars.

Against game contests.

Numerous requests for more game wardens, too much violation of law, more enforcement.

Criticism of current game wardens, too much time in offices, etc.

Majority feel Fish and Game Commission is doing a good job, stick to present setup.

Ormsby (180)—

General feeling Indians should pay for licenses.

License fees too high in relation to fish and game available.

Plant more fish, what about other species?

Feeling that closed seasons on fishing are necessary.

Complaints on fishing restrictions by landowners along Carson River.

Heavy support for elimination of fish and game contests.

Restrict nonresident hunting, raise nonresident license fees.

Considerable feeling that pheasant planting should not be carried out or, if done, some predatory control; mixed feelings on tags—feel license fee could cover.

Generally against doe killing, unless absolutely necessary.

Favor a smaller number of commissioners, 5 quoted frequently, also Governor appoint.

Majority feel Fish and Game Commission should have authority to set seasons, etc.

Division on increased legislative control of expenditures of Fish and Game Commission.

Feel Information and Education Program should be continued and/or expanded.

Majority feel they don't want return to county control.

Criticism that Fish and Game Commission spends too much on equipment and salaries.

Churchill (211)—

Fine moneys should go to Fish and Game Commission rather than schools.

Most like to hunt all the big game mentioned in No. 17, same for other game.

Hunting licenses on a fiscal-year basis, fishing on calendar-year basis.

Equal division on question of raising or lowering license fee.

Slight favor toward acquisition of real property.

Favor lower fees for juveniles, some request that they hunt with adult supervision.

Opposition to game contests rather heavy.

Need for more game wardens, some criticism of wardens' conduct.

Heavy request to either keep out nonresident hunters, limit them, or raise fee.

One or two deer tags, no special hunts.

Feel deer herds are depleted.

Against harvesting does.

Requests for more fish planting.

Close streams or lakes, after planting, for some period of time.

Favor seasons on fishing.

Question necessity of purchasing Lahontan Lake permit (if they have fishing license).

Some favor free license for those over 60 years.

Heavy request to cut out free Indian licenses.

Criticism of pheasant planting, suggest abandoning projects.

Those in favor of tags suggested low cost, such as 10 cents; considerable view toward making pheasant hunters pay entire cost of program—some think hunting license should cover cost.

Close season on pheasant until flocks build up.

Grouse season to be no longer than a week, some for 3 days only.

Considerable comment on Fish and Game Commission—leans toward unfavorable aspects.

Keep politics out of Fish and Game, a common comment.

Elko (294)—

Very heavy request to prohibit or greatly limit nonresident hunters.

Raise nonresident hunting and fishing licenses.

Fishing license too high.

Heavy request to prohibit game contests.

Not in favor of acquisition of land for fish and game purposes.

More game wardens, and better patrol.

Full price for juvenile game license, some desire to prohibit hunting until 16 or 18 years of age.

Feeling that older people should have free licenses but some think after 65 or 70 years only.

Feeling that Indians should pay for licenses.

Mixed opinion on pheasant program, cost from 10 cents per tag to full cost.

Very heavy request for fish to be planted in streams as well as lakes.

Strong support for fishing seasons, closed fishing especially during spawning.

Close streams for a period of time after fish planting.

Considerable mention of deer shot and left to rot, wanton slaughter.

Feeling is that doe harvest not necessary, requests to completely discontinue.

Limit tags to one or two per person.

Retain present dual control on seasons.

Majority of comments in regard to Commission unfavorable—some request return to county control.

Close Lake Mead to fishing during spawning season.

Requests that something be done about the carp situation in Lake Mead.

Clark (535)—

Requests for trapping seasons in the county.

Examinations for all persons before issuance of game licenses.

Criticism of private clubs allowed to obtain areas like Alamo preserve.

General agreement on acquisition of real property and access roads (around Lake Mead).

Control of wildcats, destroying big game.

Heavy criticism of question No. 17, like to hunt them all.

Criticism of questionnaire, too many being sent out by different groups.

Numerous requests that those under 16 not be issued hunting licenses, or, if so, be accompanied by adults.

Frequent criticism of the conduct of wardens, rough treatment when not called for.

Need more wardens and better law enforcement.

Limit or exclude nonresident hunters, and hunting seasons for them.

Heavy request to prohibit or control game contests, particularly big game.

Heavy request to raise nonresident license fees, high figures given, or suggest reciprocity.

Requests to lower resident license fees.

Favor free licenses for older persons but many suggest age of "over 65."

Mixed feeling on free Indian licenses.

Strong recommendation that metal tags be employed for deer.

Several requests that deer season open on a Saturday rather than a Sunday.

Mixed comments on doe harvest, slight majority opposed to killing does.

Comments against killing fawns.

Favor current regular tag issue for deer hunters; against any increase.

References to the Ruby Valley special hunts as disastrous for deer herds.

Critical of special hunts, favoritism in issuance of lists (names).

Favored a smaller number of Commissioners; most frequent, 5.

Four-year terms for Commissioners.

Most comments favored dual control of fish and game by county and state.

More game information and expansion of education program.

Favor retention of Fish and Game Commission.

Suggestions that quail season be moved up.

Feeling that pheasant hunters should pay cost of program or at least $1–$1.50 a tag—plant only larger birds and close off area.

Washoe (1,380)—

Question 1a-b. Smaller Commission, 5-man mentioned most frequently.

Question 1c-d. About equal division on whether to appoint or elect.

Question 2. In favor of Commission complete control, 12; dual, 9; county, 8.

Question 3. Very little comment, 4 felt no increase necessary, 2 felt it needed.

Question 4. Practically no comments, mixed reactions.

Question 5a. Slight majority favor license fees for those over 60. Some comment that those on social security or under a certain income bracket be exempt. Many requested that the free limit be raised from 60 to 63 or 65.

Question 5b. License fees for Indians by 2-to-1 majority—when off reservations.

Question 5c. Nonresident fees should be raised to take place of free license issues.

Question 6. Heavy request that juveniles *not* be allowed to hunt or, if so, they be accompanied by an adult or pass an examination before being issued a license. Favor same fee as adult. Frequent mention that their tag is "filled out" by an adult, anyway.

Question 7. Large majority not in favor of tags. Bootlegging mentioned, also if tags employed that the cost be included in license.

Question 8. Heavy favor for acquisition of additional lands.

Question 9. Very light reply—mixed reactions.

Question 10. *Very heavy criticism of doe harvest.* Some believe it is necessary to proper management but that the harvest has gone too far. Suggest only once every few years. Red Rock mentioned frequently as an area where this was "overdone." If done, last week of season. (Most felt either not necessary or overdone.

Question 11. Heavy feeling that special hunts lead to *unnecessary slaughter.* Red Rock mentioned again. Against killing of fawns. Suggest transporting deer to other areas. *If necessary,* feeling is that an either-sex season is best.

Question 12. Very heavy favor for only 1 tag per hunter, some for 2.

Question 13. *Very heavy* request to *cut away down,* or *exclude, out-of-state hunters.* Frequent reference to Elko County slaughters. If non-resident hunters are to be allowed, direct them to overpopulated deer areas, or allow them to hunt only after resident season well under way. Frequent reference to raising out-of-state licenses to place in line with other states. Feeling that the hunters are underwriting the bars, hotels and motel industries.

Question 14. *Very heavy request* that *program be dropped* because most of the cover is on private lands where ordinary hunters are restricted. *Heavy request* that more attention be given to chukar and quail rather than pheasants since habitat seems to be more favorable. Some question as to age and place of planting not proper. If tags are to be employed, frequent mention of $1–$3 per tag.

Question 15. *Heavy request* to have closed seasons on streams—particularly small streams, and during spawning season; 4–5-month closed season mentioned frequently.

Question 16. *Heavy* request to stop all game contests. Frequent criticism of out-of-state abuses in Elko County.

Question 17. Many felt the question poorly framed because (a) they had more than one choice or liked to hunt all; (b) they felt it was not a matter of what they liked to hunt but what might be available to hunt.

Question 18. Very little response—had not been checked.

Question 19. Only comment was in regard to the clubs—those who commented favored abolishing private clubs.

Question 20. In general, did not support present program.

Question 21. Comments favored return to county control (3–2).

Comments in General on Other Points Not Covered in Questionnaire

1. *Very heavy* request that fishing be closed after planting for varying distances along stream or river (and for varying periods of time). *Very heavy* criticism of "fish truck followers" and notice to individuals that plants have been made.

2. *Heavy* request that more fish be planted—especially in the Truckee River and Pyramid Lake. Also requests that small streams be stocked rather than larger rivers and lakes. Some criticism of Pyramid Lake planting when Indians charge for fishing there.

3. A few requests for big game planting—elk (and antelope)—in southern Washoe, along Carson range.

4. Archery requests for qualifications for such a license (ability to pull a bow).
5. Requests that deer be *trapped* and *transported* to other areas where they will not be overpopulated.
6. Requests for more upland game—concentrate on chukar, quail, etc.
7. *Heavy request* for higher nonresident license fees.
8. Comments favored the operation of the Fish and Game Commission by 3 to 1.
9. *Heavy* request for more game wardens and better enforcement of game laws—request present wardens set up checking stations, also go deeper into hills and out of their cars.
10. Heavy criticism of expenditures for technicians and personnel, also expensive equipment. Feeling of these critics was that the money would be best spent on more game.
11. Some felt the questions too technical, "loaded," or better answered by technicians. Others thanked us for the opportunity to have a say.
12. Requests open seasons on Saturdays (workingman's day off), rather than later in weekend on Sundays.
13. Requests that nonresident's license and hunt start a week or two after resident hunt.
14. *Close Red Rock* area on certain kinds of hunts.
15. Close sage grouse seasons for several years.
16. Criticism of use of poison for control.
17. Requests for gun safety laws and hunter safety programs.
18. Heavy request that fish and game fine moneys be retained for fish and game programs rather than go to schools.
19. *Heavy* request for publication in local papers of the salaries and expenditures and program costs of the Fish and Game Commission.

VIEWPOINTS AND RECOMMENDATIONS OF THE CONSULTANT COMMITTEE ON QUESTIONS IN THE QUESTIONNAIRE

The Consultant Committee on Fish and Game of the Legislative Counsel Bureau met in the Senate Chamber of the Capitol Building at Carson City, Nevada, on Wednesday, January 14, 1959. Present were Mr. Roger Teglia, Chairman, Mr. Paul P. Conlon, Mr. Al Conelly, Mr. Hugh M. White, and Mr. Jack H. Burns.

The following recommendations were adopted by the Consultant Committee for presentation to the Nevada Legislative Commission and the 1959 Session of the Nevada Legislature, the said recommendations pertaining to the questions contained in the questionnaire.

Question No. 1

That the number of members of the Fish and Game Commission remain at 17; provided, however, that, if and when the size of the Commission is changed, there be not less than nine members.

That the members of the Fish and Game Commission continue to be elected as at present; provided, however, that, if and when the members are made appointive, they be appointed at large with no more

than one member from any one county, that the Commission meet at least once each month, that members receive a salary of $25 per day while attending meetings or while engaged in official business, and that the members receive adequate travel reimbursement.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered the two parts of Question No. 1 in the questionnaire. The Committee believed that the sportsmen of Nevada are not ready at this time for a smaller, appointed Fish and Game Commission, that it is important *at this time* for all the counties to be represented on the Commission, and that it is best for the members to be elected by the people of each county. The Committee believed that eventually a smaller, appointive Commission will be necessary. The Committee believed that adequate salary and travel reimbursement might induce better men to be interested in running for membership on the Commission.

Question No. 2

That the present system of dual control between the State Fish and Game Commission and the county game management boards be retained.

That open seasons and nonresident quotas be set by the county game management boards.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered the two parts of Question No. 2 in the questionnaire. There may be some difference of opinion as to just what functions are performed by the State Fish and Game Commission and the county game management boards. We have examined the law with care and in detail, and it appears that the opening statement in the question is generally correct. The law is quite complex, and not entirely clear. Along with some gaps in the law, some of the legal provisions might be subject to judicial interpretations. It can only be suggested that anyone in doubt about the functions of the State Commission and the county boards should read the law. The functions of the two boards are determined by law at the present time, and any change would involve legislative action.

Question No. 3

That there be increased legislative control of the expenditures of the Fish and Game Commission.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 3 in the questionnaire. This is a simple question on its face, and is merely designed to determine whether the Legislature should take more interest in expenditures by the Fish and Game Commission and should take some steps to limit such expenditures. This could be done in at least four ways. But it is necessary to first explain the present procedure. At each session, the Legislature enacts the General Authorization Act, which authorizes lump-sum expenditures for the ensuing biennium by non-General Fund agencies, including the Fish and Game Commission. Under the authority of a saving clause at the end of the General Authorization Act, the Fish and Game Commission may expend in excess of the authorized sum with the permission of the Governor and the Director of the Budget, provided that the funds are available through gifts or

increased license sales. At the present time, all revenues from the license fees are deposited in the Fish and Game Fund, and expenditures are made from the Fish and Game Fund. Increased legislative interest and control could be achieved by any one of the following procedures:

(1) The Ways and Means and Finance Committees of the Legislature could devote more time to analyzing the biennial budget of the Commission, and arriving at agreements with the Fish and Game Commission on how the money should be spent.

(2) The Legislature could leave the Fish and Game Commission in the General Authorization Act, but eliminate the provision that the Commission could expend in excess of the authorized sum with the permission of the Governor and the Director of the Budget.

(3) Instead of authorizing expenditures, the Legislature could appropriate directly from the Fish and Game Fund, and thus eliminate automatically the proposition that they could expend in excess of the appropriation with the permission of the Governor and the Director of the Budget. That is one of the major differences between authorizing expenditures and appropriating money for expenditures.

(4) By law, the Legislature could require that license fees be deposited in the General Fund, and the Fish and Game Commission be supported by direct appropriation from the General Fund. The Legislature is primarily interested in the General Fund, and has a tendency to pay less attention to other funds in the State Treasury. This procedure would automatically guarantee maximum study and analysis of expenditures made by the Fish and Game Commission, in the same way that the Legislature studies the budgets for all the other General Fund agencies. An official opinion has been received from the federal Fish and Wildlife Service indicating that this procedure would not be considered a diversion of federal funds, and that no federal moneys would be lost, providing it was so stated by law that the license fees could not be expended for any other purpose than fish and game. It should be kept in mind that license fees are intermingled right now with General Fund moneys and deposited in the banks of the State of Nevada, and that this process involves little more than a change in bookkeeping procedures.

The Consultant Committee believes that license fees should be deposited in the General Fund, and that the Fish and Game Commission should be supported by direct appropriation from the General Fund, as outlined in Item (4) above. This procedure would guarantee greater legislative control of the purse strings, funds would be appropriated on the basis of demonstrated need, the danger of fish and game programs being underfinanced or overfinanced would be lessened, bookkeeping on the revenue side would be reduced, the Commission would know exactly the amount of funds available for expenditure for each fiscal year and could tailor its programs to fit. Unless fish and game programs are supported by direct appropriation from the General Fund, there will be a tendency to sell more and more hunting licenses as more and more money is needed, and the deer herds will suffer. Gifts and bequests would still be kept in separate funds. Interest in fish and game programs goes beyond sportsmen alone, because the

fish and game belong to *all* the people of the State of Nevada; therefore, there should be greater legislative participation and interest in the expenditure programs, especially when approximately $1,000,000 a year is being expended.

Question No. 4

That hunting and fishing licenses should be issued on a July-to-June fiscal-year basis, rather than on a calendar-year basis, as at present.

Explanation: The Consultant Committee agreed with the majority of sportsmen that answered Question No. 4 in the questionnaire. The Fish and Game Commission receives its revenues on a calendar-year basis, but it spends on a fiscal-year basis, resulting in lack of coordination in its fiscal records. There is also lack of coordination in time of use between state hunting licenses and federal duck stamps. There have been complaints by sportsmen that, when the duck season ran over into a new calendar year, they had to buy new hunting licenses even though the season had not ended, and even though their federal duck stamps were valid until July 1. The complaint was made that this situation forced hunters to buy new licenses in order to finish the season, even though the purchase caused financial hardship for some of them.

Question No. 5

That free hunting and fishing licenses continue to be issued to persons over 60 years of age who have been residents of the State of Nevada for 10 years.

That free hunting and fishing licenses continue to be issued to Indians.

That the Nevada Legislature should not appropriate public funds to offset the expense of providing fish and game for such persons over 60 years of age and for Indians.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered the first two parts of Question No. 5 in the questionnaire, but the Committee disagreed with the majority on the third part (c). On part (c), the Committee felt that such appropriations smacked of class legislation and might set an evil precedent. It should be noted that, regardless of what the Legislature may do on this matter, hunting and fishing licenses can never be required of Indians residing on federal Indian reservations, because such reservations are beyond the jurisdiction of the State of Nevada.

Question No. 6

That provision be made for combination juvenile hunting and fishing licenses, costing a nominal sum but not exceeding 50 cents, for juveniles of 12 to 16 years of age.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 6 in the questionnaire. At the present time, full-priced adult hunting and fishing licenses are required at 16 years of age. Juveniles under 16 years of age need no license at all, unless they desire to purchase game tags, and in that case they must again purchase adult licenses at full price. The Committee believes that juveniles from 12 to 16 years of age should be

able to obtain game tags without buying adult licenses at full price, thus encouraging responsibility and respect for game laws. In addition, the Committee believes there should be greater supervision and responsibility exhibited by parents over juveniles while hunting and fishing, and that the public schools should be required to provide instruction and training in the safe use of firearms, and in sportsmanship in the field.

Question No. 7

That a system of at-cost tags be authorized for sage grouse, chukars and geese, with a daily bag limit in possession of two limits, and that the Fish and Game Commission be authorized by law to effectuate such a system by means of rules and regulations.

(Mr. Milich requested that the record show that he was opposed to this recommendation as far as geese were concerned.)

Explanation: The Consultant Committee (with the exception of Mr. Milich) generally agreed with the majority of the sportsmen that answered Question No. 7 in the questionnaire. The law now authorizes the Fish and Game Commission to require tags as a method of enforcing a limit of the number of any species which may be taken by one person. It also provides that the tag fees for game birds shall not exceed 25 cents per tag, with the total not exceeding $1 for one species.

The Consultant Committee generally felt that a tag system would preserve some of the upland game, and that the birds would be distributed better among the hunters. It was pointed out that some hunters with much leisure time will hunt every day, and they kill more than their proper share of birds during a season. A tag system would hold everyone to a definite limit.

Question No. 8

That the acquisition (purchase or lease) of real property by the Fish and Game Commission for waterfowl production and hunting is favored.

That the acquisition (purchase or lease) of real property by the Fish and Game Commission for access to streams, lakes, and hunting and fishing areas is favored.

That the acquisition (purchase or lease) of real property by the Fish and Game Commission for wildlife refuges is favored.

That the acquisition (purchase or lease) of real property by the Fish and Game Commission for big game management purposes is *not* favored.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 8 in the questionnaire on the first three parts of the question, but *not* on the fourth part. On the fourth part, the Committee felt that the acquisition of land for big game management purposes is not a matter for immediate concern, and that there should be further study of the matter. It was felt that such a program would incur opposition from livestock owners.

On the acquisition of property for waterfowl production and hunting, the Committee felt that birds were disappearing from public shooting areas, and that it is necessary to acquire real property in order to promote waterfowl production.

On access, the Committee felt from time to time property must be acquired for this purpose, because hunters should have some way to get into hunting areas without being forced to trespass on private property.

On wildlife refuges, the Committee felt that wildlife habitat is gradually being encroached upon or destroyed by the progress of civilization, and that refuges are necessary if wildlife is to have some protection and opportunity for propagation.

Question No. 9

That land acquired by the Fish and Game Commission from private owners for game management purposes should remain on the tax rolls.

Explanation: The Consultant Committee disagreed with the majority of the sportsmen that answered Question No. 9 in the questionnaire. At the present time, all land and property owned by any state agency is exempt from taxation by law. It is to be noted that this does not contemplate that buildings, etc., owned by the Fish and Game Commission might remain on the tax rolls, but only *land* acquired from private owners.

The Consultant Committee felt that a fair proportion of the sportsmen that voted on this question were not property owners, and that the results of the questionnaire on this point did not properly reflect the thinking of property owners. The Committee felt that the ever-increasing land acquisitions by the Fish and Game Commission seriously affected the revenues of the counties, especially the smaller ones, and that this situation is contrary to good public policy. The point was made that, when the Commission raised and sold farm products from such land, it was competing with farmers and, therefore, should pay taxes. The money that the Commission earns from the sale of farm products would be adequate to pay taxes.

Question No. 10

That the harvesting of does is essential to proper deer management.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 10 in the questionnaire.

While recognizing that this was a very difficult question to frame and still be fair to everyone concerned, the Consultant Committee felt that the shooting of does is opposed by a great many sportsmen, regardless of the results of the questionnaire on the point. The word "essential" is key and, therefore, many sportsmen felt that the question was loaded. It was agreed that occasionally there are times when it is necessary to shoot does, but it was the belief of the Committee that if the question had been worded "Are you in favor of shooting does?" the majority of the answers would have been in the negative. In any event, the Committee favored no more than two deer tags per season, and that this would reduce the shooting of does because most sportsmen would prefer to shoot bucks and use the tags for bucks only, if possible.

Question No. 11

That an either-sex season be authorized when necessary to properly harvest, stabilize, or reduce a particular deer herd in a designated area.

Explanation: The Consultant Committee agreed with the plurality

of the sportsmen that answered Question No. 11 in the questionnaire. But the Committee stressed the words "when necessary." Statistics show that the deer kill is down and, if the kill was too large each year, deer herds would be lost. The Committee believed that if does *must* be killed, an either-sex season would result in fewer does being killed, but an antlerless quota would result in more does being killed. Most sportsmen will take bucks, unless they are meat hunters. The Committee believed that an either-sex season will preserve more does.

Question No. 12

That a limit be placed on the number of deer tags that one person may obtain in one year.

That no more than two deer tags be issued to one person during a season or an extended season.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered both parts of Question No. 12 in the questionnaire.

The Committee believed that a limit on the number of deer tags would keep the deer kill down to a correct figure and result in better control. It felt that two tags was sufficient.

Question No. 13

That the present practice of limiting the number of nonresident deer hunters be continued, and that they be directed into the areas where resident hunters are not adequately harvesting the number of available deer.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 13 in the questionnaire.

The Committee felt that this approach on nonresident deer hunters is a good check and balance in keeping the size of the deer herds at a proper level.

Question No. 14

That the present program of planting full-grown pheasants at a cost of approximately $3 per bird be retained.

That pheasant hunters should pay a fee of 25 cents per tag, when necessary.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 14 in the questionnaire. At the present time, the Fish and Game Commission is authorized to charge a fee of 25 cents per tag in order to partially offset the cost of the program. The hunting areas are located for the most part in five western counties.

The questionnaire proved that the sportsmen are interested in having a pheasant program. The Committee felt that the Fish and Game Commission has ample funds to carry out this pheasant program and, therefore, the fee should be no more than 25 cents per tag. It was pointed out that hunting license money is being used for fish programs and, if that is the case, some of the hunting license money should be used for the pheasant program, with less for fish, if necessary. It was felt that there were ample funds for a pheasant program without charging a fee at all, if the Fish and Game Commission so desired.

Question No. 15

That year-round fishing seasons be discontinued on lakes and ponds.

That year-round fishing seasons be discontinued on streams and rivers, that the Nevada Legislature consider a law requiring the Fish and Game Commission to establish the policy that, when fish are planted, the stream shall be closed, wherever possible and feasible, from the point of planting for one mile in each direction for one year.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered the first part of Question No. 15 in the questionnaire, but disagreed with the majority of sportsmen that answered the second part of the question. The Committee felt that its recommended procedure of closing the stream when fish are planted would promote fish distribution and growth. At the present time, fishermen follow the fish planting truck, and clean out the fish shortly thereafter. If the Committee's recommendation is carried out, smaller fish could be planted at less expense, they would have a chance to grow, there would be better distribution, the fish would be wilder and provide more sport.

Question No. 16

That the Fish and Game Commission be authorized by law to prohibit or control game contests in the State of Nevada.

That the Fish and Game Commission be authorized by law to prohibit or control fish contests in the State of Nevada.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 16 in the questionnaire. The Committee felt that there are deer being left dead on the ranges because some hunters were looking for bigger spreads in order to win a prize. The Committee believed that, if contests are held at all, they should be held on the premise that hunters would not know whether prizes were going to be given for the largest spread or for the smallest spread. The Committee objected to big prizes for large spreads only. The Committee had the same views on fish contests. Most states have outlawed contests because they result in waste of fish and game.

Question No. 20

That there be no curtailment of the expenditures and scope of the Information and Education Program of the Fish and Game Commission, that the program is necessary, that the program should be broader in scope, and that the Commission should scrutinize the program more closely, with more frequent evaluation, and with more attention to policy and procedures.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 20 in the questionnaire, and recommended additional items pertaining to the Information and Education Program.

The staff in the Information and Education Program of the Fish and Game Commission compiles and publishes all hunting and fishing season charts and regulations established by the Commission each year, the biennial report as required by law, and the annual report as required by the Commission. The staff in the program answers all correspondence requesting information on fish and game in the State

of Nevada. They attend meetings of sportsmen's clubs, civic organizations, and youth groups, and present conservation programs consisting of films, slides, and lectures. They endeavor to inform the public on current events pertaining to fish and game through the media of newspaper articles and publications. They assist the public schools in conservation education, and in training school teachers in conservation work in summer workshops.

The Committee felt that the Information and Education Program staff has done a fair job on seasons, habitat, etc., but it believed that additional effort should be made to acquaint the sportsmen with the policies of the Fish and Game Commission and why certain actions are taken from time to time. The people must know where the money is being spent and why.

Question No. 21

That the Fish and Game Commission be retained, and that the control of fish and game not be returned to the individual counties of the State.

Explanation: The Consultant Committee agreed with the majority of the sportsmen that answered Question No. 21 in the questionnaire. The Committee believed that, with the increase in population and the increase in hunting pressures, a better job can be done at the state level than at the county level. Most of the revenue comes from the heavily populated areas in Clark and Washoe Counties. By administering the programs at the state level, the money can be spent in those areas of the State where needed, and regardless of where the money came from. With county control, the money would be spent only in the county where it was collected, and other areas would be neglected.

VIEWPOINTS AND RECOMMENDATIONS OF THE CONSULTANT COMMITTEE ON THE CRONEMILLER REPORT

The Consultant Committee on Fish and Game of the Legislative Counsel Bureau met in the Senate Chamber of the Capitol Building at Carson City, Nevada, on Saturday, December 27, 1958, and on Wednesday, January 14, 1959. Present were Mr. Roger Teglia, Chairman, Mr. Paul P. Conlon, Mr. Al Conelly, Mr. Hugh M. White, and Mr. Jack H. Burns. Mr. William Milich was present on December 27, but was absent on January 14.

The following recommendations were adopted by the Consultant Committee for presentation to the Nevada Legislative Commission and the 1959 Session of the Nevada Legislature, the said recommendations pertaining to the recommendations contained in the report prepared by the survey team under the direction of Mr. Fred P. Cronemiller.

Recommendation No. 1

That the Legislative Commission study further the feasibility and desirability of creating an appointive Fish and Game Commission, composed of not less than nine members, chosen at large rather than from districts, with members familiar with fish and game matters, serving staggered terms, with no more than one person serving from

any one county, with adequate salary remuneration, and elimination of any requirements that members be endorsed by statewide sportsmen's clubs.

Explanation: The Consultant Committee felt that a smaller appointive Fish and Game Commission must be created eventually, but that the sportsmen are not ready for that step at this time, as indicated by the questionnaire. The Committee felt that further study of this question should be made, and the sportsmen be given more time to familiarize themselves with the various aspects of the problem.

Recommendation No. 2

That there be no qualifications in the law for members of the Fish and Game Commission.

Explanation: The Cronemiller Report recommended that a series of qualifications be met by any person who is a candidate for membership on the Fish and Game Commission. Included was a requirement that he have the endorsement of the statewide sportsmen's organization. The Consultant Committee rejected the recommendation for qualifications primarily because of this one requirement. The questionnaire showed that 78 percent of sportsmen answering the questionnaire did *not* belong to the Nevada Federated Sportsmen, the Committee felt that the statewide organization does not represent the majority of the sportsmen, and that independent sportsmen should not be thus ineligible for membership on the Fish and Game Commission.

Recommendation No. 3

That the Fish and Game Commission be established as a policy-making and budgetary body.

Explanation: There are many types and varieties of boards and commissions in government and, at law, the Fish and Game Commission is an example of the administrative type of commission with full power and authority over the administrative functions of Nevada's fish and game organization at the state level. As provided by NRS 501.165–501.240, the Fish and Game Commission, or its Executive Board, approves all expenditures of funds, appoints and dismisses the State Director and all other staff members, approves printing, enforces the fish and game laws, acquires and disposes of real and personal property, enters into cooperative agreements with the Federal Government, enters into reciprocal fishing license agreements with other states, etc. A host of other duties are set forth in the rest of the fish and game law.

In the field of political science and public administration, this clearly establishes that the Fish and Game Commission is an *administrative* board with full administrative powers and authorities. Political scientists recognize a variety of other boards in government such as *ex-officio* boards composed of regular elective or appointive officers serving on the board in an ex-officio capacity, *policy-making* boards with little or no administrative authority, *advisory* boards, *quasi-legislative* boards, and *quasi-judicial* boards.

It is interesting to note the remarks of Mr. Austin F. MacDonald, eminent authority in the field of public administration, relative to the functions of boards in state government. In his volume, *American State Government and Administration,* Fourth Edition,

Thomas Y. Crowell Company, New York (1950), Mr. MacDonald remarks as follows:

> Whenever a state undertakes a new function, it must decide whether the task of administering that function would be entrusted to a single individual or to a group of individuals who exercise authority jointly. The singleheaded department of bureau has certain obvious advantages. To put control in the hands of one person is usually to get action. Moreover, responsibility is more easily fixed. If the work of a singleheaded department is improperly done, everyone knows where to place the blame. There is no possibility of evasion. And, conversely, the credit for good work can readily be fixed and rewarded. When a board or commission assumes control, however, everything is changed. Responsibility is no longer centered in one person, but is diffused among five, six, or a dozen—as many persons as the commission has members. It is impossible to determine who is to blame for maladministration.
>
> Another good reason for preferring individuals to boards is that the singleheaded department plan is more likely to lead to the performance of administrative duties by technical experts. Even though a board is composed of laymen who admittedly have no understanding or appreciation of the problems involved and must therefore hire a trained administrator to carry on the day-to-day routine, there is seldom a disposition to give the administrator a free hand in the performance of the work for which he has been employed. Members of the board, forgetful or careless of their ignorance, are likely to interfere with every detail. They may, and often do, insist upon examining the persons whom the administrator has selected as subordinates—or, worse still, appointing their friends and followers to the important positions. This is not just a theoretical danger; long and bitter experience has shown that it is a common trend in the field of American public administration. * * *
>
> Although reference is made to boards and commissions versus singleheaded departments, it must not be assumed that these separate types of administrative organization are mutually exclusive. It is not at all necessary, or even desirable, for a state to depend entirely on individual department heads or to put its trust completely in boards and commissions. Concerning any one function of government, a choice between an individual and a board or commission may be necessary; but when the manifold activities of state government are considered, it may seem best to entrust some of them to boards and commissions and others to departments presided over by individuals.
>
> In every instance the test lies in the nature of the agency's work. Its task may be quasi-legislative—that is, resembling the work of the legislature. In other words, it may find itself concerned chiefly with the determination of policies, in the form of rules and regulations that do not differ greatly from the statutes enacted by the legislature at every session. Therefore, it should be organized for deliberation rather than for action; its work should be entrusted to several persons instead of to one.
>
> Another agency of the state government may perform quasi-judicial functions—functions that resemble those of a court. It may sit as a court, hear witnesses, take testimony, and render decisions. A workmen's compensation board of a public utility commission answers this description perfectly. True, the findings of such a board or commission are subject to review by the courts, but this fact does not alter the judicial character of its work. The decisions of courts of first instance are also subject to review. Now, an administrative agency that is performing quasi-judicial functions also lends itself readily to the commission type of organization; impartial justice can best be secured by the meeting of trained minds. That the majority of state agencies are not concerned chiefly with the performance of quasi-legislative or quasi-judicial duties. Their most important task—often their only task—is to execute the policies that they receive readymade. Obviously they should not be hampered by the needless discussions and delays that characterizes board administration. Action is their primary need, and they should be organized to produce results promptly. That is simply a way of saying that individuals, rather than boards or commissions, should be placed in control.

> Few states have made any serious attempt to apply the general principle that a board or commission should be used for deliberation and a single-headed department for action. Usually they have accepted a very different premise: "When in doubt, establish a board or commission." The result has been a veritable epidemic of multiple-headed agencies—an epidemic that is spread from coast to coast and has not yet been brought under control by the advocates of sound administrative organization. The disease has assumed a more malignant form in some states than in others, of course, but nearly every state has placed under board control some activity that could be better administered by the singleheaded department.
>
> Strangely enough, however, there are relatively few instances of departments with individual heads administering functions that ought properly to be assigned to boards or commissions. The states have pinned their faith to the board idea. Time after time that faith has been rudely shaken. Government has stood still while some board deliberated, or merely waited for a quorum; it has suffered from the mistakes of board members who did not understand their role as amateurs. But always the faith in boards has risen triumphant above the lessons of experience. For the people of the United States, despite their oft-repeated boast that they have practical men and women, find it extremely difficult to change their theories of government. * * *

Even though Nevada's Fish and Game Commission is an administrative board under the law, it is not operating as such in fact. Its own members admit, and its minutes reveal, that it has delegated rather extensive powers, authorities and duties to the Executive Board, the State Director, and various staff members, occasionally in violation of law. In other words, practical experience has shown that it is an impossibility for it actually to carry out all the *administrative* powers, authorities and duties charged to it in the law. To a surprising extent the commission is operating in actual fact as a *policy-making* and *budgetary* body. Nothing could be more normal in the complex fish and game programs. It could not operate any other way. This is "old stuff" to experts in the field of public administration everywhere. It is a very well-known fact that boards composed of citizens serving part time, function quite well in *policy-making* and *budgetary* capacities. The reasons are simple. A board composed of laymen meeting several times a year, or even once a month, cannot possibly handle day-to-day administrative details, hire and fire staff, etc. *Immediate action* is of paramount necessity, and administrative problems cannot wait for lack of a quorum, or while members discuss and debate details with which they are not familiar and for which they have no training or experience. *But* boards composed of citizens serving part time *can* settle policy and budgetary matters, determine open and closed season dates, types of seasons, etc. These are the proper functional areas for Nevada's Fish and Game Commission, and these are the principal functions that are being exercised for the most part by the Commission *now*. Consequently, the law should be amended so as to properly define the policy-making duties, the budgetary duties, and certain fish and game duties of the Commission, and properly defined *administrative* duties of the State Director should be written into the law.

Recommendation No. 4

That the position of Executive Director of the Department of Fish and Game be created, with the following duties and responsibilities:

(1) To carry out the policies of the Fish and Game Commission.

(2) To have complete administrative authority over Department activities and personnel.

(3) To enforce laws and rules and regulations of the Commission.
(4) To prepare a budget for Commission approval or modification.
(5) To supervise all officers and employees of the Department.
(6) To gather factual data and information on the status of game and fish for presentation to the Fish and Game Commission as an aid in setting seasons and bag limits.
(7) To plan a long-range program of fish and game management for the approval of the Commission.
(8) To collect license revenues and to make disbursements according to the budget approved by the Commission.

Explanation: This recommendation continues the concept discussed in the explanation of Recommendation No. 3. The recommendation sets forth the *administrative* duties and responsibilities that should rest upon the Executive Director, and which should be written directly into the law. These administrative duties and responsibilities normally belong to the full-time head of a state department, and they are part of a concept that is common in Nevada's government today, as well as in every other state government in America.

Recommendation No. 5

That the Executive Director of the Department of Fish and Game be in the classified service of the State's personnel system, and that the following minimum qualifications for the position be written into the law:

(1) Graduation from an accredited college or university, with a degree in wildlife management or related subjects, and at least a minor in business administration or engineering.
(2) At least 10 years of paid experience in the wildlife field, the last five years of which the applicant must have held progressively responsible positions in the field of fish and game management.
(3) The incumbent should be removed from office only for inefficiency, neglect of duty, or misconduct in office after a public hearing before the Personnel Commission.

Explanation: The Consultant Committee believed that the Executive Director should be in the classified service of the State's personnel system because it is a technical position where political influence should be kept to a minimum, and every device used that would better the chances of getting a qualified person to fill the position whenever a vacancy occurred. In addition, the Committee agreed that qualifications for the position should be written into the law as recommended by the Cronemiller Report, but it added the following words in qualification No. (1): "and at least a minor in business administration or engineering." The theory of the Committee in adding this wording was that the Executive Director should have training in business administration as well as in wildlife management, because his primary duties would have to do with the administration of the Department of Fish and Game.

Recommendation No. 6

That a Department of Fish and Game be created, and charged with the direct responsibility of carrying out the policies of the Fish and Game Commission, and that all fish and game properties held by the counties be transferred to the Department for administration.

Explanation: To call the entire organization that administers Nevada's fish and game laws the "Fish and Game Commission" is not only factually incorrect, but is a type of governmental designation that has been abandoned generally in American government for 35 years. Today, governmental functions are departmentalized because departmental organization provides a natural method of breaking down the operation by function. An ordinary state department includes (1) a board, (2) an executive director, (3) a series of functional divisions headed by chiefs (there is nothing to prevent one person being the chief of two or more divisions), and (4) a series of sections (subdivisions) in each division, with section leaders in charge of the various sections. Thus functions are allocated to proper sections and divisions. Sections and divisions are created or dissolved in accordance with the functions charged to the department by law and as determined by the rules and regulations of the policy-making board or commission within the department.

Actually, Recommendation No. 4 would force very few changes in Nevada's fish and game organization. The name of the organization would change in the law, but the Fish and Game Commission would continue to exist and function in accordance with the law defining its powers, authorities and duties. The recommendation merely attempts to apply a modern organizational concept to a rather large organization that is spending approximately $1,000,000 a year.

The Cronemiller Report recommended that "the administrative authority heretofore held jointly by the Commission and county boards should be vested in the Department." This recommendation was rejected by the Consultant Committee on the grounds that the county game management boards should not be disturbed at this time.

Recommendation No. 7

That county game management boards be continued, with no change in their powers and duties.

Explanation: The Consultant Committee felt that eventually the county game management boards must be discontinued, but that the sportsmen are not ready for that step at this time, as indicated by the questionnaire.

Recommendation No. 8

That the recommendation in the Cronemiller Report for the creation of a Sportsmen's Advisory Council be rejected.

Explanation: The Consultant Committee could see no reason why another 17-man board should be added to the 17 members of the State Fish and Game Commission, and to the 51 members of the county game management boards that are already participating in fish and game matters in the State of Nevada, especially if the county game management boards are going to be retained. There are "too many fingers in the pie" now.

Recommendation No. 9

That the Department of Fish and Game be provided with legal counsel, that such attorney be employed by and responsible to the Attorney General, that he be paid out of fish and game funds, and that his offices either be located in the Department building, or be

located in the City of Reno and be readily available to serve the Department.

Explanation: Many legal problems have developed, and more are foreseen in the growth of the State and in the widening of the programs of the Commission. The interstate compact on the Truckee-Carson rivers and other water problems, the legal phases of land acquisition, and certain phases of cooperation with federal agencies require competent legal counsel in addition to that presently afforded through opinions of the Attorney General. However, the Consultant Committee agreed that such legal counsel should be appointed by and responsible to the Attorney General; the Attorney General's office is the central legal arm of the Executive Branch of the State Government, and the various departments and agencies should not be authorized to employ their own separate attorneys.

Recommendation No. 10

That the fish and game laws to rewritten so as to provide clarification, eliminate conflicting clauses, and to state more accurately the intent of the law on the responsibilities of the Fish and Game Commission and the county game management boards, and that the Legislative Counsel Bureau be required to perform this task.

Explanation: This recommendation is self-explanatory. The fish and game laws are poorly written, and create many problems of interpretation. Considerable wording is duplicated elsewhere. A good redrafting would be beneficial to all concerned.

SURVEY OF FISH AND GAME PROBLEMS IN NEVADA

PART II

REPORT AND RECOMMENDATIONS OF THE CRONEMILLER SURVEY TEAM

CHAPTER I

MAJOR FINDINGS AND CONCLUSIONS

1. Although sportsmen are never completely happy, Nevadans seem to be satisfied generally with the supply of fish and game. Success is above the average of the western states.
2. When the size of the State and its limited funds are considered, we find a surprisingly big job has been done in both fish and game management and in the acquisition and development of waterfowl habitats.
3. Wildlife protection through law enforcement is not far above a bare minimum.
4. Fish and game administration is only 10 years of age and its job has more than doubled in size during its lifetime. The young administration has made mistakes, but it profited by them and is now better organized to prevent errors in the future. An alert and critical public, though overly critical at times, has served a good purpose as a part of the democratic process, reshaping policies and eliminating complacency in administration.
5. With a limited budget, game management programs must be simple. They must be focused on wildlife species whose inherent qualities make them adaptable in needs for food and shelter of high breeding potential, and capable of good normal survival rates and rapid recovery from disaster. These species should be the more abundant and would be easier to manage.
6. It appears the professional ability of the Commission's staff is better than its local repute. In considering the general level of professional ability of the staff we feel it averages better than the mean level of several of the fish and game departments in the western states.
7. We have a feeling that some Commissioners take their duties for granted. Some should keep themselves better informed on programs and policies statewide and not be tempted to concentrate on desires emanating from their own counties. Actually, most Commission members have not recognized the true functions of a board or commission—making policies and through these directing paid administrators. Functioning in this way relieves them of the job of making decisions on each and every problem, makes for uniformity of action, and simplifies procedures. We find, too, that Commissioners should be compensated

more fairly for their actual expenses and at least on a level justly due leaders in State Government.

8. Though a fine oil painting of Abraham Lincoln dominates the Chamber of the Assembly in the State Capitol, Nevada is not "one nation" in fish and game administration. It is 17 separate counties. Policies as to seasons and bag limits vary between counties, each often speaking of "our game" and "our fish," and each creating barriers against other counties. Defensive maneuvers of the small county versus the well-populated ones are likely to continue under the present set-up.

9. The State has no facilities for instructing and training department heads and their staffs in business administration except in the field of accounting. These people are on their own to sink or swim. They must learn the hard way by their own efforts and mistakes and by contacts with similar agencies in other states.

10. Few citizens or policy makers have recognized the basic fact that the land and the water is the source of fish and game production. Sportsmen have not recognized the severe impact of big game on range conditions in many areas. They have not realized limited seasonal forage supplies on game range are being destroyed and, once food is gone, the game will go with it. The managers of public lands have neither started to consider game needs adequately nor started to develop integrated programs that recognize present game use.

11. Including commissioners and county game management boards, 68 people have authority by law to make fish and game regulations and administer the laws: one per 4,000 population. California has one per 2,500,000. Yet Nevadans love this cumbersome, archaic, and frustrating system. They have learned to live with it; it gives them the ultimate in opportunity to participate in government, in opportunity for argument. Everybody gets into the act as a critic or the criticized. Somehow, and the study group cannot explain it, a pretty fair administration emerges. The technicians are often frustrated but do contribute a lot of leadership and, without anybody realizing it or admitting it, there is a lot of progress.

12. Several county boards are using the information collected by fish and game technicians in order to guide fish and bird planting and recommendations as to seasons and bag limits. They recognize that the staff members in their field work are assembling better information on the harvestable crop than has been available before. This trend should continue in all fields as the staff qualifies for such responsibilities.

13. Sportsmen's groups generally are extremely cautious in setting seasons and bag limits. Universally the West has oversold itself on the effect of the gun on wildlife populations. Not more than one-fourth, more often less than one-tenth, of our game bird and mammal populations reach the hunter's bag. Management must perfect the ability to determine harvestable surpluses accurately and provide full opportunity for the taking.

14. More adequate surveys are needed, particularly of big game ranges and waterfowl areas, both those proposed and those under development. Better surveys will allow for more detailed planning,

better cost estimates, and the setting of priorities. Critical big game ranges should be surveyed and delineated at an early date.

15. The development of the rivers of western Nevada will have a damaging effect on their fishing and recreation values. Nevada has committed itself to the eventual drying of Pyramid and Walker lakes such that trout will not be able to live there, to the loss of major sections of the Truckee River, and to minimal flows in the lower Carson. Too many rivers have been sold down the river; possibilities of recapturing some of them should be explored. Otherwise, Nevadans may have to travel to other states for much of their fishing and recreation.

16. No professional job can progress without inquiry, study, and fact finding. We are beyond the stage of midwifery, we believe. The development of the marvelous bass fishery in Lake Mead is a result of study. Some fine leads to the management of Walker and Pyramid lakes have been secured. We better understand the behavior of bird populations through climatic cycles. Present work should be followed up to determine more accurately the sizes, species, and perhaps strains of fish that should be planted. We should know why we have to carry a herd of 20 deer to provide one buck for some hunter. A broader fact-finding program is a prime need for full production of wildlife in Nevada.

Fish and game administration in Nevada has suffered severe growing pains. It has undergone an almost violent change within only 10 years. Starting as a completely decentralized, purely laymen's administration, it has developed a new organization with partly professional leadership. The new leadership has not always been expert, has not always been astute in business dealings and administration, and at times has been youthful and naive. It could hardly have been otherwise. It had to learn many things the hard way.

Despite the pains of rebirth, the organization has progressed amazingly. A good group of professional men has been assembled. They have sold themselves to large groups of people. They have developed fact-finding methods that have been most helpful in providing basic information for fish and game management. They have improved the protection of wildlife and its food and shelter, developed new wildlife areas, and extended cooperation to those who are responsible for the care of the land and water that nurture Nevada's wildlife. Early organization gaps in administrative and professional competence have been largely corrected.

Then why have differences of opinion arisen on management, policies, and organization? For one thing, fish and game administration is one of the most difficult jobs in present-day government. Fortunately, in Nevada it is not plagued to a great extent with partisan politics or political appointments. Its major difficulty lies in the fact that wildlife management is a young field. Not all its principles have been reduced to generally accepted formulas. Many local problems are subject to decision purely on the basis of judgment without a mature science for guidance. However, it is progressing.

Fish and game administration is also complicated by certain human attributes without parallel in other democratic processes. It has been

said that among the various attributes of the human male, three are almost universal:

. . . each considers himself a good driver;
. . . each, for a period at least, considers himself attractive to the opposite sex;
. . . each considers himself expert in fish and game management.

With 70,000 potential advisors, administration can become difficult.

With these thoughts we have made a start in prescribing for a growing personality, that of fish and game administration in Nevada.

We find four major areas for consideration in this study. Three of them have been the subject of considerable discussion in Nevada during the past two years. The fourth has hardly been recognized. These four important areas of study involved in our analysis include:

1. What should be the size and scope of the job and what is the organization needed to administer fish and game in Nevada?
2. Is the business administration properly organized, competent, and well administered?
3. What are the recommendations for the management of various wildlife species? This should include such regulations for the take as will result in the maximum harvest of most species (perhaps trophy hunting of some) and a sustained yield insofar as the gun and the rod may be factors in the control of populations.
4. Most important and a subject that has been given too little weight up to now—how can the land and water be made to produce the best possible crops of fish and game? This is the job of fitting wildlife production into all of the other uses of land and water.

This job has hardly been considered by sportsmen and has not been approached with vigor by the Commission and its staff nor by the managers of public lands. Those engaged in water development, for example, seem content when economics apparently justify the destruction of major fishing streams and recreation values—the inevitable result of present plans to almost completely dry up such important waters as Pyramid Lake.

In this study, we have not been able to evaluate each project or program. There is need for much more engineering work, evaluation, and planning. This is of highest priority. It is a function of the Commission staff. This report indicates the steps that should be taken to develop and complete plans and set priorities for the work ahead.

CHAPTER II

THE PLACE OF WILDLIFE IN NEVADA'S ECONOMY AND RECREATION

Fish and game is big business in Nevada. Hunters and fishermen pursuing their sport in 1958 will spend about $10,000,000! This contribution to business is important in Nevada's economy.

The business is growing steadily. In 1955 residents spent $2,600,000 for hunting and $4,700,000 for fishing. This includes guns, ammunition, fishing equipment, tents, boats, transportation, guides, rentals, fees, pack trips, licenses and refreshments. The expenditures of the 7,500 nonresident hunters and nearly as many nonresident fishermen approximated $1,700,000. This would make a grand total of $9,000,000.

One man in four fishes, one woman in nine. One man in four hunts and one woman in 16. Among teen-agers, the proportion is even higher; the number of sportsmen is going to grow faster than the population.

We must, therefore, face the fact that we will have a rather rapid increase in hunting and fishing pressure, that the impact will increase the workload of wildlife managers, and that the harvest of the wildlife crop must be efficient and management must be perfected.

In 1957, the number of fishermen was 59,000, including 7,500 nonresidents. Since many hunters pursued more than one species (Table 1), a total of the figures has no meaning, being greater than the number of licenses purchased. Over 36,000 Nevadans hunted and, in addition, there were 6,327 nonresident deer hunters. Over 70,000 people fished and/or hunted during the year and probably averaged 13 days each in the enjoyment of their sport.

A state's wildlife is produced mostly by its own lands and waters. Nevada has millions of productive acres and, fortunately for the sportsmen, they are mostly in public ownership (Table 2) and pose few problems of access to the better hunting and fishing areas. The principal exception is the habitat of the pheasant, which is mostly on the 240,000 acres of privately owned, cultivated land.

TABLE 1—Hunting Pressure on Important Game Species, Nevada, 1957.

Species	Number hunters participating	Percent of hunter licensees
Deer	28,190	77
Chukar	7,207	20
Sage grouse	2,874	8
Quail	5,691	16
Pheasant	6,104	17
Cottontail	4,769	13
Geese	4,964	13
Ducks	9,988	26
Dove	6,215	16

TABLE 2—Land Ownership in Nevada, 1954.

Ownership class	Area (Acres)
Gross area	70,745,600
Water	*480,640
Net land area	70,264,960
Public land—	
Bureau of Land Management—	
Public domain	46,226,454
Other federal	4,652,988
Total B.L.M.	50,879,442
National Forests	5,057,533
Army, Navy, Air Force	3,567,512
Bureau of Indian Affairs	1,142,362
Bureau of Reclamation	1,274,702
National Parks and Wildlife Service	370,684
Other agencies	21,213
Total public	62,313,448
Patented land†—	
Under B.L.M. management	346,401
Other	7,605,111
Total patented	7,951,512
All ownerships	70,264,960

*Total fishable water estimated at 340,000 acres.

†Irrigated areas:

Cultivated	241,000 acres
Meadow (hay)	220,000 acres
Pasture	320,000 acres
Total	781,000 acres

These wildlands of the State support five types of vegetation, each with somewhat different value for wildlife:

Low Desert or Southern Desert Shrub. This is the creosote bush area of the southern part of the State. It contains some Joshua trees, big rabbitbrush, cactus, mormon tea, mesquite, and other desert plants. It varies in elevation from 2,000 to 3,500 feet and covers about 6 percent of the State. This type is the home of the Gambel quail and some cottontail rabbits, particularly along the washes and on the better soils where the vegetation is more diverse. Water limits the distribution of wildlife. About 7 percent of the area is potential Gambel quail range. Total area, 4,100,000 acres.

Northern Desert Shrub or Shadscale Type. This is the shadscale area found just below the sagebrush types and above or to the north of the creosote bush areas. Saltgrass is found in the better drained flats; winterfat, snakeweed, rabbitbrush, and Bailey greasewood are rather common. Valley and Gambel quail are found sparingly on the

upper and lower edges, and a few cottontail rabbits inhabit parts of the type. Total area (about 30 percent of the State), 20,800,000 acres.

Sagebrush. This well-known type runs from the desert edge up through pinyon-juniper and forest types. Mixed with sagebrush are bunchgrasses and a few shrubs, such as bitterbrush, important to game. Valley quail, cottontail rabbits, and chukars are often abundant within this type. The pure sagebrush type is found from 4,500 to 6,500 feet in elevation. Total area, 32,500,000 acres.

Pinyon-Juniper. This type occupies the hillsides at elevations of 6,000 to 7,000 over much of the State. Interspersed with the trees are sagebrush, bunchgrasses, and bitterbrush. The type contains much of the important deer winter range. Chukars, sage grouse and rabbits are often common. Total area, 8,500,000 acres.

Forest. There is little continuous forest in the State. The isolated stands are composed of pines, fir, and aspen intermingled with sagebrush, grass, and herb areas and many excellent shrub types containing wild plum, serviceberry, chokecherry, snowberry, willow, and mountain mahogany. This is the most important part of the summer range for mule deer. Sage and dusky grouse and rabbits are fairly common. Elevations are over 7,000 feet. Total area, 550,000 acres.

Barren, etc. About 3,000,000 acres are dry lake beds, alkali flats and, as shown in Table 2, over 1,000,000 acres are in irrigated lands or in water areas.

Nevada's 2,000 miles of fishing streams and 340,000 acres of fishable lakes, reservoirs, and ponds are also accessible to the public. Good management should furnish abundant fishing to the eager residents.

Visualize these vast areas, the source of our fish and game, as a sizable ranch. Game management is a ranching job with a herd of 350,000 big game animals. Sample counts show there are more than 20 deer on the range for each buck killed. This kill has exceeded 17,000. In terms of livestock the ranch would be a 75,000 to 100,000-head outfit. The hunting of small game, mammals and birds develops a job load at least equal to that of deer management. Fishing provides a still greater job load than hunting.

In summary, there is huntable game on nearly one-half of the State of Nevada. About 20 species of mammals and birds are available to the hunter. Fishing is good but maintained at considerable expense and a lot of work. A fresh look is needed at the size of the administrative job in fish and game. Most residents have not guessed the scope of the work it should encompass.

All of this is an attempt to show that the old days are gone except in the far backwoods. Fish and game management can no longer run itself. There is a professional job to be done— a small law enforcement force and some not fully efficient fish hatcheries cannot do the job. The purpose of this report is to describe the job ahead: What will be required to face the pressure of an increasing population and an increasing interest in outdoor recreation by residents of Nevada.

CHAPTER III

PREVIOUS STUDIES OF FISH AND GAME ADMINISTRATION

THE GABRIELSON REPORT

Soon after the law setting up the present Fish and Game Department was passed, steps were taken to develop a professional administration. After the organization of the new Commission in 1948, a small group of professional men was selected and headed up the technical phases of the job. It was then decided to employ someone in the wildlife management profession to make an analysis of the fish and game laws, including that which established the present form of administration; of the organization being developed to manage the fish and game resources of the State; and of existing programs and projects. Dr. Ira N. Gabrielson was selected for the job. He had been Chief of the U. S. Biological Survey (now U. S. Bureau of Sports Fisheries and Wildlife) and was then (and still is) President of the National Wildlife Management Institute. His study was made in 1951. The report was printed and widely distributed within the State. His recommendations for legislation making for a less cumbersome Commission and simplifying the mechanism for setting up regulations have not been accepted but the administrative programs he proposed seem to have become the Bible for the Commission and its staff and have been carried out almost in toto. Sportsmen, however, did not seem to recognize the value of the report and have forgotten it existed.

Abstract of the Gabrielson Report

The report undertook:

1. To describe the existing fish and game laws; the organization developed under them; the programs and projects under way or planned.
2. To analyze the suitability and adequacy of laws, divisions of responsibility, organization as viewed by the Wildlife Management Institute, based primarily on earlier studies of other states.
3. To recommend changes needed and to present a "model law" to effectuate them.

The report does not seem to state the nature and extent of specific work done in Nevada.

The 1951 Situation

As a result of 1947 legislative action, each county elects a member of the 17-man State Commission, which meets twice or more times a year: once to deal with budgets, once with bag limits, seasons, etc. A five-man Executive Committee of the Commission meets monthly to deal with current administrative and management matters.

Each county has a three-man game board, appointed by the County Commissioners, and the boards exercise great authority in actual dealing with fish and game, and the manner and extent of hunting and taking.

Additionally, the State is divided into five Fish and Game Districts; each has some form of separate organization, with far from clear relations to other fish and game organizations.

The basic laws under which this diffused system of control operates are those passed by the Legislature.

The Commission may and does appoint a Director with rather nebulous duties. The Executive Board maintains close control on personnel and finance. The Director deals with current supervision.

A simplified staff included two men to study and report on wildlife and plan habitat improvement projects. There was no public relations or education officer.

The most important game management project was a statewide wildlife survey, showing widespread overgrazing in which deer are a major factor. Projects in transplanting game birds and animals, development of a waterfowl management area, a beaver program, and predatory animal control have been undertaken. A game farm and fish hatchery are operated. The outputs are distributed with insufficient regard for suitable habitat.

Weaknesses as of 1951

In this essentially arid state, wildlife, as a product of land and water, is always in delicate adjustment with the habitat. Thus errors in dealing with both habitat and wildlife readily have ill effects of major proportions. An essential to avoid errors is systematic, adequate, and up-to-date information. The likelihood of costly errors is increased in Nevada with its growing population, and thus pressure on wildlife is increased.

The 1951 legal, organizational, and administrative setup was not suited to do the job required. A high part of the time and effort of all concerned went into routine processes of administration, and there are vague zones of ill-defined responsibilities.

Legislative Recommendations Made by Gabrielson Report

1. Appoint a bipartisan five-man State Commission, chosen at large rather than by districts or counties, familiar with fish and game matters, to serve staggered terms.
2. Establish the Commission as a policy and budgetary body.
3. Establish the post of Director as administrative head of the organization, to be appointed by the Commission and be responsible to it for: (a) appointing, assigning, and dealing with personnel; (b) working within Commission budgets; (c) obtaining, preparing and presenting information requisites for intelligent setting of seasons, limits, and other technical management matters; (d) preparing proposed regulations for final action of the Commission.
4. Find ways to increase the funds available to the Commission, which are currently insufficient. Means are suggested.
5. Organize the staff into six Divisions under the Director and Assistant Director; these to be fisheries, federal aid, game, law enforcement, public relations, and administration. The roles and functions of each are described. Investigations and research would be conducted by appropriate divisions, rather than by a research division.
6. The basic legislation should deal with retention or modification of existing law which covers other less weighty matters.

The recommendations leave County Game Boards out of the picture, emphasize the need to build up and deal with organized sportsmen's groups, emphasize the need for more and better organized public relations and educational work.

Program Recommendations; and Comments as of 1958

1. *Have staff members make proposals for a five-year program.*

Comment: Much progress has been made, but not all programs have been thoroughly crystallized.

2. *Study habitat carefully before making additional plantings of chukar and quail.*

Comment: Studies of chukar and Gambel quail have been completed under the Pittman-Robertson program and excellent reports have been published furnishing guidelines for future action.

3. *Abandon the costly game farm for chukar and pheasant.*

Comment: Done. Chukar are live-trapped as needed. Pheasants are purchased.

4. *Install additional bird-watering devices in carefully selected places.*

Comment: A modest program is being carried on within limit of funds. The program for mapping potential range for chukar and Gambel quail should be stepped up.

5. *Continue waterfowl flyway studies and development of Stillwater project.*

Comment: Done.

6. *Survey State to select land acquisition areas for public shooting grounds.*

Comment: Much work has been done but there is still much to do in order to establish priorities and perhaps secure options so that some important areas are not lost forever.

7. *Continue beaver program.*

Comment: Done. Policy established and one man is employed full time.

8. *Install either-sex deer law for herds already too large for their ranges; acquire deer winter range where needed.*

Comment: Deer management has gone further than damage control. Tentative policy may attain maximum sustained yield. Haven't yet sufficient facts on which to base a deer winter range acquisition program or else opportunities for such purchases have not been suitable.

9. *Capitalize on opportunities to increase antelope and mountain sheep.*

Comment: More facts are needed on how this might be done. Fish and Wildlife Service is studying both species intensively.

10. *Abandon introduction of elk.*

Comment: Done. Habitats are not suitable for any large number of elk.

11. *Concentrate predatory animal control in areas where game herds need building up.*

Comment: No such areas have been designated. We are not sure that any important areas exist. Need more facts on the role of predators.

12. *Study hatchery and fish planting programs to get essential facts.*

Comment: A survey of all of the fishing waters of the State is practically complete and a report prepared. This is now being reviewed by County Game Management Committees.

13. *Study reservoirs not yet covered.*

Comment: Done.

14. *Study and act on pollution, especially by mining industry.*

Comment: The needed legislation was passed in 1957 Session.

General Comment

The general shape of key recommendations in the Gabrielson report is undoubtedly sound and necessary. The recommendations look to a strong, centralized authority, acting on a statewide basis. The "model law" duties and powers of the Commission include the so-called "regulatory powers" on seasons, limits and areas; authority to acquire land and water; authority to enter into cooperative agreements and authority to conduct studies. All of these are vital for true management of a wildlife resource.

A professionally sound, aggressive and forward-looking program, such as the report visualizes, would require, in addition to good basic laws and competent central authority and executive officer, at least two other things. These are:

1. A competent and well-organized method to obtain, analyze and interpret facts essential for intelligent management policies and actions—usually called research.

2. Development of a body of officers capable not only of conducting good fact-finding but also of applying the results to the highly variable, shifting, fluctuating practical problems of management found in nature in Nevada.

The Gabrielson report indicates that, in the long run, the quality and competence of the Commission and Director, their policies and programs—and thus the welfare of wildlife, hunters, and fishermen—will depend on the quality of the professional staff. As it recommends, the selection of such key people is now under the direction of the State civil service body, with the employing agency having a large look-in.

The report recognizes the sensitive relation of wildlife and habitat in a generally arid land and notes that increasing hunting pressure intensifies old problems and creates new problems of wildlife management, and even of mere maintenance. But as to one widespread pressure on wildlife—widespread use and over-use of game habitat by domestic animals—the report is strangely silent. Destructive competition between wild and domestic creatures is one of the universal facts of western wildlife management. It is hardly a secret that it exists in Nevada.

Such a widespread problem is not to be solved by ignoring it, nor by verbal combat between graziers and sportsmen. In this respect the report seems incomplete. The State of Nevada has hardly started working out mutually satisfactory programs of range stocking with the principal federal land-managing agencies within its borders. The tremendous area of federal land is too potent a factor to be ignored.

Doubtless, widespread experience leads to the strong recommendation that organized sportsmen groups be the primary recipients of the Commission's public relations effort, and the primary vehicle to exercise political power in building toward better things. But experience shows that this is a two-edged sword. Many such groups are dominated by ardent hunters and fishermen wholly untrained in biology who are primarily concerned with their own desires, habits, and conveniences. Game management, however, is for the game and its habitats. It can go only so far in fulfilling all the hunters' desires.

The omissions in the report left it, despite very real and solid value, less than complete. Wildlife management in Nevada seems certain to be sensitive and tricky. A biologically sound program, meshed with the problems of land ownership and land owners' attitudes and aims will, beyond doubt, be required. On the whole, perhaps the most important forward-looking steps, other than further centralizing authority, would be to build up the corps of professional workers to develop a strong fact-finding program and to work hard at securing public understanding of Commission policies and programs.

THE QUESTIONNAIRE OF THE CONSULTANT COMMITTEE

In December 1956 the Legislative Commission of the Nevada Legislature appointed a 17-man committee of laymen to investigate certain aspects of the Fish and Game Commission. During the 1957 Session, the Legislature memorialized the Legislative Counsel Bureau to study fish and game management, policies, organization, and fiscal matters and problems pertinent thereto.

A smaller committee later was formed from the 17-man group which was eventually called the Consultant Committee. One of the duties assigned this committee was to determine sportsmen's opinions on several phases of fish and game management. Accordingly, in cooperation with the Legislative Counsel Bureau and with the help of others, a questionnaire was prepared.

Questionnaires were sent to each of the more than 36,000 resident hunters licensed in 1956; 8,000 could not be delivered but, of the 28,000 delivered, about 11,000, or 40 percent, replied. While the committee considered the return less than satisfactory, pollsters would consider this percentage quite high, especially when return postage was not provided—30 percent would have been good, and a far lower return would probably have given the same answers.

The completed questionnaires have been compiled by counties and totaled. A report has been prepared under the direction of the Chairman of the Committee and publicized.

The Legislative Counsel Bureau has requested our appraisal of the questionnaire.

Findings of the Questionnaire

By a 9-to-2 vote, hunters favor the continuance of a 17-man Commission, one from each county elected by the voters at the general election. This structure is preferred over a small Commission appointed by the Governor.

It is the feeling of this study group that more consideration should be given to a smaller Commission. Nevada sportsmen have learned to live with the large cumbersome Commission and the county boards; they like this system though it is more likely to hamstring government than to accomplish game management. Everyone can get into the act, speak his piece, criticize and be criticized—and a fine time is had by all. In addition, there is considerable fear that appointments to a Commission would be political. It has been the experience of the study group in the last several years in several states that if a governor wants to commit political suicide he should inject politics into fish and game appointments. Sportsmen will not tolerate this.

A 3-to-2 majority favors the setting of seasons and bag limits by the county game management boards.

This archaic form of government has no parallel in any state which is dealing with statewide problems. It was hard for the study groups to understand just why Elko and Humboldt Counties should have opposite policies in regard to out-of-state deer hunters—why Nevada should have nine quail seasons (1957) and six rabbit seasons—the bulk of the information on which seasons and bag limits are now based is collected by staff personnel. We believe in the continuance of the county boards, but believe their action should be advisory only.

In regard to increased legislative control of expenditures the replies spit 8 to 7 in favor.

The thought behind the proposal is to encourage legislators to take a more active interest in the fish and game budget. There is the additional thought that the Legislature should be the governmental body responsible for the spending of state funds. Of course, responsibility is exercised under present legislative procedure when the budget is authorized under the General Authorization Act. However, it is felt that the earmarked items under this act receive only superficial consideration and do not ordinarily go before legislative fish and game committees. The tendency in government is in the direction of appropriating all moneys, and perhaps Nevada will follow.

The present system has the advantage of flexibility. The Director of the Budget may allow the transfer of funds between items within the budget. He "may authorize the augmentation of the amount authorized" to the extent funds may be available, or he "may also reduce any authorization whenever he determines that funds to be received will be less than the amount so authorized" in the budget. For such a dynamic resource as fish and game, the degree of flexibility now existing has been needed on several occasions. Freezing the financial plan for a two-year period can often prevent adjustments to changing wildlife conditions, can cause the loss of advantageous offers of land that suddenly arise, and can prevent the meeting of new demands resulting from the rapidly expanding economy of the State. There are already 65 men exercising authority over fish and game administration. The study group recommends against adding 64 more.

Hunters were strongly in favor of continuing to acquire real property for fish and game purposes and access thereto. By a 4-to-3 vote they opposed keeping such properties on the tax rolls.

This is a matter for all people of Nevada to decide. The study group makes no recommendation.

To the question, "Do you believe that the harvesting of does is essential to proper deer management?" 71 percent said yes, 29 percent no.

This is a most difficult question to word. Most would answer orally, "In places, yeah." However, they might develop reservations when pinned down to specific areas—perhaps to their favorite hunting territory. Nevertheless, the summary reply is so positive that only one interpretation can be given to the general feeling of sportsmen of Nevada on the subject.

Surprising strong endorsement was given to the pheasant program. Even though only five counties have pheasants in any number and only one-sixth of the license buyers hunt these birds, everyone apparently is in favor of any program that will increase hunting opportunity within the State. Pheasant programs and trout planting programs are expensive. Apparently Nevada sportsmen are willing to pay for them.

One question asked whether the Fish and Game Commission should be empowered to prohibit or control fish or game contests. The respondents favored this. We recommend the enactment of such a statute and that it contain a clause that no more than a prize of nominal value be awarded in any case.

A pleasant surprise was the finding that 48 percent of the respondents had been checked by a game warden in 1957. This seems to be highly complimentary to the activity of the field men on the staff of the Commission.

Twenty-two percent stated they belonged to a sportsmen's organization. This is probably about normal and perhaps higher than occurs in more populous states. Many people are not "joiners," many are not interested in participating in policy making and are satisfied to accept whatever privileges are granted. A few, of course, are not in agreement with the programs their local organization sponsors, and do not join. There is little to be concluded from the summation of this question.

Two out of three favored continuation of the Information and Education Program. The study group endorses this policy. An uninformed public is often a hostile public. Support for programs cannot be secured if the public does not understand them; if they understand them, they will not support them unless they are good. The policies of the Commission have not been fully understood.

Weaknesses of the Questionnaire

1. The questionnaire was sent to hunters only. Nearly 15,000 licensed fishermen who do not hunt were not polled, although it contained questions in regard to fishing.

2. The questionnaire did not reflect as accurate a sample of opinion as a poll conducted by professional people making personal interviews. This procedure was not feasible in this survey, and we do not feel the variance is of practical significance.

3. It is impossible to write a question so it will be interpreted the same by everybody. The committee made every effort to have all questions clear. We feel they were. None seemed to be "loaded," although

several of those polled have felt the wording of some questions directed the answer. In addition, some people looked for hidden meanings and ulterior motives in the authors.

4. The group replying included many levels of knowledge. It is difficult, therefore, to conclude how much weight should be given the collective replies.

5. Some questions should be considered merely as asking the sportsmen's preference. One, for example, had to do with year-long fishing seasons, but a decision on appropriate seasons requires fact finding coupled with good fish management and should be decided finally by facts developed by professional people.

6. Some of the answers should be decided by all of the people of the State. For example, the question of continued taxation of lands acquired by the State for game management purposes will not be decided by hunters alone.

7. Some of the questions are beyond the knowledge of the average sportsman to answer accurately. For example, most of them have experienced no other form of fish and game administration than that experienced in Nevada. They have nothing with which to compare it within their experience, have learned to live with it in its present form and, therefore, like it.

Value of the Questionnaire

Considering the collective replies as sportsman opinion, the clear-cut ballot on most of the questions leaves little doubt as to the predominance of feelings. However, the summary should not be considered a mandate in any degree. In view of the uncertainty as to the level of knowledge behind the answers, it may be that what sportsmen want is not necessarily good management of game.

As national polls show, opinions change from month to month. There has been no more radical change in public opinion in the game management field than in regard to doe shooting. The same is true of many other principles of game management. The summary should be considered a fairly good report on the current opinion of hunters in Nevada on the several phases of fish and game management.

Supplemental Comments Made on the Questionnaire

Additional comments were invited and space provided at the end of the questionnaire for them. For summarization, these were placed on cards, sorted by subject matter and a summary by counties has been duplicated for distribution.

This is not a good method for soliciting public opinion. This is indicated by the fact that a major portion of the comments are at variance with the replies to the questionnaire.

Most of such comments are made by the upper and lower strata of sportsmen, meaning the dissatisfied on one hand and the devotee on the other. The enthusiasts and the peevish are several times more apt to add comments than the run-of-the-mill citizen or the satisfied sportsman.

It was not a good sample. Probably in very few cases were there as many as 30 comments on a single subject from any one county, less than 10 in most. In addition, any resemblance of this summary to that of the questionnaire does not exist on many of the questions. Washoe

County, for example, voted 5–3 for doe shooting in the questionnaire. The written comments strongly opposed it. The comments did not show much enthusiasm for the pheasant program and were mostly against tags or paying as much as 25 cents per tag. The replies to the questionnaire strongly favored the program, a tag system, and endorsed a charge of 25 cents per tag, at least.

The comments oftentimes showed a lack of knowledge of either the law, the existing regulations or adopted policy.

Some series of comments run through all the counties, such as a plea for increased law enforcement. It appears it might be worthwhile to make a statewide summary, compare it with the replies to the questionnaire and the weakness of the summary of the comments divulged.

It is the feeling that the summary has some value. It indicates the items the sportsmen are thinking about, items several are dissatisfied over, and should be given study by the Commission and its staff. It should by no means be considered a cross section of sportsmen's opinion.

CHAPTER IV

ADMINISTRATION

ORGANIZATION AND OVER-ALL ADMINISTRATION

This section was prepared by Mr. Thomas L. Kimball, Executive Director of the Colorado Department of Game and Fish, who worked with the study group for a period. Mr. Kimball was Arizona-reared and started with the Arizona Game and Fish Department in 1937. He climbed the ladder to the job of Director of the Department in 1948, having taken four years out in the Army Air Force in World War II. He resigned the Director's position in 1952 to become Director of the Colorado Game and Fish Department after a nationwide competitive Civil Service examination, a position which he now holds. He is presently Vice-President of the International Association of Game, Fish and Conservation Commissioners and Past President of the Western Association of State Fish and Game Commissioners. Mr. Kimball has served longer as a Director in the western states than any other incumbent.—F. P. C.

Organization of the Nevada Fish and Game Commission

The fish and game laws of Nevada provide that the administration and management of the wildlife resource are vested in a 17-man, elected Commission (one from each county), and 17 county boards, consisting of three men each appointed by county commissioners. Such divided policy-making and administrative authority is considered archaic, cumbersome, and wasteful. Such an organization makes it extremely difficult, if not impossible, to pinpoint responsibility. Inevitably, such overlapping will lead to "buck passing" in connection with any decisions, mistakes, or irregularities which may arise in the management of wildlife resources.

Perhaps one of the greatest disadvantages of the present system is the tendency of each county to try to get as much of the budget, planted fish, and personnel as it can. Each tends to ignore over-all state needs or consideration of the type of management which will make the greatest return to the bag and creel. This tendency can lead to the unwise expenditure of limited funds. It fosters trading between counties for favors and projects regardless of feasibility. It will set up a serious roadblock to a program designed to produce the greatest harvest of the wildlife crop.

The finding that most sportsmen favor this dual responsibility is understandable. The average hunter or fisherman wants to be heard. Local county boards are readily accessible, usually listen, and are sympathetic to local wishes. Few sportsmen are concerned about fish and game affairs which do not affect them locally or directly. However, fish and game are declared to be the property of the people of the State of Nevada. More and more hunters and fishermen are traveling statewide or even nationwide to do their hunting and fishing. If the State can maintain the good fishery with plenty of fish to be caught or continue to produce game in abundance, sportsmen will harvest the

crop wherever it is. Game and fish know no county boundaries, and it is in the interest of all Nevada sportsmen that the resource be managed uniformly on a statewide basis.

As Nevada population increases, more and more city dwellers must seek their pleasure afield in the counties where game and fish abound. Less-populous counties always fear that a strong central commission will be dominated by the counties exerting the greatest political pressures, with a detrimental effect on local hunting and fishing opportunities. Any change in the present organization must minimize this possibility.

Nevada sportsmen at present are in a most enviable position. They have a large state with a plentiful game and fish supply. Hunters and fishermen are relatively few, in comparison with other states. This situation permits longer seasons, greater bag limits, and high success ratios for the comparatively few sportsmen available to harvest the surplus wildlife crop. Percentagewise, however, Nevada's population has increased more than that of any other state in the Union. Projecting the population dynamics of Nevada into the future will provide the basis for forecasting a proportionate increase of problems in fish and game management. As has been stated by many authors before, wildlife is a product of the land. If managed properly, the land can produce a greater sustained yield of fish and game. To cope with increased problems of management, to insure more intensive manipulation of fish and game habitat and a wildlife crop matching increased human population, the creation of a strong, independent central authority is not only necessary but imperative.

Recommendations

1. A law should be enacted creating a five or seven-man Fish and Game Commission, appointed by the Governor on a nonpolitical basis and for staggered terms. An alternative to this would be to have a part of the Commission appointed by the Board of County Commissioners. This is done on the Welfare Commission and works out well. The Commission should have full authority over budgetary matters, seasons, bag limits, and broad policies only.

2. In order to prevent domination of the Commission by any section, the law should state that no more than one Commissioner could serve from any county at any one time.

3. In order to prevent powerful political forces, which might develop, from dictating the appointments to the Commission, it is recommended that the following qualifications be met by any person who is a candidate for appointment:

(a) Must have had at least five years' interest and demonstrated service in wildlife affairs.

(b) Must not, during the year preceding the appointment date, have been a candidate for a local or state political office.

(c) Should be selected from lists which have the endorsement of the statewide sportsmen's organization.

(d) Must have successfully demonstrated his ability in business or vocation.

4. Commission members should be appointed at large so they may feel their statewide responsibilities and eliminate any obligation to

districts or local communities. The wildlife resources must be managed on the basis of the greatest results for the money expended, regardless of county, district, or local boundaries. The philosophy of the greatest good for the greatest number should apply in game and fish management, and this stipulation should be provided in the law. It is absolutely essential that well-qualified persons be appointed to the Commission—men who are capable of rising above petty personal politics and can serve the best interest of the entire State, not merely the local communities in which they live. The success or failure of wildlife resource management in Nevada will depend upon the ability and quality of those serving as Commissioners.

5. Commission members should be unsalaried but should be allowed adequate traveling expenses, and should not be bound by per diem limitations for salaried state employees unless such limitations still allow proper reimbursement. Commissioners who receive no compensation should be able to perform this public service at no out-of-pocket expense to themselves.

Organization of Nevada Fish and Game Department

Under present law, the Nevada Fish and Game Commission not only sets the policy for wildlife management but also maintains joint authority with the county game management boards for administrative direction of fish and game activities and the supervision of salaried personnel. At present, the direction and supervision of salaried employees seems to fluctuate between the Commission members, the county game management board members, the Director, the division chiefs, the district supervisors, and sometimes a combination of all. At present there is no Fish and Game Department, as the Commission holds the primary administrative authority and delegates whatever portion it deems proper to the Director and staff. This is considered poor procedure, principally because it provides fuzzy, poorly defined areas of responsibility. The Commission does not devote full time to the important business of game and fish management and must depend upon full-time employees to activate and maintain the wildlife program. No employee, however, can be held completely responsible for the success or failure of a program unless he also is given full authority for administration of policy and program.

Recommendations

1. There should be created a Nevada Department of Fish and Game charged with the direct responsibilities of carrying out the policies of the Commission. The administrative authority heretofore held jointly by the Commission and county boards should be vested in the Department. All fish and game properties held by the counties should be turned over to the Department for administration.

2. There should be created a position of Executive Director of the Nevada Department of Fish and Game. The Executive Director should have the following duties and responsibilities:

(a) To carry out policies of the Commission.

(b) To have complete administrative authority over Department activities and personnel.

(c) To enforce laws and rules and regulations of the Commission.

(d) To prepare a budget for Commission approval or modification.

(e) To supervise all officers and employees of the Department.

(f) To gather factual data and information on the status of game and fish for presentation to the Fish and Game Commission as an aid in setting the seasons and bag limits.

(g) To plan a long-range program of fish and game management for the approval of the Commission.

(h) To collect license revenues and to make disbursements according to the budget approved by the Commission.

3. Fish and game management is a science requiring skillfully trained and competent personnel. To maintain profession standards, it is recommended that the Director be included in the classified service and that the following minimum qualifications be written into the law creating such a position:

(a) Graduation from an accredited college or university, with a degree in wildlife management or related subjects.

(b) At least 10 years of paid experience in the wildlife field, the last five years of which the applicant must have held progressively responsible positions in the field of fish and game management.

(c) The incumbent should be removed from office only for inefficiency, neglect of duty, or misconduct in office after a public hearing before the Personnel Commission.

The organization should follow the line and staff pattern. The Director should be responsible for carrying out policies and work programs approved by the Commission through a line organization of regional supervisors. The staff should have the responsibility of preparing the work plans, assisting in developing a budget for submission to the Commission, assimilating factual data and information from the regions for recommendations to the Commission on a statewide basis. The staff should also represent the Director while inspecting the field operations to assure that Commission policy and work programs are being carried out uniformly and satisfactorily in all regions. In-service training schools should be scheduled regularly, and employees given systematic training in the various functions of the Department, with particular emphasis on the activities where improvement of performance is needed.

It is recommended that qualified fish and game managers be selected for the principal field positions, with specialist technicians to assist them in performing all the functions and duties of the Department. The conservation officer should have the necessary qualifications to complete in a satisfactory manner most, if not all, of the operational needs of the Department.

Fact-finding jobs should be supervised and directed by the staff officers. Basic research should be carried on by the University of Nevada or other accredited agencies by cooperative agreements or contracts. Technicians working on applied research should devote their principal efforts toward improving techniques of gathering factual information on the game and fish resource and management and in demonstrating these improved methods to the conservation officer in order that he may obtain more reliable information from the area he serves.

There has been some criticism of operational procedures, department programs, expenditure of funds for this purpose or that, etc. When irrefutable facts are presented on which to base fish and game management recommendations, arguments usually cease. When very few facts are presented, the situation usually develops into an argument of personal opinions, and, as all of us are aware, there are plenty of opinions on game and fish management. It has been a proven axiom in most wildlife matters that "the fewer the facts the greater the argument." The applied research, or fact-finding program, should be designed to develop techniques which will provide irrefutable facts with which to answer sportsmen's questions and take wildlife management affairs out of the category where opinions must be used for a guide.

Equally as important as gathering proper information is presenting the facts to the general public in a manner which the majority of the reasonable sportsmen of the State can understand and accept. To accomplish this requires the assistance of all personnel, who should familiarize themselves with the supporting data and reasons behind Commission policy and assist in keeping the public well informed on all matters. Radio, television, and newspapers are excellent media for disseminating information, but nothing will substitute for the personal touch. Meetings with sportsmen's clubs, civic and fraternal organizations, Chambers of Commerce, and other groups will all pay great dividends in good public relations. The matter of establishing and perpetuating good public relations is the nemesis of most game and fish departments, and its importance in maintaining an efficient job of resource management cannot be overemphasized. Game and fish departments are public agencies and can move no faster in providing wildlife management needs than the public will allow. A well-informed public can and will provide the necessary support and impetus for a progressive, successful wildlife program.

Organization of the Sportsmen's Advisory Council

Under the present administration of wildlife resources, the majority of the sportsmen of the State participate and take an active interest in game and fish affairs. This condition is healthy and should be perpetuated under any new system of management which may be established.

Recommendations

1. In order to have county representation under a five or seven-man commission a law should be enacted creating a "Sportsmen's Advisory Council," composed of 17 members which might be developed in one of several ways, one of which would be to have a member of each county game management board serve as a member. Selection could be made by the Commission or the Director or county commissioners as at present. The Council would be charged with the responsibility of establishing and maintaining a close liaison between the Fish and Game Commission and presenting the wishes of sportsmen and local communities at the grassroot level. The law should provide that the Advisory Council meet with the Commission as frequently

as is necessary. In order to assure full participation, individual members should be paid their traveling expenses for a maximum of two meetings per year. The Fish and Game Commission should allow the Advisory Council sufficient time on its agenda to discuss whatever business is desired or recommendations to be made. The Commission should attempt to develop policies sufficiently in advance of Council meetings to give the sportsmen of the State sufficient time to study proposals and make comment before final action is consummated. Wherever possible, the Department of Fish and Game should furnish to the Council factual data and information upon which wildlife programs will be developed and seasons and bag limits set.

By such cooperative endeavors the wildlife program in Nevada will continue to make progress to the end that this valuable renewable natural resource will be wisely used and conserved for posterity.

LEGISLATIVE NEEDS

This section is the combined thought of Mr. Kimball and Mr. Cronemiller following extensive discussions with sportsmen, including the Consultant Committee, several leaders in sportsmen's organizations, and members of the Commission and its staff. It may be the consensus of many leaders. However, the portion dealing with Commission size, method of appointment, etc., definitely are not supported by the rank and file, as indicated by the returns from the questionnaire.

We have considered legislative programs in two groups: the immediate needs and the long-time trends.

Immediate needs include:

1. Rewriting some of the fish and game laws of the State to provide clarification, eliminate conflicting clauses, and state more accurately the intent of the law with regard to the responsibilities of the Commission and the county game management boards. The Commission staff can give references to the sections involved. This job should not be confused with any attempt to write new laws; otherwise the job would not get done.

2. Providing per diem rates in the form of salary or expense reimbursement to the members of this and perhaps other state commissions, whereby they would be fully compensated and could enjoy the kind of food and lodging justly due leaders in the State Government. The Commission members are neither knaves nor financially independent. They are businessmen whose absence from their work is an expense. The State of Nevada is derelict in failing to provide at least the actual expenses of Commissioners on a level justified by their positions.

3. Provision should be made for the Commission to employ or otherwise be provided with special legal counsel. Many legal problems have developed, and more are foreseen in the growth of the State and the widening of the programs of the Commission. The Interstate Compact on the Truckee-Carson Rivers and other water problems, the legal phases of land acquisition, and certain phases of cooperation with federal agencies require competent legal counsel in addition to that presently afforded through opinions of the Attorney General.

The questionnaire sent out by the Consultant Committee propounded a question on fish and game contests: "Should the Fish and Game Commission be authorized by law to prohibit or control game contests in the State of Nevada?" There was a similar question substituting the word "fish." The returns were 60 percent in favor of the former and 54 percent in favor of the latter. Contests featuring the maximum size of fish or game lead to violations. Small-sized trophies may be discarded when there is an opportunity to take larger. Unsportsmanlike behavior has often taken place in attempts to win valuable prizes. It does not seem that any commercial enterprise should use any such contests as a "come-on" to improve business, nor should organizations use them for fund raising. Fishing and hunting are pleasurable sports in their own right and prizes and gifts should not be an extra reward for hunter success. It is recommended that such legislation be enacted and that it contain a clause providing that no more than a prize of *nominal* value to be awarded in any case.

The long-range legislative program should visualize:

1. A five or seven-man Commission, each member with a statewide perspective.
2. Their duties should cover budgetary matters, seasons and bag limits, and policy making. Through such policies the Commission would direct the staff. It should be noted that setting this size for the Commission promotes statewide thinking, prevents pork-barrel action and reduces sectionalism. With a Commission of smaller size there should be no more than one member appointed from any one county. This could be included in the legislation. However, the State should not be divided into districts. There should be an informal understanding as to general areas concerning which individual Commissioners have a better knowledge, and whose opinions on these would demand respect. However, these areas could change with succeeding appointments. In any event, if districts were outlined, the Commissioners would not then be a state body thinking in terms of statewide policies, but would be district representatives doing what they could for their districts.
3. With the Commissioners functioning solely as policy makers, partisan politicians would lose interest. Election then is no longer the proper method of selection. The code should provide for their appointment by the Governor, and the staggering of terms so that no one Governor would appoint a majority.
4. There should be created a Department of Fish and Game which would administer the policies of the Commission, and the fish and game laws become the administrative body in fact.
5. Nevada should eliminate the administrative authority of the county game management boards. They should be advisory with the Commission empowered to take all necessary action.
6. We favor continuation of the present budgetary system which provides flexibility with the budget. This permits handling fiscal problems that develop within the one-year budgetary period. For example, purchases not completed may free some funds, and where opportunities or new needs have developed, funds may be transferred. Legislative control of expenditures would freeze funds for a one-year period; this

is not good business practice in such a dynamic field.

7. Legislation is needed which will recognize recreation and wildlife values in water use. This is being studied pursuant to Senate Resolution No. 22 of the 1957 Legislature. Such amendment is needed not only in the basic water law but also in the Water Conservation District Act.

We recognize the desirability of the Legislature controlling all state expenditures. We feel, however, this can be done without the formality of new legislation but through legislative committee members giving attention to the budget and to fish and game administration.

A good start has been made on the job of developing needed policies. Some new game management policies are being tested. Several administrative policies have been adopted. These include:

1. Definition of division of authority between Commissioners, Director, and county game management boards.
2. Deputy warden appointments.
3. County game budgets.
4. Establishment of seasons, limits, closures, etc.; emergency changes.
5. Feeding of wildlife.
6. Game refuges and sanctuaries.
7. Wild animals in captivity.
8. Predator and rodent control.
9. Licensing of fur farms.
10. Operation of commercial hunting camps.

A deer-management policy has been prepared and is being given a trial. This is a good policy for range protection and the reduction of range abuse. It does not fully consider the maintenance of a herd at its most productive level. In other words, range damage is required to justify herd control. Recent research findings show that maximum production results when deer numbers are at the point where no range damage occurs. Deer are then on a high level of nutrition, and survival of fawns and other deer is at a maximum. It took years to reverse ourselves on the total protection of all does. We should not get into the trap of having a policy that requires demonstration of range damage to justify antlerless shoots.

A pheasant policy has been adopted which provides for planting just before or during the open season. Plantings are made only in areas where there are pheasants; in other words, where the birds have demonstrated that they are able to reproduce. They are planted in limited numbers and on lands open to hunting. The policy encourages sportsmen and county boards to secure the cooperation of land owners to allow hunting on their properties. There is strong sentiment for heavier pheasant planting. More fact finding is needed to see if costs can be reduced to a figure that can be afforded.

The new Stream and Lake Survey Report will become the trout management policy if adopted.

Several reports by committees of Commission members and by staff men have been adopted by the Commission. In effect, these reports are adopted policy. These files should be reviewed and the policy matters summarized and set up with those that have been more formally stated.

There were hopes within sportsmen's groups and within the Consultant Committee that this study group would be able to indicate where savings could be made in fish and game funds. There are few specific items within this report. This section will indicate that the opportunity lies in the field of improved efficiency and in better business management.

The eventual elimination of two positions within the Reno office is recommended, yet we suggested adding the position of Warden-Pilot and increasing engineering effort.

Our group did not audit. It did not have the opportunity to examine all jobs or expenditures. It did, however, find ways to improve business management. This section is, therefore, in sharp detail and should indicate the approach that should be made that will result in efficiency in administration and savings. This is the opportunity for savings, not a general paring off of personnel, jobs, or projects.

A reduction in Commission size would effect a small saving, yet increased compensation for Commissioners would partly erase this. General salary increases will, no doubt, be passed by the 1959 Legislature. Our group does not foresee any marked reduction in the budget. However, it does have faith in the Commission and its staff with its present personnel to react to any reduction in income with speed and effectiveness so that there will be no financial crises. The Commission is well financed, carrying a cushion of $1,000,000 in cash in the bank and in amounts due for federal contributions on joint projects. We cannot see that any major reduction in receipts will result in a financial debacle. A major delay in bookkeeping a few years ago resulted in overbudgeting by $100,000. The ability of the organization to react to such a situation is indicated by the fact the books were balanced in less than six months.

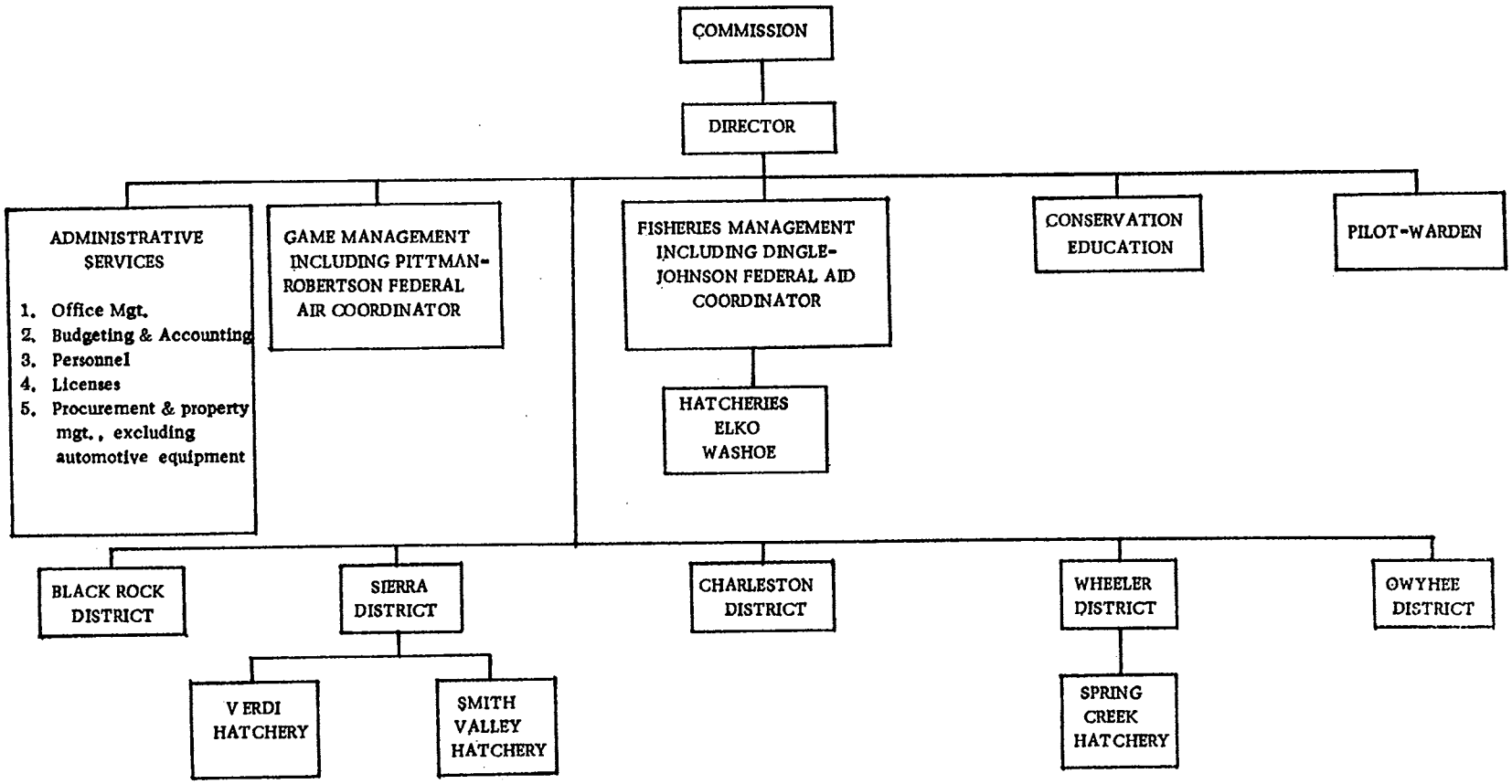
In looking over all of the work to be done over an area of 70,000,000 acres we see more jobs that should be done than it is possible to finance. Nevada is a small state only in population and finance. It equals many other states in the size of the job in fish and game administration. However, a further increase in license fees would probably not result in an increase in income. The least interested would just drop out. Nevada's budget should be kept within the income produced by present fees.

Our forecast is for a general and continued upswing in income. Nevada has lots of game and, although it is being spread among more hunters, it is far from the point where many hunters will be discouraged. Success ratios are far above those in California. Lack of success in Nevada is a lack of skill rather than a lack of fish and game.

California should be envious of Nevada, due to the fact it is overbudgeted in excess of $300,000 and has just paid $100,000 to business management consultants to learn how to get out of their trouble. We have been impressed by the general financial situation in most departments of government in Nevada.

CHART A

PROPOSED ORGANIZATION OF COMMISSION AND STAFF



CHAPTER V

BUSINESS MANAGEMENT

Mr. Eugene R. Lepley has handled the Business Management Section of this report after a careful inspection of the staff offices of the Commission. Such inspections are among his regular assignments as Assistant to the Chief of the Division of Operation of the California Region of the U. S. Forest Service, from which he was on leave while making this study.

The organization and administration under the Commission and within the Forest Service are almost the same. The latter, of course, has had much longer experience and with much more guidance from higher levels. The report has been prepared in considerable detail; it points out many ways in which more efficient management could be obtained, how better records could be kept, how some could be simplified, and how organization and training could be improved. While some suggestions would entail more manpower than is now in sight, others will reduce manpower requirements. The report should be considered in part as a long look ahead to serve as opportunities for adjustments arise and as finances become available for needed changes and improvements. Mr. Lepley's discussion and recommendations follow. It is hoped that the report will be found to be constructive.—F.P.C.

Management of fish and game for the State of Nevada is a million-dollar annual job. It is a rapidly expanding business which requires efficient administration. This can only be achieved by using the best management practices tailored to fit the needs of the organization. Members of the present administrative group of the Commission have been doing their jobs well under difficult circumstances. A lot of progress has been made during the past 10 years. Much more will be needed in the coming decade.

Administrative Organization

Recommendations

1. Work into the organization plan shown on Chart A as soon as it can be effected, with the realization that complete adoption will have to await some natural personnel turnover.

(a) It is proposed to shuffle positions, with the result that the position of Assistant Director is eliminated and the duties reassigned to appropriate Divisions. The job of Acting Director would then be rotated among Division heads.

(b) Realign federal-aid work eventually, assigning game and fish functions to the respective divisions.

(c) Create a new position of Warden-Pilot if qualified personnel can be found.

(d) Eventually assign automotive equipment management and building construction maintenance to the Division of Engineering. This is not timely at present. The job is being handled adequately by present personnel.

(e) Assign the safety program and disposal of surplus property to the Administrative Services Division.

2. Prepare organization charts for the Director and his staff group and for each district organization. Distribute copies of these charts to all employees concerned. Revise such charts annually, or as often as may be necessary to keep them reasonably up to date.

3. Periodically review the staff divisions and district organizations. Adjust as necessary to avoid conflicts, to take care of new responsibilities, to equalize workloads and responsibilities, and to keep in tune with changing times.

Discussion

These above recommendations are designed to provide a well-balanced, efficient organization. Similar and closely related work has been grouped together. Personalities and persons in present positions have not been considered. It is realized that any changes in an organization which affect people must be worked out gradually and with due consideration for those involved.

The job of Airplane Pilot is presently assigned the Chief of the Fisheries Division simply because he is a most excellent pilot and because there is no pilot position. He should be relieved of this duty and a pilot employed. At the same time, there is a need for a supervising warden in the Reno Headquarters. His duties would be to assist in more effective training of personnel and to assist the districts in handling the tough cases with involved problems of evidence and where outside assistance may be needed from state and federal law enforcement groups. It has been suggested that a position of Warden-Pilot be created if a competent person can be secured. Such individuals are known to exist, and the possibility should be explored.

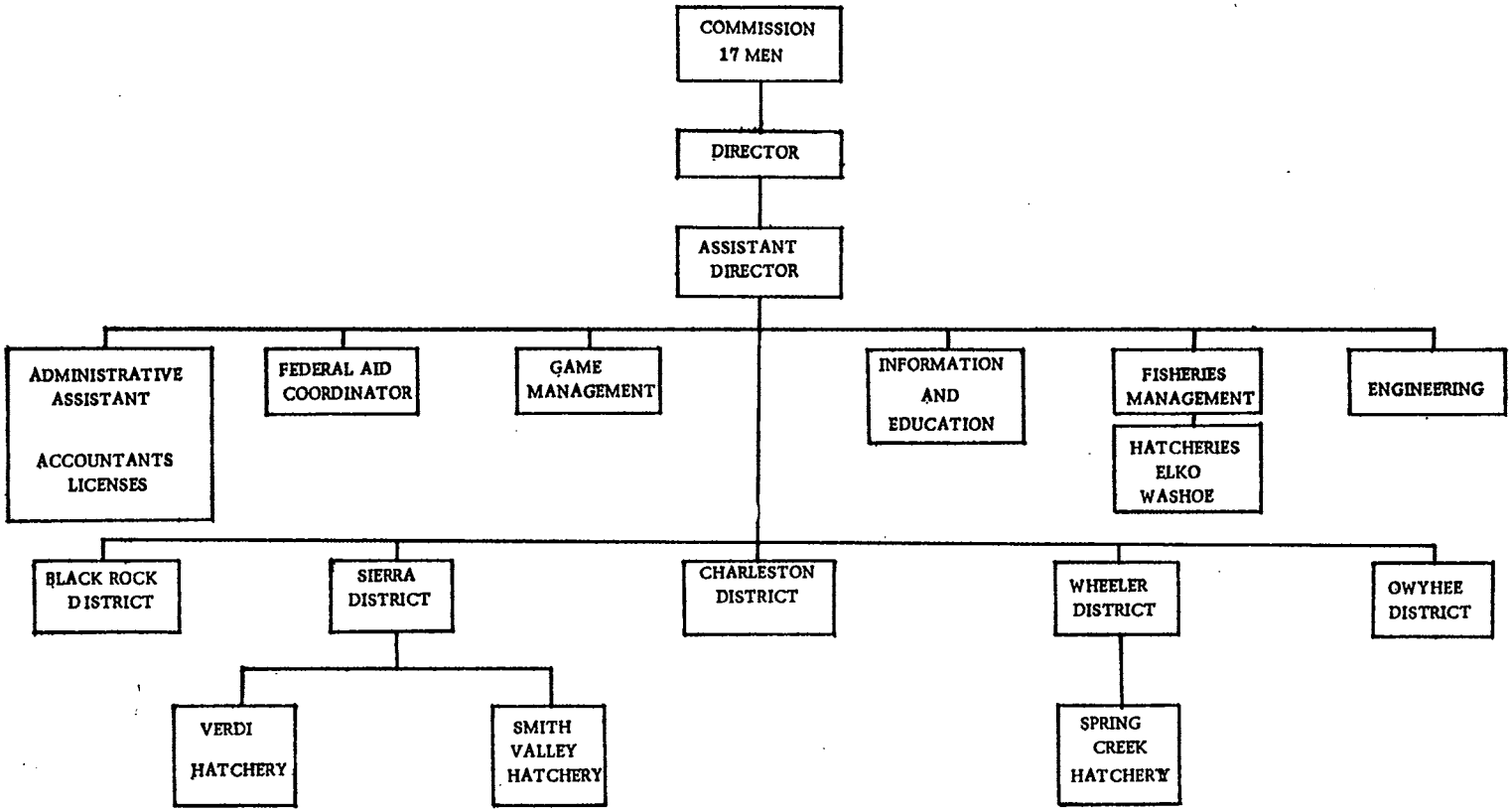
Federal Aid coordination is confined largely to game projects under the Pittman-Robertson Act, and to fish management under the Dingell-Johnson Act. The present personnel of the three divisions (Game Management, Fish Management, and Federal Aid) work together very well, with the latter a well-coordinated service division. Turnover in personnel should eliminate the need for this three-way split, and then Pittman-Robertson work would be administered by the Division of Game Management. Similarly, all Dingell-Johnson activities would be administered by the Division of Fish Management.

There seems to be a tendency for the Commission to look upon the Division of Administrative Services as a nonproductive, necessary evil. Actually, it is one of the more important parts of the Director's staff. The success of the entire organization is probably more dependent on this Division than any other one. Its work has been building up greatly in recent years. It is operating under the general direction of the Administrative Assistant, with the Accountant and the License Officer assisting. The Division is a loose-jointed organization at present and needs to have someone take hold of this and allied work with a firm hand to coordinate and get on top of the multitude of jobs that need to be done. The Accountant should have more help. He is forced to do much work of a routine clerical nature. Undoubtedly, additional personnel is also needed to handle the other work of the Division properly.

The existing Commission staff organization is shown in Chart B. It is operating fairly well under the direction of Frank Groves. In

CHART B

PRESENT ORGANIZATION OF COMMISSION AND STAFF



May 1957, he gave clearcut assignments of duties and responsibilities to all key positions. These assignments have helped a lot in letting the staff know what is expected of them and have strengthened the entire organization. The delegation of duties to the division chiefs provides for true line-staff status. However, in actual practice, they have not quite reached this level of performance. The Director should be able to follow through all the way and spend less time on jobs which can be turned over to his top assistants. He should concentrate on high-level contacts, long-range planning, coordination of staff work, and over-all supervision to see that basic laws and policies are followed.

Organization charts showing incumbents by positions are not available for the Director's office group or for the district personnel. Charts should be made up and revised annually for both levels. All employees should be furnished copies. Separate charts for each district are desirable.

A long step was taken in the direction of good administration a few years ago when the State was divided into six districts (recently reduced to five) and a supervisor was placed in charge of the various activities for each one. Previously, the field work was all supervised out of the Director's office and lacked good on-the-ground coordination. Now it is possible to use the field personnel on a district for a variety of assignments and mold them into an excellent fish and game management team for maximum accomplishment. This is exactly what is being done.

Plans and Programs

Recommendations

1. That the Commission develop realistic long-range (5-to-10-year) plans and goals for the management of the fish and game resources of Nevada.
2. That the Director and his staff set up annual programs of work to accomplish the long-range objectives established by the Commission.
3. That the Director determine and adjust the manning (based on realistic estimates of workloads for divisions and districts) of the Administrative units of his organization as necessary to accomplish the Commission's long-range program.
4. That uniform work planning and scheduling procedures be designed by the Director and used effectively by the divisions, and on the districts to get maximum day-to-day accomplishment of high-priority work.
5. That periodic checks be made on the travel of all field personnel by their superiors to insure that (a) it is all necessary and (b) that it is well planned.

Discussion

The Commission does not have long-range plans and goals for the management of the wildlife resources of the State. Such a program should be developed at the earliest possible time. The Director and his staff have definite ideas for this program and have gone so far as to put some of them in writing. However, they need positive direction from the Commission and its full support when projects get under way.

With few exceptions, workloads have never been measured or carefully estimated for positions or areas. The Director, division chiefs,

and district supervisors have a sort of "gentlemen's" understanding of their workloads. All are kept very busy and it is a matter of figuring out who needs help the most when additional personnel are requested from time to time. There is need for a more businesslike approach to the problem. Simple and realistic time allowances should be developed for the various types of work, and should be used in deciding on placement of personnel and in giving them a proper workload to accomplish. Obviously, the administrative staffs will not be financed to do 100 percent of the jobs they would like to do, but there should be a knowledge of how much they can and should plan to do with the funds and personnel available. This step is a vital one if the Director is to make proper assignments of people by areas and by positions. "Guesstimates" are all right up to a point, but the Nevada fish and game program is getting too large and too important to operate much longer on such a basis.

Annual plans of work are spread out through the annual budget, in federal-aid project instructions, and in memoranda. There is a need for summarizing the budget and the financed work by divisions and by districts for each fiscal year. This could well be done in the form of a brief operating plan covering both finances and people. It should be kept simple and not be broken down into small "housekeeping" jobs, but should show at a glance the major work and projects of the division or district, and who is going to participate in doing them.

Some of the employees use a lettersize calendar sheet (samples may be obtained in the offices of the Fish and Game Commission) to schedule their special appointments, day-to-day projects and field trips. This is a simple and effective system which should be made standard and used by all employees except those who have routine duties.

Field trips by the Director and his staff to the districts should be set up monthly on a consolidated schedule. Copies of the schedule should be mailed in time to reach the district supervisors a few days before the first of each month. This will permit the district personnel to plan their work ahead to better advantage. They will know of trips on which they are to participate and can arrange other work accordingly. It will not eliminate the need or desirability of staff visitors confirming their planned trips by telephone or radio a day or two in advance. One of the clerks in the Director's office can be designated to go around to the divisions and put all planned trips for the coming month on a consolidated schedule. It can then be reproduced promptly for field distribution. Sample consolidated trip schedules may be obtained in the offices of the Legislative Counsel Bureau.

At this stage, coordinated trips seem to the staff somewhat of an Utopian dream. This young organization sometimes gets to juggling the lids of several boiling pots almost at once. Trip plans are adjusted to pressures overnight. Planned inspections are postponed and administrative action delayed. As the organization grows, however, there will be need to put administration on a more orderly basis, solving problems before they arise, and to apply staff efforts to more constructive lines than trouble shooting. Coordinated trip planning should be made more effective.

Written diaries or daily accomplishment records are kept by all administrative personnel. This furnishes basic information which may

be used in measuring workloads and establishing time requirements for the various jobs or classes of work.

Personnel Management

Recommendations

1. Further improve the management of personnel at all levels by:

(a) Providing clearcut and understandable job descriptions for each employee.

(b) Giving increased emphasis to employee orientation and to training based on a personal development plan for each individual.

(c) Keeping the grade assignments currently in line with changes in work responsibility.

(d) Working for a system of annual salary adjustment based on the Cost-of-Living Index.

(e) Securing a retirement system for all professional career people that will give them a decent living standard.

(f) Preparing a safety handbook and giving more attention to working habits and work conditions to insure that each employee observes good safety practices at all times.

(g) Giving formal encouragement and recognition to employees for their work improvement suggestions.

2. Make more full use of the brains of division chiefs through regularly scheduled, businesslike staff meetings.

Discussion

Competent and satisfied personnel are highly essential to the success of any business. An organization staffed with poorly placed, disgruntled employees is doomed to failure from the start. Good personnel management doesn't "just happen." It takes a lot of thought and effort on the part of supervisors. Careful selection of qualified people, placement of them in self-satisfying jobs, and giving them adequate orientation and training, providing decent wages and living conditions, and otherwise taking care of their welfare—these are all parts of the management of employees which require the best efforts of all directors of personnel.

All fish and game employees, except the Director and Deputy Director, are recruited from civil service registers maintained by the State Department of Personnel. Appointments are made only after successfully passing written examinations (plus oral in some cases). Most of the new recruits are interviewed orally by the Director or his representative before being selected from the top three of the register. Almost without exception, the administrative and professional employees of the Commission are devoted to their jobs and stick in spite of low salaries and not always favorable living conditions.

New employees are on probation for the first full year after appointment. Personnel ratings are made every three months and care is exercised to weed out misfits during this time. After the probationary period has been successfully passed, performance ratings are made every six months. This is required by the State Personnel Commission. The timing seems unreasonably frequent for most employees, and

certainly takes a lot of work time if done conscientiously and discussed with the employee each time.

Broad job descriptions are prepared for purposes of classification. Duties and responsibilities in general terms have also been spelled out by the Director for all key positions. This gives a reviewing official a good general idea of each job, but is not very specific for the new man in the position. There is need for consolidating and supplementing this general data with more specific instructions and descriptions of the jobs at each location.

New employees are briefed on some procedures by the Administrative Assistant in the Director's office and are further oriented on the job. They usually work with experienced employees during the first few weeks of their assignments and most of their training is done in this manner. More emphasis on initial law enforcements training would probably pay off for most new employees—especially in teaching interpretation of the laws and proper methods of handling violations. Short formal training periods on all phases of information and education, employee safety, and effective work planning and scheduling would also be beneficial to both new and experienced personnel. It is suggested that the Director's staff give field personnel more training in these activities in the future. It is also suggested that a simple training and career development plan be maintained in each employee's personnel folder. It should show type of work in which the employee has had adequate training and activities on which he needs further training. Personnel management should also keep track of the employee's potential for ultimate development. A sample plan may be obtained in the offices of the Legislative Counsel Bureau.

Salaries are determined by the grade classification for each position and by the state compensation schedules of pay for each grade. These rates are periodically reviewed by the Legislature and raised to keep up with inflationary trends. However, by the time the Legislature gets around to raise salaries, the raise has been overdue for a year or more and the employees are penalized. Annual adjustments of the compensation schedule, based directly on the Cost-of-Living Index, could alleviate many inequities. It appears that most of the present salary rates are due for a 5 to 10-percent raise to catch up with the living cost increases.

Some changes in the grades of key employees also appear to be justified in keeping with the added responsibilities delegated to them by the Director in May 1957. The following revised grades are suggested as being proper for the positions concerned:

Chiefs of divisions	Grade 27
Assistant division chiefs	Grade 25
Accountant and Budget Officer	*Grade 25
District Supervisors	Grade 25

Other changes may also be desirable, such as raising the Senior Wildlife Technicians to Grade 23 and the Wildlife Technician position from Grade 19 to Grade 21.

*This is not in line with the State's grade structure for such a position. They are graded 24's or 26's.—F. P. C.

Prescribed hours of work are:

For clerical employees in the Director's office, 40 hours per week.

For all other employees in the Director's office, 44 hours per week.

For all field employees, 48 hours per week based on working six days.

The job of game management in the field is not accomplished by punching a time clock. Weekend field work is a basic requirement for patrol and law enforcement. The usual overtime system cannot be applied and a longer workweek is often necessary.

A step in pay grade is granted for each four hours prescribed over 40. If 48 hours are worked by Saturday noon, the employee may take the afternoon off.

Although all of this does not lead to a modern, well-planned, routine life, it is the way the job is and a condition of employment.

Nevada's retirement system needs an overhaul. Increases are contemplated which revolve around the cost of living. There should be a new look taken at the basic policy, whether retirement pay should be down towards a bread-and-water standard of living or provide some degree of comfort.

The State law provides for promotions within the ranks, and the Commission follows this practice as much as possible. All promotion is by competitive written examination.

There is no formal safety program in effect for fish and game employees. Two men were killed in an airplane accident about five years ago. Since then, the Director has tightened up on safety in use of aircraft. Safety precautions and standards should be spelled out in a handbook for guidance of employees and to use as checks for inspecting safe working conditions.

Employees occasionally make suggestions for improving their work. The field people trade ideas and sometimes pass them along to others at group meetings. There is no formal policy or program to encourage and provide for recognition of work-improvement suggestions. All employees should be encouraged to make suggestions and procedures should be set up to insure that worthwhile ideas are widely disseminated and used. Incentive payments for especially meritorious improvements would help. A new state law would be needed to allow for such awards.

Staff meetings are held infrequently and at irregular periods in the Director's office. Much can be gained by holding short, businesslike staff meetings of top personnel at regular intervals. It is suggested that monthly meetings of the Director and division chiefs be held. The date should be about one week before the end of each month. Current problems and policies that can benefit by group thinking should be covered. Each person can also contribute by giving a brief rundown on major developments in his line of work since the preceding meeting. Field trips and major jobs to be done the coming month can be discussed to advantage and properly coordinated. A lot of brains and good judgment is available to the Director from his division chiefs. Regular staff meetings help capitalize on this most important of all resources.

Financial Management

Recommendations

1. Provide monthly balances of all allocations to the divisions and district supervisors. Reduce detailed cost-keeping at the district level as much as possible.
2. Reduce and strengthen the system of accounting for sales of hunting and fishing licenses (as now planned by the Accountant).
3. Revise the fish and game laws of Nevada to require paid hunting and fishing licenses for resident minors 12–16 years of age.
4. Raise the per diem allowance for Commissioners to properly cover their travel costs and loss of time from their regular occupations.

Discussion

Budget estimates are started at the ground level. District personnel who are intimately familiar with field needs prepare preliminary estimates under the direction of the district supervisors. These figures and supporting statements are then reviewed by the divisions concerned and tentative approvals, adjustments, and disapprovals are made. The Director and chiefs of divisions then review and agree on items to be included in the annual budget which will be presented to the Commissioners. The Budget Officer then sets up the proposed budget in final form and sends a copy to each Commissioner two or three weeks in advance of the meeting date when it is to be considered.

The annual budgets are well presented and are broken down in sufficient detail to allow for intelligent review and analysis. Priorities are considered by the Director in view of his knowledge of the desires of the Commission. More and better advance program plans from the Commission would help the administrative group in assigning priorities.

The Nevada Fish and Game Commission adopts a budget based on money in the bank: the cash receipts of the previous year plus the amount due on completed work under federal aid.

The proper size of this "cushion" is worth considering carefully. The law provides that no "cushion" need be maintained and that the budget can be based on anticipated receipts. Most western states operate in that manner with $100,000 to $200,000 reserved to cover a drop in income.

Historically, disasters of drouth and hard winters have caused only minor reduction in receipts. The greatest reduction was during the depression of 30 years ago, when receipts dropped 25 to 30 percent in some states over a two to three-year period. World War II caused a drop, but it was offset as personnel went into the armed services. Carrying a full year's receipts as a cushion gives the Commission about three years to complete an adjustment to new levels of financing. It is recommended the present policy be continued.

Funds for fish and game management are limited to receipts taken in from the sale of licenses and to the Federal Aid obtained for Pittman-Robertson and Dingell-Johnson projects. Many worthwhile activities and projects cannot be financed. The use of each dollar must be carefully scrutinized to get the most out of it.

The Commission passes final judgment on the budget, and approved items then become the basis for allocations to field projects. Each district supervisor gets a copy of the entire approved budget. This is a bulky document. It is suggested that a summary of allocations by districts be prepared and set up on a simple form to give a complete picture of district finances at a glance. This form could well be coordinated with major work assignments of the district personnel (an operating plan) for the year, and a number of advantages would be gained thereby. It is further suggested that each person in the district be given a copy of the operating plan. Thus, he can see what is to be done and how he fits into the program.

Strict financial controls are used at both staff and district levels. Considerable extra paper work is required to account for funds on the fine breakdowns which are used. However, these breakdowns are in line with the controls which the Commission desires. It is suggested that the Commission consider granting more flexibility in expenditures for individual items within approved budgets.

All district expenditures are reported in writing to each of the district supervisors currently, and they report monthly to the Director's office. The Accountant has been furnishing balances for financial allocations to the districts about three times per year in the past. This gives the supervisors a check on their figures, but is too long an interval to spot errors by field employees. Balances should be made available monthly. This can be done if the necessary bookkeeping machinery and help is provided for the Accountant. In working out such a system, the monthly cut-off date for reporting expenditures or obligations must be fixed and adhered to very carefully by the field staff. Successful operation on this basis should reduce the detailed and continuing cost-keeping now maintained on the districts.

All of the various kinds of licenses for taking fish and game are sold both wholesale and retail at the Director's office. Fairly good records are kept of these sales, but they could, and should, be improved. The Accountant has in mind a system which will give a running balance of sales, receipts, and licenses on hand (or not sold) at all times. The sales and receipts for each year will be segregated so that complete and factual audits (based on physical checks of unsold licenses) can be made. The audits of license sales which have been made by the State during the past few years have been time-consuming and not fully satisfactory. Changing the state laws to provide for issuance of licenses on a fiscal-year basis will further help to simplify accounting for license receipts.

Payrolls are processed for employees twice each month. Expense accounts are paid promptly with no limitation on frequency of submission. Reasonably adequate per diem allowances are made for the travel of administrative employees. However, the allowance for Commissioners is not adequate to cover their expense and loss of time from their regular occupations. Their rates should be raised to properly compensate them for their time and to cover travel costs.

Under the law the voucher for every expenditure must be approved by the Executive Board of the Commission. This is handled by the Secretary to the Board. In the past this has generally been done in

a perfunctory manner. At present it is being conscientiously handled by the incumbent Secretary. This is not a job that should be saddled upon an unpaid Commission member. To make prompt payments, the job must be done once a week. This requires 3 to 4 hours' work and, with travel time, it kills a day. The Secretary receives auto mileage and $1.50 per diem. This is not fair and ordinarily it is not possible to find a Commissioner who can spare that much time from his business, nor one who is qualified to properly audit the bills.

In other states and in other departments within the State this job is handled by a department head checked by periodic audits.

As indicated in the section on "Legislative Needs," there should be created a Department of Fish and Game and the usual procedure followed.

Office Management

Recommendations

1. Provide one full-time clerk-stenographer for each district headquarters to reduce the amount of clerical work now done by administrative and professional people and allow them more time for higher caliber fish and game jobs in the field.
2. Screen office callers more carefully at the receptionist's desk to reduce the number which go to the Director personally with problems which should be handled by other members of the staff.
3. Move the Director's office group to more adequate quarters when the lease on the present space expires.
4. Study the filing scheme critically and streamline it as much as possible. Study has already been given this problem and it seems very difficult to perfect a filing scheme for such a dynamic job. One improvement may be to key the filing scheme to major subdivisions of the staff directive system (manuals and handbooks).
5. Review all forms in use, standardize them and eliminate duplication or obsolete ones. Set up a system of tight controls on any new forms added.
6. Get a bookkeeping machine for use in the accounting section.

Discussion

Clerical assignments have been made in writing to stenographers in the Director's office. Additional work is given to them by the Administrative Assistant on a coordinated basis. All clerical employees are well trained and function at a high level of efficiency. The receptionist does typing and compiles reports in addition to her regular duties. She acts as a filter to see that callers are referred to the right person. Some time could be saved for the Director by screening callers more carefully.

The Director's office is located at 51 Grove Street in Reno. It occupies an entire building. The rooms are small and a lot of space is wasted in an unnecessarily wide hallway; consequently, the office is crowded and inadequate for the present force. Some of the stenographers have to type in the hallway. This builds up noise levels in a building with poor acoustics, and gives visitors an unfavorable impression. Lighting from the ceiling fixtures is weak and has to be supplemented with desk lamps. In the past few years the staff has been in this building, enough

rent has been paid to buy or construct one equal to it. The Commission should seriously consider building an office adequate to take care of present and foreseeable future needs.

The Accountant does a lot of laborious longhand work. He needs a bookkeeping machine similar to the Burroughs Series 1500 to speed up the job. He should also have clerical help to operate it. There is plenty of higher level, more important work for him to do in setting up budgets, making field audits, and training others in accounting procedures.

Forms are used as needed in reports and routine record keeping. Those reviewed were well designed. Fisheries forms have been carefully controlled to prevent duplications. Those of other functions should be reviewed to weed out unnecessary ones. In the future, all new forms should be cleared for use through the division concerned.

Mail and correspondence are handled efficiently. Letters to those outside the organization are clear, concise, and friendly. Replies to inquiries are usually made within a week after received. A few cases were noted where answers were delayed for two weeks or longer. In such instances, a brief note of acknowledgment should be sent out promptly, stating when a full reply may be expected. Informal memoranda are used to advantage for in-service correspondence. "Speed letters" would be handy, particularly at isolated places away from district headquarters. Samples have been furnished the Director.

Only one of the five districts has a full-time clerk-stenographer; recently another district hired one half-time. The volume of clerical work done by professional men runs up to 1½ man-years per district per year. This appears to justify at least one full-time clerical employee to do typing and other routine paper work and to give information to the public.

Property Management

Recommendations

1. Strengthen the system of consolidating Fish and Game purchases statewide. Operate on a planned basis.
2. Provide adequate storage or locked enclosures for protection of official automotive equipment where needed, particularly at Reno.
3. Issue written permission to staff for storing State cars at their homes and specify conditions.
4. Revise the base for rentals charged employees for occupancy of State-owned dwellings.

Discussion

The License Officer keeps the property inventories and assignment records at the Director's office for the entire organization. Property of each District is charged out to the District Supervisor and he, in turn, charges the items to those who use them. Record keeping is at a desirable minimum and the routine provides for adequate protection and care of state-owned equipment.

All purchases of over $25 must go through the State Purchasing Department. The Director's office tries to pool small purchases for the organization as much as possible, but this procedure could be set up on a more systematic, planned basis. Gasoline, oil, tires, tubes, and

batteries are bought under contracts let by the State. Much saving is made by this means.

No storage facilities are available for official autos at Reno. Provision should be made for such storage there and at other places as needed.

The Commission has a written policy regarding employees storing state-owned vehicles at their homes. This is a vulnerable arrangement and results in criticism by the public. Permission should be given in writing to each individual who may be allowed to store a car at his home because of lack of storage facilities at his office, or because of his possible need for the car at any hour of the day or night or at times when public transportation to his home is not available.

Automotive equipment management is under the supervision of the Deputy Director. He is dong an excellent job. Average total cost per mile for use of the equipment is low. This is due to care in maintenance and providing for full use with trade-ins at the proper time before expensive repairs are needed. Average annual use is high. The office of the Fish and Game Commission can produce records of the equipment on hand as of last spring. Good records are kept for each vehicle to show daily use and monthly costs. Standards of maintenance and instructions for servicing are printed in the individual use books of each vehicle. District supervisors have the responsibility for making inspections of equipment under their jurisdiction.

High annual use per automobile favors low average cost, but there is still the question: "Is all this travel necessary?" This can only be answered by detailed analysis of vehicle use with the drivers. It should be done from time to time by those in a position to know what trips are necessary. New employees are particularly vulnerable. In their zest to get going and make a good impression the first few months, they are likely to do a good deal of unproductive travel. With a little helpful advice, they soon learn to plan their work and their trips in an efficient manner.

A survey is under way of the charges for living quarters furnished to employees in eight residences under the control of the Commission. Rentals are figured from a system borrowed from the United States Fish and Wildlife Service. A review of it indicates a need for revision. For example, rates are reduced only 15 percent to compensate for the isolation of quarters 50 miles or more from the nearest town. This is obviously inadequate. Charges should be based on average commercial rentals for similar property in the areas concerned, with due allowance for travel to necessary facilities and services for those not located in towns.

Controls

Recommendations

1. Set up and maintain a good directive system (looseleaf manuals or handbooks) which will cover all operating policies and procedures used by the Commission and the administrative employees.
2. Make more integrated inspections of field activities. Reduce the frequency of some of the routine functional inspections. Record the findings and recommendations of all inspections in writing in a clear, concise, and constructive manner. Provide copies for all personnel concerned. Keep in mind that training is a part of inspection.

3. Provide for systematic follow-up of all inspections which require action by the person or group inspected.

Discussion

Major controls for the Commission and staff consist of policy memoranda, inspections, and annual reports of accomplishment.

The directives system of the organization is contained in mimeographed memoranda, with the exception of the Law Enforcement Manual which was prepared a few years ago. Directive by memoranda is an awkward and inadequate system. It can serve the first few years for a small organization, but soon falls short of meeting the day-to-day needs for a busy outfit. The Commission staff and field employees are seriously handicapped without a well-organized set of policies and procedures to guide them. Looseleaf handbooks with policy in one section and procedures in another are suggested. The same broad headings and detailed breakdowns should be used for both policy and procedure sections. The following is a suggested breakdown:

Fish Management	Personnel Management
Game Management	Budgets and Accounts
Law Enforcement	Procurement
Engineering	Property Management
Information and Education	Legislation

Illustrations can be obtained in the offices of the Legislative Counsel Bureau to show a subject-numeric system which could be used in organizing material in the handbooks.

Most inspections (excepting automotive equipment) are made on a very informal basis. Written reports of findings and recommendations for action are not usually prepared by the inspectors. Much of the value of these inspections must be lost through failure to put findings in writing. Memories are short for details, and other important matters soon intervene to cloud the chance for corrective follow-up. The Director, in his Memorandum 57–1 of May 23, 1957, says of the Division Chief: "He must check through his programs in the field on the District Supervisor's level at least four times per year." This duty was assigned to make sure the division heads got out in the field regularly, rather than to make inspections. One good, thorough functional inspection of each district by each division once every two years should be adequate. To get his office staff in the field more, the Director should specify that each one will spend a certain minimum number of days on the districts annually. Staff men can help with the progress of field work many other ways besides formal inspections. Provisions are not made for integrated inspections. Good inspections of this type for all activities on the districts (including quality of administration by the supervisors) are very helpful. In summary, it is felt that fewer and better inspections should be made, and a written record prepared for each one. Then provide for systematic follow-up on all corrective action needed.

Accomplishments are reported for each Federal Aid project as soon as completed. Annual reports of law enforcement actions are submitted for each district. The annual financial statements and biennial reports also give a good over-all idea of what is being done. If the work of

an individual needs to be checked, his diary can be analyzed and physical accomplishments may be inspected on the ground.

Communications

Recommendations

1. Expand the use of radio for field employees as much as possible. When funds are available to install the needed equipment, get a separate frequency for the Commission, distinct from other state agencies. Maintain a central set at the Director's office.

Discussion

Internal communications, both oral and written, are fairly good. All members of the Director's staff are well informed on matters which affect them. Staff chiefs could keep even better informed if regular monthly meetings were held where each one brought the rest up to date on the more important developments in his division.

The Chief of Information and Education feels that an interdepartmental newsletter should be prepared at two-week intervals. This sounds like a good idea, but may be too frequent.

Radio is a particularly useful means of communication between supervisors and other field personnel, especially those stationed at isolated points away from the district headquarters. The Commission administrative personnel are permitted to operate 16 radios on the State Highway Patrol frequency. Use is restricted to law enforcement and emergencies. While this is a big help, it falls short of meeting the full needs for radio communications. As the fish and game organization expands, and business builds up, the joint use with the Highway Patrol will have to be expanded. Full use of radio cannot be permitted by the Highway Patrol. Therefore, the Commission should try to get a separate frequency assigned. Several relay stations will be needed to cover the entire State, and funds are not in sight for the immediate purchase and installation of all of them. They could be built up as needed and, eventually, the staff would not be restricted as to type of business which could be sent over the air. Full use of radio might well save many thousands of miles being traveled by personnel who now are not in touch by radio. A central set in the Director's office would have many advantages in making prompt field contacts with key staff personnel.

CHAPTER VI

FISH AND GAME MANAGEMENT

FISHERIES MANAGEMENT

This section was prepared by Dr. Paul R. Needham, Professor of Fisheries at the University of California. Between 1932 and 1944 he directed inland fisheries investigations for the U. S. Fish and Wildlife Service, with most of his work on streams on the east slope of the Sierras. He developed the so-called warm-water trout hatchery which is now an important source of California's planting stock. For four years he was Chief of Fisheries for the Oregon State Game Commission and presently his program includes fact-finding studies on the Sagehen Creek Experimental Stream, a tributary of the Little Truckee River, a few miles beyond the State line. At times he has worked with the Nevada Fish and Game Commission on its trout problems.

It is believed that his report will furnish helpful suggestions on hatchery management and for augmenting and perfecting the recently completed survey of the waters of the State.—F. P. C.

Recommendations

1. The Elko Fish Hatchery in Ruby Valley site offers the best possibilities for expanding trout-rearing operations. The present capacity could easily be doubled if and when justified on the basis of Statewide requirements. Such expansion would only be justified under full state and not county control, as at present.
2. The Verdi and Spring Creek State Fish Hatcheries are fairly efficient units, but certain improvements at each will increase their fish-rearing capacities considerably.
3. The Washoe Fish Hatchery in Idlewild Park should be abandoned and its fish cultural activities transferred to the Verdi and Elko hatcheries.
4. The Washoe County Ponds are productive units but without an adequate water supply. Steps should be taken toward finding a more suitable site or an additional source of cold water.
5. The efforts toward development of cutthroat brood and planting stocks at the Smith Valley Station are commendable and worth the cost as another major and necessary step toward saving the native Nevada cutthroat trout from extinction, as well as improving its availability for stocking Nevada waters.
6. As further insurance toward development of native cutthroat stocks, it is suggested that at least one small mountain stream be chemically treated to remove all non-cutthroat trout present. It should then be replanted with Lahontan stocks to establish pure, stream-dwelling strains of these species. The trout present could be saved by shocking and removal in advance of chemical treatment. The stream should be closed to all angling and used solely for experimental purposes.
7. Efforts should be expanded toward setting aside one or two selected natural lakes or artificial reservoirs for the permanent maintenance of wild cutthroat brood stocks as egg sources for the future.

This, with items 5 and 6, p. 74, will provide a three-way attack toward building up native cutthroat stocks and thus saving these fine fish for future generations.

8. An average statewide catch rate of 1.95 trout per hour set up in the Frantz-King Report for streams is considered too high a standard to be maintained in the face of increasing human population and other factors.

9. As recommended on page 46 of the Frantz-King Report, the construction of additional centrally located holding ponds is badly needed in or near heavily fished areas where fish could be rested following long truck hauls prior to final distribution.

10. The Kingston Creek tests of alternating and direct-current fish shockers indicated a place for each type of equipment. For backpacking, the alternating current (A.C.) is the only feasible unit since it weighs only 35 pounds. For accuracy, the direct current (D.C.) unit is better, but can be used only on streams accessible by road. It weighs over 125 pounds. Therefore, it is recommended that one 400-watt, A.C. unit and one 2,000-watt, D.C. unit be purchased for each district headquarters of the Commission.

11. From the evidence derived from test shocking, it is recommended that less emphasis be placed upon stocking reared, hatchery trout. More emphasis is recommended for work aiding and abetting the contribution of wild, naturally propagated trout to anglers' catches. A fact-finding study should be instituted under Dingell-Johnson funds to find out more precisely the contribution of wild fish.

12. The planting of larger numbers of reared, hatchery trout into lakes and reservoirs is recommended along with a parallel reduction in the numbers stocked in streams. That reductions in stream plants can be made is evidenced by the stream sampling tests. Hatchery fish grow and really become "wild" fish in lakes and reservoirs, but stocking them in streams often leads to the vicious "put and take" cycle that results in anglers following planting trucks and highly competitive fishing along with a general lowering of the quality of angling.

13. To parallel the recommendation in item 11 above, it is recommended that an experimental program be developed for stream improvements that are badly needed in Nevada. A mobile crew of four men could be used to set up "demonstration streams" in the various districts where different types of improvements could be installed and tested under controlled conditions. Such work will pay off better returns in the long run than planting more hatchery fish.

14. In summary, the progress being made by the Commission staff in fisheries is excellent and of generally high caliber. The staff members are a dedicated, hard-working group in which Nevada can take pride.

Fish Hatcheries

Nevada's fish-cultural program to develop the native Lahontan cutthroat *(Salmo clarki henshawi)* trout deserves the highest praise. These fish are world-famous and were almost extinct when the Commission staff turned its attention to them. The decline of the Pyramid and Walker Lake fisheries for cutthroat is one of the most pathetic tales in the history of conservation in America. But now there is hope for

a partial reestablishment of these trout through careful fact-finding and fish-cultural activities, not the least of which will be to secure adequate flows of water from irrigation interests to protect spawning runs in streams like the Truckee, Carson, and Walker Rivers. The staff's program seems sound and should be carried forward vigorously in order to provide more of these native cutthroat for planting.

Brook and brown trout and many different strains of rainbows have been introduced into Nevada's waters. They have often displaced the cutthroat. I cannot say this is bad because much fine angling has been produced with these non-native forms. But the best adapted fish must be the fish that originally occupied Nevada streams and lakes and these were cutthroat.

The fish hatcheries and hatchery program appear to be fairly adequate and well managed. Water quality for fish-cultural use is generally high but water is short in supply. Certainly the Commission staff has done everything possible to fully utilize every drop of water that is available for fish-cultural uses. In fact, the intensive re-use of water at all stations, made necessary by the short supplies, makes it appear that the hatchery workers are getting away with "fish-cultural murder." At the Washoe ponds, for instance, on some two cubic feet of water per second, more than 25 tons of trout were reared in 1957. As a general rule, if two to four tons of trout can be reared per second-foot of water, the results are considered excellent. But production of more than 12 tons per second-foot at the Washoe ponds may be considered extremely high. Similar intensive use is found at all of Nevada's hatcheries because of the critical shortage of waters suitable for fish-cultural purposes in the State.

Methods of feeding, foods (now usually fed in pellet form), and practices to reduce parasites and diseases are up to acceptable standards, as far as we were able to observe. Prevention of disease and parasite infestations is far more important than attempting to cure the fish after they have become ill. The rates of conversion of fish food into fish flesh are generally high and equal to, or better than, standard rates obtained elsewhere.

The methods used to weigh fish to determine the number of pounds shipped from each station are acceptable and accurate and are generally standard for hatcheries throughout the United States.

The Idlewild county hatchery has too many deficiencies in its location, water supply, and costs. It is recommended that this station be abandoned and its operations be transferred to the Verdi Station.

Production at Spring Creek Rearing Station could probably be increased from one-third to one-half if agreement for an increased use of the available water could be obtained from ranchers who hold the water rights below.

The Ruby Valley Hatchery offers the best opportunity to increase the output of trout in the State, if and when such an increase proves desirable. It has the necessary water supply and lands needed for expansion.

The Fisheries Division of the Commission's staff has a fine, active program but with far too much concentration of effort and funds on the "rearable" or "catchable" trout program. The budget of the

Fisheries Division shows that some 75 percent of its funds are being spent to rear fish. Less than 25 percent are devoted to matters such as trash-fish control, stream and lake surveys, stream and lake improvements, creel checks to determine angler success, and evaluations of the survival of planted hatchery fish.

Nevada's hatcheries are supplemented by additional fish supplied by the U. S. Fish and Wildlife Service at Hagerman, Idaho, and Springville, Utah. New federal stations proposed at Willow Beach below Hoover Dam on the Colorado River, and in connection with the Washoe Project of the Bureau of Reclamation, will greatly increase the supply of trout for Nevada waters. In view of these considerations, it is felt that top priority should not go to construction of additional hatchery facilities now. Rather, priority should go toward fact-finding work to determine with accuracy the most effective means of putting fish in anglers' creels at the least cost and with full utilization of natural spawning.

The Frantz-King Stream and Lake Survey

The Frantz-King Stream-Lake Survey Report represents a new approach to fish stocking and management problems. Sportsmen may have difficulty in understanding precisely all the steps involved in arriving at the specific stocking rate for any given stream. Nevertheless, they should be reassured to know that the Commission staff in fisheries has taken an original approach that cannot but help Nevada's trout distribution problems tremendously.

One of the outstanding contributions of the report is the allocation of fish to the various counties on a statewide basis. If the recommendations are followed, promiscuous planting of fish by guesswork or local pressures will be eliminated. The plan is a fair one, treating all counties equally with full regard to the basic character of the waters in each. The report clearly indicates that the allotments of fish are not final but are subject to revision as warranted by changing stream conditions, such as flows, angler usage, and food, and by the availability, size, numbers, and species of fish available for planting.

Lack of space here prevents a thorough analysis of the Frantz-King Report nor is there any need for it. But certain comments may aid in the improvement and application of some of the methods and standards adopted in the report.

Catch Per Angler Hour

The Frantz-King Report uses a figure of 1.95 fish per hour as the average angler success in Nevada waters. This, the report says (page 48), was derived from "obtaining the average success from several streams on which the quality of the fishing was generally considered to be entirely satisfactory and upon which adequate creel census data were available." This appears to me to be superlative, not average, fishing when anglers can average almost two fish per hour.

As an illustration of catch rates reported from other parts of the United States and Canada, Dr. Kenneth Carlander in his "Handbook of Freshwater Fishery Biology" (1950, pp. 218–219), cites over 50 creel census records from streams where the catch per hour ran from

0.09 to about 1.0 trout per hour. He cites another series of over 25 records where the catch ran between 1.0 and 1.79 trout per hour. He lists only seven reports where the catch ran between 2.1 and 2.59 trout per hour; these high catch rates were mostly all derived from records on remote, inaccessible waters having abundant, unexploited fish populations.

Creel census data taken on Sagehen Creek near Truckee, California, since 1953, indicate average rates of from 1.08 to 1.88 trout per hour. In 1954 it was 1.84 per hour and, in 1956, 1.88 per hour. These rates were obtained solely from natural spawning, since Sagehen has not been stocked with hatchery fish since 1951.

The figures cited represent *averages*. The rate for any one person depends upon his skill. In Sagehen, the more skillful 12 percent of the anglers take over 50 percent of the total. Many would-be anglers simply cannot catch fish. Their zero-catch per hour must be averaged in with the high rates of the experts to produce the mean rates given here.

The standard of 1.95 trout per hour of the Frantz-King Report might well be reconsidered in the future. As Nevada's population continues to grow, skill will decline. To maintain, year after year, catch rates at the 1.95 level will put a real strain on both the streams and the hatcheries that will be difficult to meet. It will also involve getting into a vicious "put and take" planting cycle such as many states now face.

Test Shocking to Determine Trout Numbers in Kingston Creek, Lander County

All the estimates of numbers of trout per mile given in the Frantz-King Report were based upon counts of fish temporarily stunned by electrical shocking. The shocking was done with an alternating current (A.C.) 400-watt, gasoline-powered generator. The writer, staff, and students have used a direct current (D.C.) generator for sampling trout populations, and it was felt desirable to compare the two types at the same stations in the same stream under identical conditions to find out the results in terms of fish captured by each type of generator. I also wanted to gain a clearer picture of stream populations in Nevada for this report.

Kingston Creek in Lander County was selected for the test. On September 6, 1958, a series of four sampling stations was set up on Kingston Creek, using A.C. and D.C. generators. Don King, on the staff of the Fish and Game Commission, provided a 400-watt A.C., 110-volt Powerbug generator of the type in general use by the staff of the Nevada Fish and Game Commission. I provided a 2,000-watt, 230-volt, D.C. Homelite generator. Three top graduate students aided me in this work: Bob Behnke, Richard Gard, and Don Seegrist.

The numbers of trout collected at each station with each type of generator and the conditions under which the sampling was conducted are given in the Appendix of this report.

From the summary data, it is evident that the D.C. current is more effective than A.C. for such studies (Table 3). At station 1, both types took the same number but at stations 2 and 3, where weed beds were abundant, the D.C. current took considerably more fish. At station 4, the D.C. current revealed one less fish than the A.C.

TABLE 3—Numbers of Fish Captured in Kingston Creek with A.C. and D.C. Electric Generators and Estimated Number of Fish Per Mile.

Station No.	Station length in feet	Fish Taken: All Species and Sizes Combined A.C.	Fish Taken: All Species and Sizes Combined D.C.	Estimated Numbers Per Mile A.C.	Estimated Numbers Per Mile D.C.
1	100	6	6	311	311
2	60	27	38	2,331	3,344
3	100	58	85	3,004	4,402
4	75	19	18	1,337	1,267
Total 4 stations	335	110	147	1,657	2,215

Our tests resulted in considerably higher estimates of fish per mile of stream than the figures for Kingston Creek in the Frantz-King Report (page 16). For all elevations, species, and sizes of fish combined, the Frantz-King Report lists 509.6 trout per mile, while our figures for the four stations sampled both with A.C. and D.C. current are 1,657 and 2,215, respectively. The Frantz-King Report lists 80.8 fish from 6 to 12 inches long per mile at the upper elevation. If we use the combined data from our stations 1, 2, and 3 (using D.C. current) as "upper elevation," then the number of trout over 6 inches estimated to be present is 832. This may not be a valid comparison, however, for I do not know precisely what stream area was included under the designation "Upper Elevation" in the Frantz-King Report.

Three additional fish-shocking stations (5, 6, and 7) were run on lower Kingston Creek using only the D.C. generator. Data for all seven stations on Kingston Creek were summarized to show the number of trout above and below 6 inches in length as well as total fish per mile (Table 4).

TABLE 4—Numbers of Fish Collected at Stations 1 through 7, Kingston Creek, Lander County, Using a D.C. Generator, September 6 and 7, 1958.

Station No.	Station length in feet	Total Fish Taken Under 6″	Total Fish Taken Over 6″	Estimated Number Per Mile Under 6″	Estimated Number Per Mile Over 6″	Estimated Number Per Mile All sizes combined
1	100	5	1	259	52	311
2	60	29	9	2,552	792	3,344
3	100	54	31	2,797	1,605	4,402
4	75	10	8	704	536	1,267
5	50	3	5	317	528	845
6	75	3	5	211	282	493
7	75	8	7	563	493	1,056
For entire stream	535	112	65	1,104	640	1,744

It is evident that station 3, a meadow area with beds of watercress, is the most productive portion of this stream, yielding 1,605 fish, over 6 inches, per mile and total fish estimates at 4,402 per mile. Additional evidence of the abundance of trout in this meadow section (station 3) is the fact that Joe Greenley and Starker Leopold both

caught their limits there in about an hour's fishing one evening last August. Leopold told me he could catch five or six fish from a single position when casting a dry-fly upstream. This catch rate would run roughly 15 fish per angling hour by these two experts.

In view of the abundant trout populations found in Kingston Creek, it is recommended that consideration be given toward a material reduction in the number of hatchery-reared trout to be planted in this stream in 1959.

In view of the fact that the 2,000-watt, D.C. generator gives more accurate results when samples are taken from slow-water, weedy sections, I recommend that each district headquarters be supplied with at least one such type of generator. Because of their weight, more than 135 pounds, D.C. generators can be used only in streams accessible by road. The 400-watt, A.C. generators weigh only 35 pounds and, hence, can easily be packed on the back for upstream sampling away from roads. Hence, both types should be provided by the Commission at each district headquarters. The A.C. type costs around $300 each; the D.C. type (Homelite) sells for around $500.

Test Shocking in Elko and Lander Counties

The number and size of the trout present in Birch Creek, Soldier Creek, and the South Fork of the Humboldt were amazing. Birch Creek produced 19 trout over six inches long from only 54 feet of stream. Soldier Creek was almost as well populated, showing 16 trout from a 45-foot section, of which six were over six inches. Of the 16 trout, 14 were taken from a single pool. The South Fork of the Humboldt gave up 20 nice trout from 50 feet of stream under a cut bank below the bridge at the town of Lee.

Lamoille Creek at the Boy Scout Camp was practically fished out. We took only small eastern brook. This is a type of stream that is heavily utilized and, coupled with a poor food supply, occasional in-season plants of reared trout are fully justified. Of the five streams sampled by us, the Lamoille Creek was the only one in which I would consider stocking necessary in 1959. If the rest of Nevada's small streams like this one are in as good shape as Birch, Soldier, and the South Fork of the Humboldt, there seems to be little necessity for making heavy plantings of reared hatchery fish in 1959.

These samples were taken at the close of the intensive angling summer season when the fish populations should have been at their lowest point. The large amount of natural spawning indicated by the take of large numbers of trout under six inches leads me to the conclusion that more reliance should be placed on natural propagation to maintain angling.

Artificial Stocking Versus Natural Propagation

In 1958, fish plantings in the study streams were as follows (these records were supplied the writer by A. J. Dieringer of the Reno office of the Commission on September 29, 1958):

Kingston Creek	7,385 rainbows weighing 2,127 lbs.
Birch Creek	3,681 rainbows weighting 898 lbs.
Lamoille Creek	4,750 eastern brook weighing 1,700 lbs.
South Fork of the Humboldt	4,300 rainbows weighing 1,400 lbs.
	4,120 eastern brook weighing 1,400 lbs.

In Kingston Creek, the samplings, using D.C. generator at all stations, yielded the following catch by species:

	Number	Percent
Eastern Brook	116	65.5
Brown Trout	30	17.0
Wild Rainbow	24	13.5
Rainbow X Cutthroat Hybrids	7	4.0
	177	100.0

The fact that 65.5 percent of the 177 trout taken in Kingston were wild, eastern brook trout provides further evidence that natural propagation is highly successful in this stream.

In Birch Creek we found a phenomenal brown trout population from a single sample. Yet this stream received three plants of large rainbows weighing 898 pounds. Only four rainbows, two hatchery and two wild, were taken by shocking. Biologically, Birch Creek evidently has a rich, self-reproducing population of brown trout and there appears to be no point in stocking it in 1959, in view of the abundance of this species.

Lamoille Creek needs periodic stocking of reared eastern brook trout. Water temperatures there are best suited to this species. In 1958, this stream received 1,700 pounds of large brooks.

In South Fork of the Humboldt River, some 28 percent of the trout taken in a single shocking sample were brooks; they were obviously from the 1958 plant since they had marked dorsal fins. A total of 4,300 rainbow trout were also planted which weighed 1,400 pounds. Three of these were taken in our sample. With the present abundance of trout in this stream, there is little need for stocking it in 1959.

The heavy 1958 plantings in all these streams may have provided the anglers with "extra," nonstream-raised fish, but I believe that the highest quality angling came from catches of wild fish present. These cost the State nothing. Nevada badly needs a thorough study of the costs and benefits to be derived from heavy stocking with reared trout.

In all my years of experience, I have yet to see wild-trout populations more abundant and ready for catching.

Downstream Losses of Rainbow Trout

We were told by persons at the Jones ranch on Kingston Creek that there are heavy losses of rainbow trout in their ditches and fields because of the movement of rainbow trout downstream. They said the losses were much heavier during the spring runoff when the water is high than during low runoff periods. On one day in 1958, two of the ranch hands recovered 50 dead rainbows from one ditch after the water was shut off. This is not an uncommon occurrence wherever rainbow trout are planted and it happens regardless of the size at planting.

In eastern states, too, plants of rainbow "legals" or "catchables" or "reared" trout (the latter designation is strictly a Nevada term) in the early spring resulted in many fish moving seaward. They were found in the lower reaches, where they were taken in gill nets set by shad fishermen.

To avoid such downstream losses, plants should be made after peak runoff is over.

In Kingston Creek such losses could be obviated entirely by planting only eastern brook trout. The latter form "stays put" after planting. Also, eastern brook trout are easier to catch than rainbows or browns and those surviving angling pressure readily breed naturally in streams like Kingston Creek. That natural reproduction by this species is contributing materially to the populations of Kingston Creek is evidenced by the large numbers of young collected at station 3.

Brown Trout

Brown trout, once established in any given water, will usually take care of themselves by natural spawning without aid from stocking from fish hatcheries. However, brown trout are hard to catch and most anglers, unless especially skillful, have difficulty taking them. Large, educated, "post-graduate" brown trout when present in a stream or lake do more harm than good. They are too wily to be caught, and they feed voraciously on young trout of their own or different species. Evidence of the brown trout's "hard-to-catch" character is seen in fish population analyses. Practically every creel census made in waters having abundant brown trout populations show extremely low catches of this species.

Fishery managers often use selective gill-netting in lakes to remove large, old predator brown trout weighing from 3 to 10 pounds.

Needless to say, such an operation is an effective method to assure greater survival in lakes of younger and more easily captured species such as rainbow, cutthroat, or eastern brook trout.

Stream Improvement

Many of Nevada's streams could easily be improved to provide both more shelter for fish and more fishable stretches of stream for anglers. Shelter improvements, as such, will not increase the number of fish one single bit but these improvements will produce a better distribution of fish already present. Experience gained from electric shocking clearly shows that the most fish are always taken from the best shelter.

Cut banks, deep pools, roots, stumps, down logs, brush, and boulders provide the shelter. Many long, flat, riffle areas completely lacking in underwater shelters, could hold fish if the shelter were there to attract them. Current deflectors or dams—built with a single log or log pyramids or rocks—could be installed to provide badly needed shelter.

Dense brush along many Nevada streams provides a major barrier to angling, shade to keep water temperatures down, and escape areas for survival of brood stock for natural spawning. All of these conditions are good for a stream. I would not propose to eliminate or remove such brush. However, in some areas judicious and careful thinning or pruning could be done in a few places not suitable for natural spawning in order to obtain a somewhat higher rate of exploitation of available fish stocks.

Bulldozers should not be used; they have ruined more streams than any other machine. No clearing of *underwater* shelter whatsoever

should be done. All I am proposing here is the careful selection and removal of obstructing *dead,* above-water snags to make it possible to fish otherwise impenetrable stream stretches. Where dense shade is provided by a canopy of birch trees, for instance, they should be left untouched except for a bit of pruning to aid growth and to get a line into the water. Only areas that provide unsatisfactory natural spawning conditions should be treated in this manner. Completely impenetrable brush beside good spawning grounds should be encouraged, and not thinned or opened in any manner.

Only persons highly trained in this type of stream improvement should be used. Streams are, in a sense, like china shops; they can easily be wrecked.

A small, mobile, four-man crew properly equipped, and under proper direction, could accomplish much of this type of work in the course of a single summer. Demonstration streams could be established in the various districts to test different types of improvements and to gather other essential data. Kingston Creek would make an excellent demonstration stream.

Close cooperation should be established with the public land management agencies to adjust livestock use along stream bottoms, or to fence out cattle along streams where riparian vegetation is being destroyed and where erosion is taking place.

As pointed out in the Frantz-King Report, "Of more importance (than stocking) and of greater permanency is the protection and development of satisfactory fish habitats."

Pond Development

The construction of small impoundments, or reservoirs as proposed on Kingston Creek, would greatly expand the area of fishable water and afford far more angling than is provided now by this small stream. The rich soils when flooded should result in lakes high in the production of fish foods.

Wildhorse and Wilson Sink reservoirs in Elko County and other impoundments, as well as some natural lakes, show high potentials for fish production. Surveys of sites with such potential should be given high priority.

Beaver dams on such small streams often produce good fishing. Studies have conclusively shown that ponds behind beaver dams are far richer in food than the stream areas and are highly productive, especially of eastern brook trout. In future years small dams on headwater streams in Nevada could provide for a large increase in fish and fishing areas. Careful engineering surveys will be required to determine the precise depths and surface areas of waters necessary to avoid water temperatures too warm for trout and to prevent winter kills of fish life.

Water Development Projects and Fishery Resources in Nevada

It is my frank opinion that the fishery resources of Nevada have been sadly neglected in preliminary planning for water development by the Bureau of Reclamation and other agencies. Adequate flows must be set aside for maintenance of fish life in the Truckee, Carson,

and Walker Rivers and Pyramid and Walker Lakes. Otherwise, the efforts of the Commission's staff to bring back the famous Lahontan cutthroat trout and their efforts to build up angling on these waters will be largely nullified.

The Commission's staff knows what is needed and has made sound recommendations. Passage of the Coordination Act by Congress in August 1958 will greatly expedite reconsideration of the needs of fishery protection. If the fishery of Pyramid Lake can be brought back, it would bring fame and much economic return to the State. A little water flowing into Pyramid Lake to aid this process would pay off a hundred-fold.

The magnificent trout fishing to be had below both Hoover and Davis dams is strictly a man-made affair. It was made possible by the silt settling out and the water clearing in Lake Mead, coupled with discharge of colder water suitable for trout. A "Sword of Damocles" hangs over the permanency of this fishery; a series of dry years might make it become necessary to discharge hot surface-water from Lake Mead. If this were to occur, the rainbow fishing could be wiped out in short order below both Hoover and Davis dams.

The present policy of stocking only reared, hatchery fish in these waters is essential to avoid heavy predation by bass and other predators that occupy the same water areas. In such interstate waters, aid from the Federal Fish and Wildlife Service is appropriate, and it is to be hoped that this agency will supply the bulk of the fish needed to maintain good angling in the Colorado. Once the Services' Willow Beach Hatchery is placed in operation, a considerable amount of fish can be diverted for strictly state waters in both Nevada and Arizona. And once the Glenn Canyon Dam is completed above Lake Mead, conditions relating to water temperatures and silting should improve in Lake Mead as well as in downstream sections of the Colorado.

While at Lake Mead in August 1958, I observed hundreds of schools of the threadfin shad that had been introduced in 1955 to provide a forage fish for large bass and furnish a buffer food supply between adult bass and their own young. This introduction has been vastly successful and both bass and trout are found with their stomachs gorged with threadfin. This is an excellent example of the good that can come from research. The work was done jointly by Arizona, California and Nevada. The quality of the angling should be greatly improved as a result, but only time will tell the story.

Lake Mead teems with threadfin shad and this has resulted in an extremely large population of bluegills, crappie and other game fishes. In terms of utilization of its fish crops, it is probably one of the most underfished reservoirs in the West.

Fact Finding

Fact finding is a necessity if a state is to move ahead on its stocking and management problems. Research provides the main source of new ideas. Fishing was restored to Pyramid and Walker Lakes through technical studies which tested the new idea of planting trout of catchable size in order to overcome predation by trash fish.

Most sportsmen and Fish and Game Commissioners are not wholly intrigued by the idea of research. They know what it is doing for

America in terms of national defense and industrial progress. Even so, they are reluctant to attack fish and game problems with scientific tools.

We propose that the tough questions on which facts are needed be "farmed out" to the University of Nevada. This may be an inexpensive way of doing the job. Graduate students, who have ready access to libraries and to trained faculty members for consultation, can produce answers at relatively little cost. If the University lacks trained faculty members, then the encouragement of such work through Dingell-Johnson and Pittman-Robertson funds should permit research to move ahead in Nevada. Possibly a cooperative unit could be established at the University. In any event, research should be completely insulated from management; when it is not insulated, little research gets done.

BIG GAME MANAGEMENT

Dr. A. Starker Leopold has developed the Big Game Management section of this report. He is Professor of Zoology at the University of California and Past President of the Wildlife Society, a professional organization devoted to the advancement of wildlife management in North America. He started hunting and fishing in New Mexico, worked on different wildlife projects in the Mississippi Valley, is co-author of a book on wildlife problems in Alaska, has just completed a book on the wildlife resources of Mexico, and is author or co-author of several articles and bulletins on deer management in California, most of which emanated from Pittman-Robertson projects contracted to the University by the California Department of Fish and Game.

He is a member of the Advisory Group on the Washoe Interstate Deer Herd and has been a successful nonresident deer hunter and fisherman in Nevada on occasions.—F. P. C.

Recommendations

1. Many winter ranges and some summer ranges are being abused by deer or by deer and livestock. The Commission staff should locate and map these and determine the degree of overuse that is taking place.
2. As jobs are completed under (1) above, the staff should work with the public land agencies in developing plans for management of game and livestock on these critical areas.
3. Means should be found to rejuvenate browse ranges that are deteriorating either through over-use or through senility.
4. Deer in Nevada are still being under shot. Hunters are not taking the full crop. In the past 10 years Nevada has probably reared close to a million deer. Hunters took less than one-fourth of them. The rest were lost to natural causes such as starvation. An increased hunter kill in the future would reduce this wastage of animals.
5. Antelope once in tremendous numbers are now in remnant bands. Thirty years of study have given few leads that would direct management. Protection alone is not the answer. Range improvement may be.
6. Bighorn sheep likewise may be kept at a low level by range limitations. Ranges should be protected from livestock competition. The present program of harvesting a few adult rams is endorsed.
7. Nevada is poor elk range. The existing population should be carefully regulated and not encouraged to spread.

Historical Background

The mule deer *(Odocoileus hemionus)* is the only big game mammal that is either abundant or widespread in Nevada today. There are, in addition, limited surviving populations of native pronghorn antelope *(Antilocapra americana)* and bighorn sheep *(Ovis canadensis)*, and two small herds of introduced elk *(Cervus canadensis)*.

At the time of exploration and settlement, the distribution and relative numbers of these four animals were very different than at present. Antelope and bighorn were numerous and widely distributed in the State; deer were localized in distribution, and quite uncommon. Elk were restricted to a few localities.

Fremont, for example, traversing northwestern Nevada in 1844, mentions encountering antelope twice and bighorns three times. Bighorns seemingly were particularly numerous in the Lake Range along the east shore of Pyramid Lake. But Fremont says nothing of deer until he reached the vicinity of Bridgeport, California, where he found a wintering herd in the foothills of the Sierra Nevada (Fremont, 1854).

Two years later, in August 1846, Bryant entered Nevada from the northeast and describes the antelope herds along the Mary's (Humboldt) River as follows: "During the day's march we have seen not less than three or four hundred antelopes, with which the valley seems to teem." This was near Elko. He mentions antelope almost daily on the trip down the Humboldt, speaking again of "hundreds" in the vicinity of Lovelock. Along the Truckee River near Reno he first mentioned deer: "We saw numbers of deer and antelope in the valley." Near Donner Lake the party finally killed a deer (Bryant, 1848).

Simpson (1876) visited the Ruby marshes in June of 1859 and commented thus on the wildlife: "A great deal of game, such as antelope and aquatic fowl, is said to abound in this region, and deer and mountain-sheep are also seen." Near Eureka he found many antelope in Antelope Valley and says the place was well named. Returning through eastern Nevada in July, his party saw elk in two localities which Hall (1946) identifies as on the west side of the Schell Creek Range near Ely and north of Wheeler Peak in the Snake Range.

Reverend G. H. Greenfield states that the city and county of Elko were named by Mr. Charles Crocker of the Central Pacific Railroad, who "simply added an 'o' to 'elk,' because of the large numbers of elk in the surrounding hills at the time"—about 1868 (Davis, 1914).

From these and other historical documents it is clear that antelope were abundant and widely distributed in the valleys of central and northern Nevada; that bighorns were quite numerous in the arid mountains and rimrocks of the northwestern and, presumably, the southern parts of the State; that elk were present in moderate numbers in their territory in the northeastern corner; and that deer were perhaps the least abundant, or the least obvious, of the native ungulates, being noted specifically only in the foothills of the Sierra Nevada and in the Ruby Mountains. Admittedly, the travelers avoided the mountains where they certainly would have found more deer, but positive evidence of deer abundance is lacking.

It is quite certain, however, that the changes in land use and vegetation after settlement led to a great decrease in antelope, bighorn.

and elk and to a substantial increase in numbers of deer. The most important alterations in range vegetation were virtual elimination by livestock grazing of the perennial grasslands that supported the antelope, bighorn, and elk and the development of woody browse types in their stead on which the deer now winter. Future management of these big game species must take fully into account the transitory nature of these vegetational stages, all of which are subject to further change.

Deer

Deer were scarce in primeval Nevada, but even scarcer for a time after settlement. Although vegetational changes were under way that later would benefit the deer substantially, uncontrolled hunting apparently kept these animals in a state of rarity until effective legal protection developed in the era 1910 to 1920. With enforcement of game laws and the legal kill limited to bucks only, deer increased rapidly. In the 1920's and 1930's sport hunting for deer became popular, and by the 1940's such excellent sport was available that not only Nevadans but many nonresidents took to the hills in autumn in quest of venison and trophy heads.

Kill Records

Records of license sales and big game kills, available since 1942, show that the annual kill of deer in Nevada has increased steadily during the past 15 years (Table 5). This trend was due at first to the increase in deer, which attracted more and more hunters. But the era of deer increase is over. In fact, there may be fewer deer in Nevada now than a few years ago. It is doubtful that hunting itself has reduced the deer herd, even locally, since the kill of bucks has consistently exceeded the kill of does. Hunting probably is taking only part of the annual surplus, or crop. This generalization can be arrived at in the following way:

Detailed records of hunting removal from mule deer herds in various parts of the western United States indicate that an average buck harvest constitutes from 3 to 7 percent of the population (Longhurst *et al.*, 1952). Exceptionally heavy buck hunting may remove annually a maximum of 9 percent of the animals in a population. Some Nevada ranges are heavily hunted (Ruby Mountains, for example), but many areas are hunted scarcely at all. The buck kill probably comes to less than 6 percent of the statewide population each year. The additional doe kill recently brings the total average removal to perhaps 9 or 10 percent of the population. Reasonably productive deer herds produce an annual surplus of 25 to 35 percent of the basic breeding herd (Leopold *et al.*, 1951). Thus, since hunting as presently regulated could not conceivably be removing one-third of the annual crop, it cannot have been the cause of any reduction in present populations which are frequently discussed but not always authenticated.

TABLE 5—Big Game Tag Sales and Big Game Harvest in Nevada

	Deer			Antelope		Bighorn		Elk	
		Kill*							
Year	Tags	Bucks	Antlerless	Tags	Kill	Tags	Kill	Tags	Kill
1942	12,236	3,405	1,065	----	----	----	----	----	----
1943	16,011	3,891	3,137	512	?	----	----	----	----
1944	11,489	no report		276	?	----	----	----	----
1945	18,702	no report		240	?	----	----	53	?
1946	22,184	no report		791	?	----	----	54	?
1947	20,034	no report		635	?	----	----	53	?
1948	21,722	7,077	1,405	----	----	----	----	100	57
1949	23,722	6,621	2,224	----	----	----	----	100	40
1950	26,458	8,964	2,311	292	125	----	----	100	30
1951	31,228	16,744	3,556	431	278	----	----	100	22
1952	38,957	14,301	9,084	----	----	52	15	----	----
1953	32,456	14,256	5,902	200	135	58	15	----	----
1954	38,307	16,809	10,906	350	204	?	11	----	----
1955	41,550	15,499	19,001	465	189	----	----	60	26
1956	48,791	16,935	15,284	190	80	40	26	60	27
1957	46,569	14,197	12,411†	150	65	60	25	60	26
			(11,068)†(8,725)‡						

*Deer kill determined by questionnaire sent to a representative sample of deer hunters.

†Total of antlerless deer includes 729 animals not actually classified as to sex.

‡Starting in 1957 hunters were required to return deer tags. These figures represent the total kill reported on tags. Seventy percent of all tags were returned. The kill as determined by tag return in 1957 is 74 percent of that computed from questionnaire sample.

The numbers of deer in Nevada, therefore, must be related to range conditions since the natural loss is far more than the number killed.

Most deer in Nevada summer in the mountains and highlands and migrate to lower altitudes for the winter. Some migrations are very short and consist merely of an altitudinal shift of a few thousand feet. Other migrations are of major proportion: The deer travel 75 miles or more between their season ranges. A small minority of Nevada deer are resident and do not migrate at all. The welfare of a migratory deer population may be affected by conditions on either the summer or the winter ranges or both.

Summer Range

Summer range includes all of the higher mountains of northern, central, and western Nevada (Figure I). Only the southeastern desert ranges are devoid of deer. It is principally on the summer range that deer are hunted in autumn. Some are killed in movement from summer to winter ranges, and special late seasons may permit hunters to harvest a few of the deer on the winter ranges.

The density of summer deer populations varies greatly from range to range. By far the thriftiest populations encountered during the present survey were in the higher mountains of north-central Nevada, in Elko County. There the forage is relatively lush, with a highly nutritious assortment of both forbs and woody browse plants. In each of two localities we saw over 100 deer (mostly bucks) in a few hours, and the animals looked fat and sleek.

Sparser summer populations were found in some of the ranges of eastern Nevada (White Pine County) and central Nevada (Nye County). These mountains are drier in climate and the available deer forage is less abundant and less varied. Sagebrush predominates on

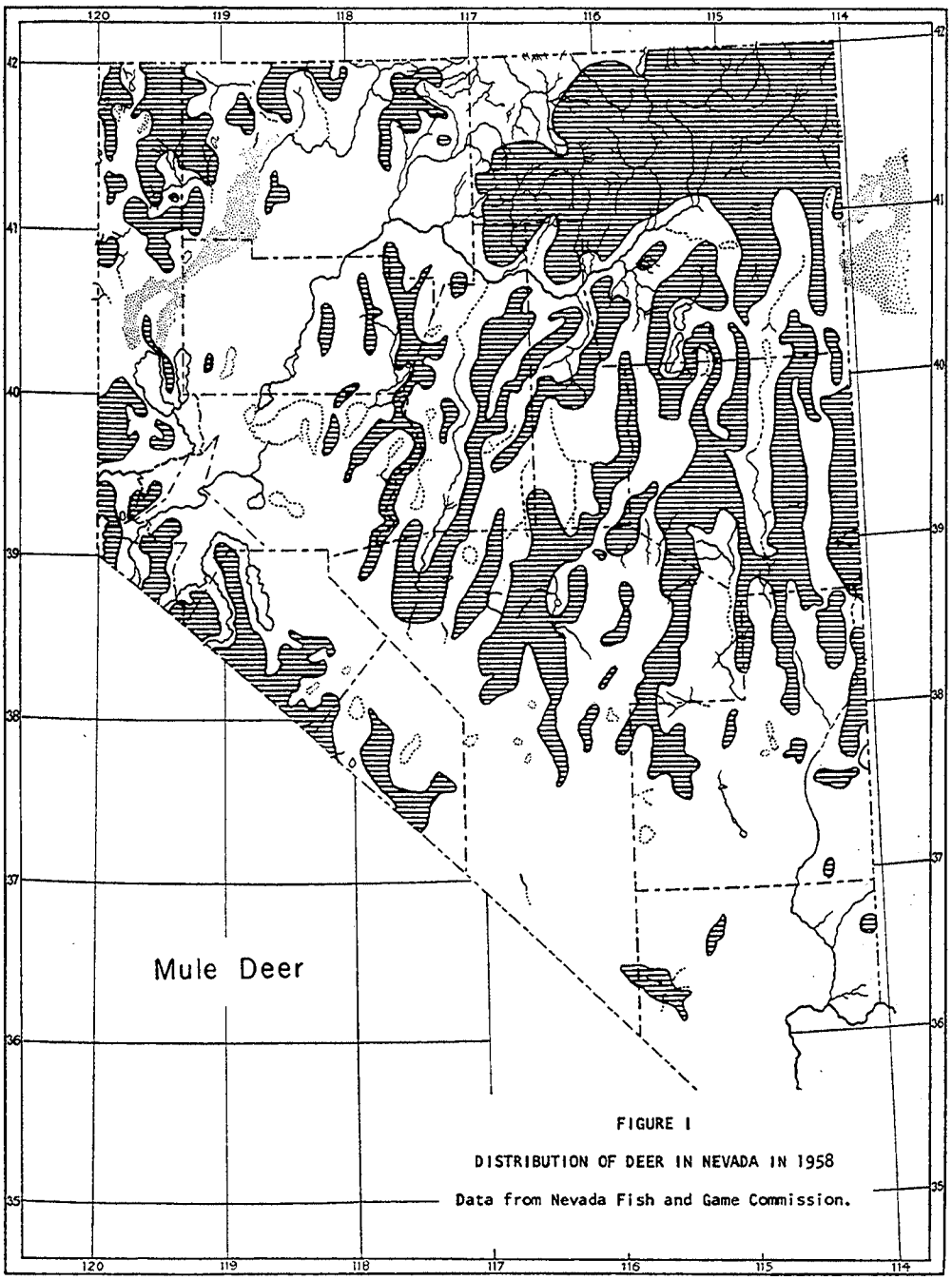


FIGURE 1

DISTRIBUTION OF DEER IN NEVADA IN 1958

Data from Nevada Fish and Game Commission.

the dry slopes, even at elevations of 11,000 feet. On one short horseback trip in the Toiyabe's, 36 bucks and 26 smaller deer were observed, but many of these animals seemed to be less fat than deer of better ranges in Elko County.

Deer are common in the higher ranges of northwestern Nevada, but broad desert valleys narrow down the suitable areas. There are good populations in the ranges along the California line from Reno to the

White Mountains in Esmeralda County. Populations build up in winter from an in-migration from California. A limited number of deer live on the sparse ranges in the Charleston Mountains and nearby ranges near Las Vegas.

In each area, the summer density of deer seems to be correlated roughly with the quality and variety of local forage. Deer investigators (including this author) have often said that the population levels of migratory deer are determined primarily by the carrying capacities of winter ranges. This often is true, but in arid or semi-arid regions the quality of summer range may strongly influence deer welfare. Deer well fed in summer probably wean healthier fawns, and animals of all ages go to the winter ranges in better shape. Thus, in sizing up deer management in Nevada, it would seem wise to consider the condition of both summer and winter ranges.

Where summer ranges are naturally arid and low in forage production, avoiding overgrazing by combinations of deer and livestock requires great care. In some parts of the Snake Range, Schell Creek Range, and Toiyabe Range, it seemed to us that deer and livestock are competing severely for summer forage. Very possibly this competition is limiting the productivity of both deer and livestock. Aspen and mahogany were browsed clean of foliage to a line as high above the ground as deer could reach. Forbs and grasses were close-cropped. The same situation may apply widely in other semi-arid ranges. We would suggest that the Forest Service, Bureau of Land Management, and Fish and Game Commission reappraise conditions on the summer ranges to be sure that the vegetation is not being over-used and that the grazing animals of all sorts are not suffering from summer competition.

Winter Range

In winter, deer seek lower, more or less snow-free ranges supplied with palatable browse. A general map of deer winter ranges in Nevada has not yet been compiled, although data are being gathered which will permit drawing such a map in the not-too-far-distant future.

Very likely it was a general change in the vegetation of the foothills and lower canyons that permitted the growth of a large deer population in country that originally supported very few deer. In primeval times the valleys of central and northern Nevada were primarily grasslands, grazed only by antelope and, doubtless, frequently burned by the Indians. The foothills apparently were mixed grass and shrublands, kept open by the spread of fires from the valleys. After settlement, the valleys were plowed or mowed and domestic livestock in great numbers were grazed throughout the country. The rich grasses were soon eliminated from the foothills, and then a series of hard winters (the worst one in 1889–90) largely eliminated the livestock. In the seedbed created by overgrazing, there apparently developed extensive stands of mixed shrubs, including some of the best winter deer foods—bitterbrush, cliff rose, and mountain mahogany. Most abundantly, of course, came sagebrush. These brushfields subsequently have been protected from fire, hence have persisted. When legal protection for deer became effective 20 years later there was a fine range

in which the population could thrive. Concurrently, of course, the antelope range was largely lost and, despite protection, the antelope dwindled.

When the deer herds started to grow, they developed rapidly on the new winter ranges, and some astonishing populations, which obviously could not be sustained, were created. The Forest Service became concerned in the 1930's about the impact of some of the herds on winter ranges. Largely through efforts of the Forest Services, the buck law was modified locally to permit the killing of some does with the idea of removing surplus deer from the overburdened browse fields. The first controlled doe shoot in Nevada took place in 1941 in Kingston and Birch canyons on the Toiyabe National Forest, Lander County. Three hundred doe tags were sold and 260 does were removed, along with 600 bucks. In the next three years special hunts were held on seven other problem ranges in Nevada. For a time thereafter special doe hunts were arranged after evidence of local overpopulation and range damage was adduced. The Nevada Fish and Game Commission was created in 1948 and gradually developed a program of regular harvest of does, along with bucks, which is a much more orderly and sensible procedure.

However, even with a planned harvest of does, many of the deer winter ranges have deteriorated. This is partly the result of heavy use by deer and, in places, by livestock. Partly, it is the natural result of old age setting in on the vast areas of shrubs formed by a sequence of fortuitous ecologic circumstances in the 1890's. Today, bitterbrush, for example, is not reproducing itself on most Nevada ranges. Conditions for the development of seedlings have not been created; or, if they have, the young plants have been consumed by the deer. In the head of Duck Creek drainage, in White Pine County, we examined an enclosure where bitterbrush has been protected from all animals for 15 years. There were no seedlings, and the adult plants were dying. The Duck Creek range, which supported an enormous deer herd in the early 1940's, has passed its prime and is going downhill—in both summer and winter range areas. Other winter ranges, such as the east side of the Pequops in Elko County and the Walker and Carson drainages in Douglas and Lyon Counties, are being invaded by pinyon or juniper—an invasion which hastens the demise of the bitterbrush.

A long-range plan of deer management, therefore, must envision not only taking the full crop of deer from existing herds to preclude unrestrained build-up of pressure on the winter ranges as they are, but it should provide for rejuvenation of the overaged browse stands. This is more easily said than done. To date, no one really knows how to rejuvenate a bitterbrush range, but the Forest and Range Experiment Station of the U. S. Forest Service, at Susanville, California, is working on the problem. Reseeding has been far from universally successful, and it is expensive. The use of the Dixie brush-remover, a heavy machine that rips out overaged shrubs—sometimes is followed by regrowth of bitterbrush, but at other times sage and rabbitbrush come in instead. Bulldozing of pinyon and juniper sometimes encourages bitterbrush, but not always.

The various land agencies interested in maintaining deer ranges must focus major attention on this problem. Mere protection of existing ranges—from grazing, fire, or other encroachments—will not guarantee deer herds 50 years hence unless the forage is self-regenerating.

To sum up, land use in Nevada in the post-pioneer epoch changed grassland into brushland on which a deer herd developed. We must learn how to maintain these brushfields if deer are to continue at desirable levels.

Deer Policy

The Nevada Fish and Game Commission, in its meeting of August 23, 1958, adopted a statement of policy regarding deer management in the State which, in our opinion, is of such importance as to warrant reproduction here.

DEER MANAGEMENT POLICY

It shall be the policy of the Nevada Fish and Game Commission to manage the deer herds of the State on a maximum sustained-yield basis for recreational use.

In carrying out this deer management policy the Commission recognizes three major factors which must be considered. These factors are the deer, the range, and the people.

The Deer

(a) It is recognized that deer have a reproductive potential greater than can be removed annually with a "bucks only" season.

(b) That the failure to harvest a limited number of antlerless deer may allow a rapid but temporary buildup in the antlerless class of deer which can result in range depletion, crop depredations and, eventually, herd degeneration.

(c) That the harvest of a limited number of antlerless deer will provide more deer to the sportsmen without reducing the number of bucks available for harvest annually, and will reduce the possibility of violent fluctuations in deer numbers.

(d) It is also recognized that, in areas of comparatively light harvest of available "legal" bucks due to light hunter pressure or inaccessibility, it may be necessary to harvest more antlerless deer than "legal" bucks to maintain a balance between herds and range.

(e) That, in some cases, natural catastrophies resulting in a severe reduction of a herd or herds in a given area far below the carrying capacity of their ranges may require the reduction or complete elimination of antlerless harvests for a period of time.

The Range

(a) It is recognized that range condition is the key to healthy, productive deer herds.

(b) That ranges throughout the State are subject to various intensities of livestock and big game use, fires, range management practices, and weather conditions.

(c) That the annual production of forage species on Nevada ranges varies considerably from year to year.

(d) That other users of the range must be considered in the over-all deer management program.

The People

(a) It is recognized that the above deer herd and range management concepts are not entirely accepted by all county game management boards, sportsmen, or the general public.

(b) That the progress of deer management will be governed by the will of the people reflected through their county game management boards.

(c) That the average individual has neither the time nor finances to conduct his own research on deer and range management.

(d) That it is the responsibility of the Commission to present to the county game management board, sportsmen and general public accurate information on the condition of the deer herds, range and concepts of deer management developed through research in this State and others.

Based on the above considerations, the Nevada Fish and Game Commission does hereby adopt the following deer management program:

(a) The Commission shall encourage the management of deer on a Management Area basis, such areas being primarily range areas coinciding with established supervisory districts, and, when feasible and desirable, with county lines. Each district and county may consist of one or more Management Areas or a group of counties or parts thereof may be included in one area. Areas to be established shall be determined by county game boards and the Commission.

(b) The Commission shall strive to determine deer migrations, concentration areas, production, herd composition, mortalities, population trends and annual harvest by Management Area and conduct on a statewide basis research studies on the life history and management of deer where specific and pertinent data are lacking.

(c) The Commission shall encourage the county game boards to permit the harvest of antlerless deer annually in approximately the same numbers as the reported "legal" buck harvest for each Management Area or subdivision, except where the findings of the Commission personnel indicate that the antlerless quota should be decreased or increased over the "legal" buck harvest as dictated by range and herd conditions.

(d) The Commission shall request predator control in areas where predator problems exist and where deer are being adequately harvested.

(e) Where desirable and economically feasible, the Commission shall strive to provide access to inaccessible areas when an adequate harvest of deer is not being obtained.

(f) The Commission shall strive to determine all factors contributing to the condition trend of deer ranges by Management Area which directly or indirectely affect deer populations.

(g) When necessary, desirable and economically feasible, the Commission shall strive to improve deer ranges through sound range improvement practices and land acquisition in those areas where the harvest of deer has followed to a reasonable degree the harvest plan outlined in this program.

(h) The Commission shall strive to cooperate with county game boards, private, state and federal agencies on the improvement

of deer ranges and the determination of equitable deer use consistent with other range uses for each area.

(i) The Commission shall strive to present to the county game boards, sportsmen, and general public all available information concerning range and herd conditions, harvest information and keep them informed on the latest ideas, concepts and practices in the field of deer management through the Information and Education Department staff, supervisors and field personnel.

(j) Nothing in this policy is intended to infringe upon the legal rights and prerogatives of the county game boards in the setting of deer seasons. It is intended to declare the direction the Commission is taking in deer management for the county boards, sportsmen, general public and to guide Commission personnel in their activities. This policy may be amended periodically as conditions and concepts change.

In our opinion this is an excellent policy statement and an admirable proposed program of management. It would seem, however, to bypass the important concept that Nevada deer range is, in fact, not in primeval condition. The range is a product of secondary plant succession brought about by land use since settlement. This condition must be maintained by active management. Range "protection" alone will not suffice. Therefore, in addition to planning for full harvest of the deer crop and over-all planning of range use with livestock interests, there should be provision for active experimentation in range regeneration. The Commission's management program in items (g) and (h) refers to "range improvement practices," but it does not make clear that at present we do not really know how to improve deer winter ranges in most parts of Nevada. Learning how to do so is perhaps the most important long-term aspect of the deer program.

Even when the know-how is discovered, the trouble and expense of managing the countless areas where deer spend the winter will require the cooperative effort of all land administering agencies and the general public. This monumental task should be defined clearly in the Commission's deer policy.

The Management Program

Translating policy and general objectives into specific management proposals is the final step in developing a deer program. We offer the following comments and suggestions:

1. *Plan of deer harvest.* The plan of deer harvest, briefly outlined in the Commission's policy statement, is endorsed. The basic premise is that the kill should be regulated by Management Areas (27 such areas have been suggested), and that within each area the annual harvest of does should be regulated to approximate the buck kill. A tag system will give control over the doe kill. If evidence of overharvest comes to light, the quota of doe tags issued in a given area can be adjusted downward or upward. This plan seems to provide for a reasonable and conservative deer kill, and is adaptable to changing conditions.

2. *Control of deer damage to agricultural crops.* Where deer are damaging irrigated pastures and other agricultural crops, relief can be obtained by special hunts held at times when the marauding deer

are in the damage area. This can be done as a simple extension of normal hunting procedures outlined above as, in fact, is already the practice.

Some deer that commit depredations are not invaders or migrant, but are deer that have been reared right in the agricultural areas, have grown fat and produced more fawns to intensify the depredations. These should not be considered game but nuisance animals. Although this is not a popular suggestion, these animals should be eliminated and big game production confined to the wild lands.

3. *Protection and proper use of existing range.* The task of appraising range use and regulating numbers of animals—both deer and livestock—to protect the range from damage, is a never-ending one. Responsibility for locating and mapping critical deer ranges clearly belongs to the Fish and Game Commission. In point of fact, Commission personnel have been making substantial progress in this direction, especially in the important deer ranges of Elko County. Responsibility for appraising range condition and working out programs of forage allocation should be shared by the land-administering agencies—Forest Service and Bureau of Land Management—as well as the Commission.

The really critical deer ranges constitute a very small part of Nevada. Where conflicts with livestock exist, it should be possible for the Forest Service and B. L. M. to shift livestock grazing allotments in such a way as to favor deer on these limited areas, be they summer or winter ranges. This is, in fact, a stated policy of the Forest Service, though much can be done to further implement it. Bureau of Land Management grazing policies are, on the whole, dictated by local boards whose primary concern is livestock. To date, the range needs of game have not been adequately recognized. The Fish and Game Commission should press for this recognition.

In addition to regulating livestock numbers, it is equally important that B. L. M. plan its program of brush removal and grass reseeding so as to spare existing deer winter ranges. In a few places, deer winter range has been bulldozed to plant crested wheatgrass for cattle. Permits for five-acre homesites and homestead patents have been issued in the middle of deer winter ranges.

Where range problems develop as a result of excess deer numbers, it is the dual responsibility of the Fish and Game Commission and the county game board to correct the situation by increasing the deer kill.

4. *Range improvement for deer.* As stated above, the browse plants on winter ranges that presently support deer in Nevada are transitory vegetational stages. They must be renewed periodically. Protection from over-use will extend their life but will not guarantee permanence. They must be managed in ways that will promote regrowth of browse plants. Every possible type of experimental treatment should be tried to discover practical ways of reviving rundown browse ranges. This experimentation should be started at once, by all interested agencies.

Pronghorn Antelope

Antelope are decidedly limited in their present distribution in Nevada (Figure II). The largest block of occupied range is along the

northern border of the State, in Washoe, Humboldt, and Elko Counties. Even there, populations are sparse and discontinuous. A few remnant bands occur in eight other localities across the center of the State. Despite close legal protection and a very limited kill, the species is no more than holding its own.

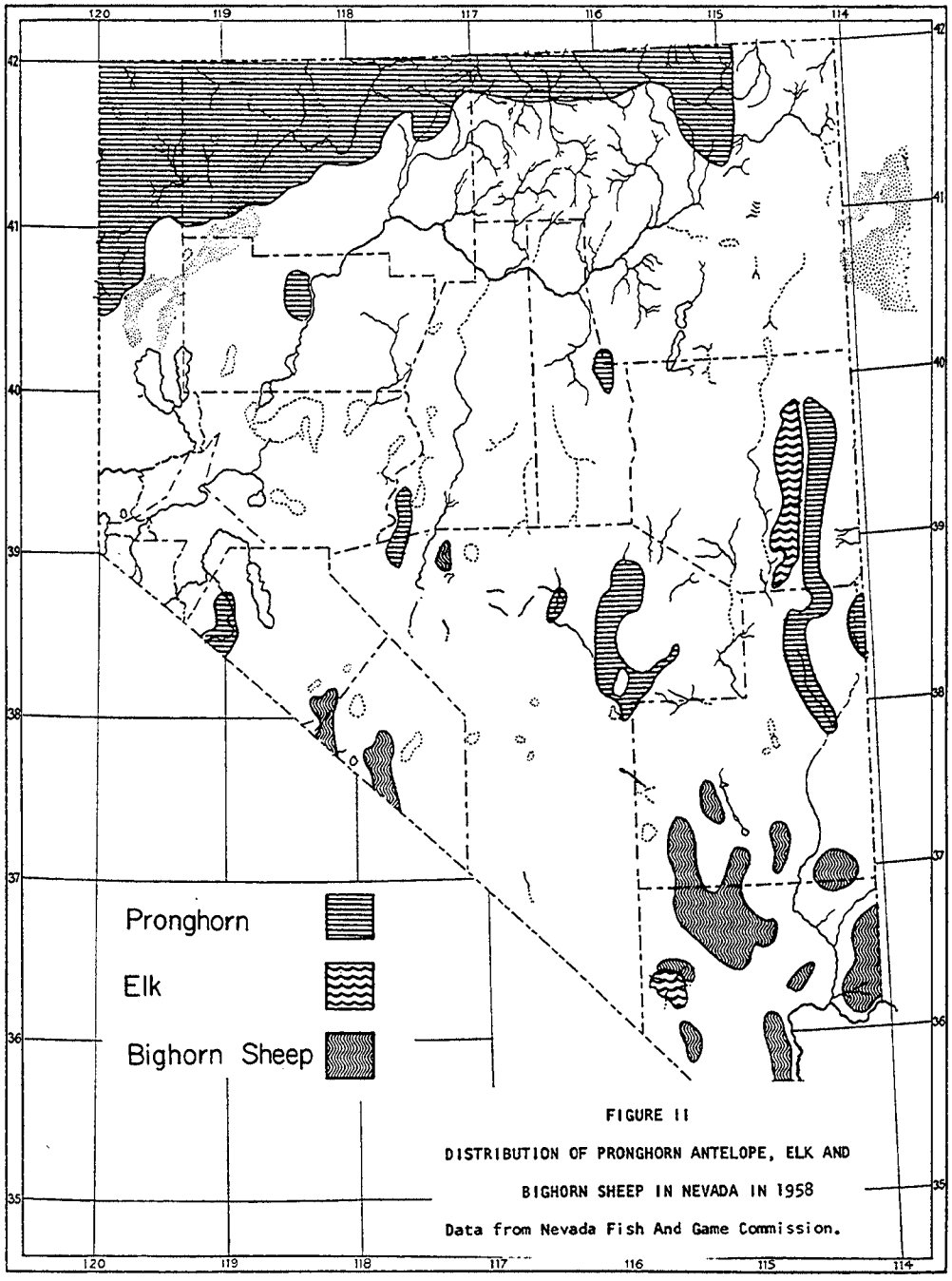


FIGURE 11

DISTRIBUTION OF PRONGHORN ANTELOPE, ELK AND BIGHORN SHEEP IN NEVADA IN 1958

Data from Nevada Fish And Game Commission.

In past years most people believed that antelope were being kept down by a combination of illegal hunting and by coyotes killing fawns. In recent times poaching has geen greatly curtailed, and coyotes have nearly disappeared as a result of poisoning campaigns. Yet antelope numbers have not increased markedly. It seems clear, therefore,

that changes in the range are largely responsible for the decrease in antelope numbers. The valley grasslands where the antelope once thrived are largely eliminated.

Antelope restoration in the future will depend largely on the program of range management. Fortunately, the Bureau of Land Management and some private land operators, are experimenting with large-scale range improvement projects. They are eliminating dense stands of shrubs and reseeding the land to perennial grasses. Already antelope are taking advantage of these reseeded lands, and continued conversion of brushlands to grasslands may lead to a steady increase of the antelope population. There will be some conflict of interest if antelope increase on rangelands improved especially for livestock, but the overlap of feeding habits is not severe. According to Buechner's (1950) studies in Texas, it takes 47 antelope to consume the preferred livestock forage of one cow. This low ratio is a result of differences in food choice. Antelope prefer forbs and scattered browse plants that grow as weeds in grasslands, instead of the grass species preferred by cows. Competition with sheep is more severe.

The Fish and Game Commission should encourage range improvement projects that may be of great benefit to antelope and, incidentally, to sagehens. Only on deer winter ranges is there any question about the desirability of conversion of brushlands to grass.

Assuming that range conditions in Nevada will improve with better management in the future, antelope may become a more important game species.

Bighorn Sheep

Nevada is fortunate to retain, in the southern part of the State, a number of bands of bighorn sheep. They occupy, in large part, the arid mountain ranges of the southeastern portion of Nevada (Figure II). Some bighorns occur farther north, in the White Mountains and Silver Peak Mountains of Mineral and Esmeralda Counties and the Toiyabe Mountains of Nye County. The most complete account of the present status of the bighorn in Nevada is that of Jonez (1957).

Nearly every year since 1952 a limited and carefully controlled hunt of bighorn rams has been held in Lincoln and Clark Counties. The harvest has been small (11 to 26 rams annually), but it is heartening to think that Nevada still is able to offer the chance of the finest of sports to its citizens. We warmly endorse the continued harvest of excess rams, whose removal cannot possibly harm the bighorn population.

There is a discouraging lack of sound information on the life cycles and habits of bighorn sheep. Consequently, it is difficult to say why the animal was exterminated over so much of Nevada in years past, or why it is so limited in range today. Introduced diseases of domestic sheep and uncontrolled poaching apparently were factors in past years, but neither is important now, as nearly as we know. More probably, changes in range vegetation induced by domestic livestock have altered the range in ways that have been disadvantageous to bighorns. Insofar as possible, livestock should be reduced or removed from the critical portions of remaining bighorn ranges. These arid crags are unproductive livestock areas, anyway.

More intensive field study of the bighorn populations could offer a better factual base for management. The U. S. Fish and Wildlife Service operates a large management area for this species: the Desert Game Range, in southeastern Clark County. Theoretically, the staff of the Desert Game Range is conducting the studies required for management but, after 22 years of operation, these studies have yet to produce a comprehensive report. However, field studies have been accelerated in the past two years under a cooperative arrangement between the Fish and Wildlife Service and the Nevada Fish and Game Commission.

The bighorn is perhaps the most dramatic and exciting of the native game species of Nevada. Its preservation and sound management should be given high priority.

Elk

Although elk originally were present in fair numbers in northern Nevada, the ranges at best must have been marginal. Today, with joint use of the mountain ranges by game and livestock, the ranges are submarginal for elk.

The two existing populations exist as a result of introduction in the Schell Creek Mountains of White Pine County where they formerly existed, and in the Charleston Mountains of Clark County. During the present field survey a brief visit was paid to the Schell Creek Mountains, which seemed poor elk range at best. The survey director who visited the latter area is quite pessimistic as to whether or not the present small herd can survive.

We recommend that no attempt be made to expand either of these elk herds and that they be kept small by periodic shooting (which is already the policy of the Commission). Also we recommend that no additional transplants or introductions be contemplated. Nevada is not elk country.

The Job Ahead

The deer is the most important game animal in Nevada and always will be. Sales of deer tags and nonresident licenses not only finance the deer program but contribute a large amount to the trout hatchery and pheasant programs. It is, therefore, of tremendous importance that deer management be soundly planned for long-term results.

Knowledge of range condition, migrations, deer numbers, and population dynamics will be mandatory for future management programs. Cooperative studies with other states and agencies should be extended. They should be augmented by fact-finding studies and training in wildlife work which probably should be centered at the State University.

A good professional job is being done in securing basic information on which to base management, but the fact finding should be accelerated. A sound program of deer management must be based on accurate knowledge of deer and their ranges. The Commission has been criticized for having too many technicians, especially in the big game field. Actually, more manpower is needed to do the job at hand.

Tagging deer on winter ranges is yielding some fine new information on the relationship of summer to winter ranges. Critical deer winter ranges are being mapped. The distribution of deer in summer is being better pinpointed. These jobs should be speeded up with additional manpower.

A clearer picture of range use by deer and of the conflicts with domestic livestock would crystallize cooperative effort with the public land agencies. Also, more complete records and additional studies will permit a better planned harvest.

With the most marvelous hunting in the West and a magnificent deer herd, Nevada should keep its deer management geared to new hunter demands and range trends.

Bibliography

BRYANT, E.
1848. What I saw in California. D. Appleton & Co., N.Y., 455 pp.

BUECHNER, H. K.
1950. Life history, ecology, and range use of the pronghorn antelope in trans-Pecos, Texas. Amer. Midl. Nat., 43:257–354.

DAVIS, S. P. (ed.)
1913. The history of Nevada. Elms Publ. Co., Reno and Los Angeles, 2 vols., 1279 pp.

FREMONT, J. C.
1854. The exploring expedition to the Rocky Mountains, Oregon and California. Miller, Orton and Mulligan, Auburn and Buffalo, 456 pp.

HALL, E. R.
1946. Mammals of Nevada. Univ. Calif. Press, Berkeley, 710 pp.

JONEZ, A.
1957. Status of bighorn sheep in Nevada. Trans. First Ann. Meeting, Desert Bighorn Sheep Council, Las Vegas, Nevada (Sept. 23–25, 1957), 98 pp. mimeo.

LEOPOLD, E. S.: T. RINEY; R. MCCAIN; and L. TEVIS, JR.
1951. The Jawbone deer herd. Calif. Div. Fish and Game, Game Bull. No. 4, 139 pp.

LONGHURST, W. M.; A. S. LEOPOLD; and R. F. DASMANN
1952. A survey of California deer herds, their ranges and management problems. Calif. Dept. Fish and Game, Game Bull. No. 6, 136 pp.

SIMPSON, J. H.
1876. Report of explorations across the Great Basin . . . in 1859. U. S. Engineering Dept., Washington, Govt. Printing Office, 518 pp.

UPLAND GAME MANAGEMENT

This section was written by the Survey Director, Mr. Fred P. Cronemiller.

Recommendations

1. County game management boards have an unfounded belief that the gun is a major control of upland game. Hunting regulations are often overly restrictive. Longer seasons would permit more sport hunting without endangering breeding populations. Drought and hard winters will reduce populations markedly and constrict the ranges occupied. However, we have just seen upland game populations bounce back in a short period with adequate food and water. Management of habitat will help upland game more than restrictive seasons.

2. Seasons should be more uniform on all species throughout the State and adjustments to fit annual production should be made by varying the bag limit.

3. Transplanting and introducing breeding stocks where none exist often pays off, but artificial propagation to augment existing population is expensive and usually unproductive.

4. The study has shown several gaps in the necessary facts on which to base management. Certain study programs should be enlarged.

The upland game of Nevada consists of several fine birds and the ubiquitous rabbits. Three species of quail—mountain, valley (or California), and Gambel; three species of grouse—the dusky, blue, and sage grouse; and the mourning dove are native birds. The introduced birds that have become adapted to the extent that they are on the game bird list are the chukar and Hungarian partridges and the ring-necked pheasant.

Hunting pressure probably has very little effect on the populations of any of these. Everyone will agree that rabbit populations peak and drop to extreme lows regardless of hunting effort. This year finds a very high population of cottontails, and one can well predict that, within a year or two, their numbers will nosedive. The upland bird populations are now at a high level, too. Grouse numbers are cyclic and also seem to vary in numbers independent of hunting pressure. Their fluctuations, however, are less spectacular than those of rabbits.

We do not yet know if the chukar will take on such a cyclic behavior, but we do know that drought can severely decimate populations over wide areas and reduce their range markedly. Hard winters, too, will probably reduce the area of chukar range—they reduce quail populations or keep them at low levels in northern Nevada when snow covers their food supply for considerable periods. We have also seen the chukar bounce back when moisture conditions improve. In less than four years, culminating in 1958, we have seen small populations develop tremendous numbers. Chukars have extended their range into areas never before occupied.

The cause of the more or less violent cyclic fluctuations is not always known. Perhaps at today's stage of management it is not necessary that we understand the cause, but it is important that we know that fluctuations do happen, how severe they are, and try to fit management to population cycles. By this we do not mean to close seasons when populations are low and open them when they are high. The first thing we need to know is if the gun is a sizable factor in the control of the upland game numbers over most of Nevada.

We believe that only in the most accessible and heavily hunted areas does the gun have any effect on upland game populations. And even here, lack of success causes hunters to go farther afield before they cause serious reduction in populations.

Hunting Regulations

Upland game is much overmanaged in Nevada. There are far too many different seasons on most of the species; there is far too much thinking that the gun is the important factor in reducing populations; there is little recognition that lack of success will reduce hunting pressure or better distribute it.

One reason for overmanagement may be a lack of understanding of the love life of polygamous species. The management principle for polygamous species when the sexes can be identified by hunters is

this: if the population is low and maximum population recovery is desired, restrict shooting to males only.

Sportsmen have pointed out that the present expansion in the numbers of upland game cannot be credited to management. We hurry to agree with this, not to discredit management but because it indicates that habitat and weather are the important things and that the gun is seldom a controlling factor for these species. But, in addition, brood counts and other census work has found that natural increases and extension of ranges occur so that plantings were unnecessary in spite of insistent pressures that more birds be planted.

No matter how low the population is, polygamous males can be heavily shot without reducing their number to the point where breeding is less than 100 percent successful. Yet we have seen such regulations as these for the polygamous pheasant: Two counties had a one-day season for three birds of either sex; two others had a two-day season for cocks only; two counties had a five-day season, and an adjoining county an eight-day season for cocks. These variations indicate that someone is guessing—or perhaps working under the mistaken idea that management can be highly refined when only cocks are hunted. Instead, probably 75 percent or more of the upland game population goes down some rathole rather than into the hunter's bag under these circumstances.

We believe that adequate management can be attained by adjusting bag limits only. Our advice would be to set more liberal seasons and forget them. As brood counts indicate a rise or fall in populations, it may be desirable to adjust the bag limit or to limit the take of polygamous species to males only. However, hunters rarely overshoot a population that is sparse. They give up! Lack of success is a greater factor than strict regulations in reducing hunting and distributing effort.

The problems in setting seasons may go beyond the management of the species. Some seasons need to be fitted into farm programs, so that crops are harvested and the cooperation of the land owner can be secured to allow hunting. The rabbit season could probably be yearlong. Bird seasons may be scheduled so that game in short supply will not be exposed to the effort of all of the hunters. But, as Nevada now sets seasons, several open simultaneously.

The State is not districted into logical units for upland management as it is for big game. The county is the unit. The county boards earnestly deliberate on their recommendations, yet reach different conclusions and different policies even though conditions are the same. A broader look and more uniform policies are needed.

As a heritage of the days of county control, Nevada has an unique unwritten policy: a closed season where a species does not exist or where the habitat is not suitable to produce a really huntable population. For example, Clark County has a closed season on sage grouse. This ruling is defended on the grounds that, if an open season were indicated, some nimrod would go out looking for the species and give a Commissioner or staff member a lacing for failure to provide it. This policy clutters up the regulations, continues the effort of the counties to isolate themselves, and serves no needed purpose in game management. Other states are usually districted on a much broader basis and

declare open seasons in districts where it is desirable, but they do not take formal action closing seasons in districts where a species does not exist.

Fact Finding

A fine job has been done in studying and reporting on the chukar and the Gambel quail. The resulting bulletins are outstanding among all of the small game publications in the United States.

Most phases of pheasant production have been studied and reported upon in Nevada and in adjoining states where problems are similar. All of these studies support the present pheasant policy, with perhaps one exception. This is the possibility of planting hen pheasants just before the laying season. This practice may have possibilities if all birds are shot in the fall and no carryover is planned. Oregon found it did not pay if cocks only were shot; greater success resulted from planting "under the gun"; that is, just before or during the open season.

Hen planting before laying was tried at Overton this year. This fall will be the first open season for a few years, Consequently, the take during the four-week season may give an indication of the success of the method; we can compare the kill with the plant, but an accurate study of this method is very difficult. One needs an area barren of birds, and Nevada has practically no pheasant habitat without birds. The chicks from the current planting cannot be distinguished from those of resident birds. Possibly, hen planting before laying in alternate years would result in sufficient information to evaluate the method. Pheasants are too expensive for a guessing game. Basic facts are a must for any pheasant program.

An excellent study of sage grouse is being made in Elko County. In the O'Neil Basin area, 300 special permits for five birds each are issued for an eight-day season. The object of this study is to determine what hunting pressure the bird will stand. The project is well organized and adequately staffed with competent personnel.

Another excellent program has been started to make brood counts and evaluate the upland game crop in midsummer. This program is designed to collect information that will help set regulations for the ensuing open seasons. The field workers traverse the game range by automobile or on foot along transects which give samples of populations and the survival of chicks and young. The samples are far from adequate in number to be completely dependable. Nevertheless, they have so far worked out to be good indicators of the game crop that can be expected. In this year of expanded bird populations they underestimated, if anything, the great increase that has taken place.

Sampling wild populations is becoming a science. The methods are still on trial, but it is clear that a more intensive system of transects is needed when manpower is available so that the sampling can be completely relied on and used more effectively to set regulations for proper harvest.

To aid in administering upland game management, a handbook is needed which will cover the essential information on the life history of each of the game species, the possibilities of habitat improvement, and the basic principles of management. A sample writeup for the chukar has been furnished the Director. This demonstrates a line of

thinking that must be followed to develop a management policy for any species. Such a writeup for each species will help Commissioners and staff workers fully understand their approach to management, and it will let sportsmen understand the reasons behind their action.

MIGRATORY WATERFOWL

Mr. Everett E. Horn has prepared the report on the waterfowl programs within the State. He spent 33 years with the U. S. Fish and Wildlife Service. For a period he was assigned to the problems of waterfowl depredations in the western states. His work resulted in a drastic decrease in crop damage, at the same time maintaining waterfowl numbers. He served as a waterfowl consultant to the California Wildlife Conservation Board in 1948–1949. In 1950–1951, he was assigned to a project concerning waterfowl problems created by drainage of wetlands in the West and then initiated the Survey of Wetlands of the United States which is now the basis of most programs for the development of waterfowl areas.

From 1952 to the present, he has been consultant to the California Wildlife Conservation Board where he and his staff make surveys, determine the feasibility of various wildlife projects, recommend them to the Board, negotiate for and consummate land purchases.

This has involved the acquisition and development of about $5,000,000 worth of waterfowl areas.—F. P. C.

Recommendations

1. The Nevada Commission has made a good start upon a waterfowl management program. Seven areas have now been acquired, totaling 225,663 acres. Five of the seven existing areas are clustered within 100 miles of Reno. One area is in southern Nevada near Las Vegas. Railroad Valley in the east central part of the State is small and affords very limited habitat.

2. A statewide program of acquisition and development of additional management areas should give consideration to a more general distribution of these areas statewide. Further clustering of additional areas in the west central part of the State is not in the best interest of sound waterfowl management. What is actually needed to best manage waterfowl in Nevada and where management areas could be located to accomplish this objective are basic questions for consideration.

3. Selection of new areas should consider the flight lines of the birds through the State, the water available, the amount of soils of suitable quality and, last but not least, the amount of public hunting that can be provided.

4. There must be a proper balance established between the need for development on existing areas, the acquisition of new areas, and the funds available annually for development, acquisition, and operation and management of such areas.

5. No waterfowl areas should be acquired solely because someone wants a shooting ground close at hand. These areas must serve a multiple purpose to be justified. The greatest need is for areas properly located and developed to perpetuate waterfowl and provide public shooting.

6. Development of a sound management plan for each area should precede any expenditure for development of the area. It should not

be "hit and miss." More time or assistance is needed by the waterfowl technicians to do the necessary biological and physical evaluation of the areas and to work out a sound management plan for the development of the acquired areas. The members of the Commission staff assigned to waterfowl management are sound, well-trained, dedicated workers who recognize the problems and know how to solve them. But they are spread out too thin, shuttled into too many duties to do the kind of a job they are capable of doing.

7. Far more engineering and designing is needed for the best development of acquired areas. The management plan developed by waterfowl management technicians should show what is needed, adequate engineering will show how to secure the management objectives and provide the blueprint for construction. Would anyone think of investing a half-million dollars in a building without sound plans drawn by an architect? A waterfowl area is no different in principle. More engineering help is needed by the Commission to secure adequate plans. It is humanly impossible for the present small staff to provide the necessary engineering for all phases of the Commission's program.

8. There is need for a definite procedure for land acquisition that will permit purchase of land at a fair value. One such procedure is suggested.

9. The Overton Management Area should be carefully examined and evaluated and the soundness of any development plan determined so far as is possible before any additional funds are expended for further development. Immediate expenditures could best be for solution of the difficulties now encountered.

10. A caution flag should be raised against dashing all over the State trying to acquire more areas than can be handled or financed. Better select fewer, sound projects and push them to an orderly completion.

Waterfowl—An International Resource

Waterfowl is a renewable natural resource of the North American continent. They are not indigenous to any particular state or nation. They migrate seasonably, spending part of each year in widely separated areas. Perpetuation of this natural resource is the responsibility of all the states and nations on the continent.

Perpetuation depends upon the existence of suitable habitat properly spaced over all the territory the birds frequent. The number of waterfowl on the continent, or on any of the four principal flyways, is generally proportional to the amount, kind, and spacing of their living quarters. A proper balance between nesting, resting (on migration), and wintering areas is essential. The total flyway population can be no greater than the poorest habitat along the flyway.

As men developed farms and other enterprises, they made large areas of land and water once available to waterfowl unsuitable for waterfowl existence. The loss of habitat can be compensated for in part by setting aside some areas and managing them so that their carrying capacity for waterfowl is greater than that of the original habitat. Given enough space for the birds, it isn't acres of land or water so much as carrying capacity that counts.

Waterfowl management areas are comparatively expensive to acquire and develop. Once they are developed, costs of operation and main-

tenance are high. But without proper development, operation, and maintenance, such areas are of questionable value.

Nevada has budgeted 17 percent of the 1958–1959 fiscal-year funds for waterfowl management. Also, $100,000 has been set aside for capital investment, all or part of which could be used for the purchase of waterfowl management areas. The determination of how much can be invested annually in waterfowl areas can best be made by the Commission and its staff since they know all the needs for the entire state fish and game program.

Last season, about 11,000 shooters purchased duck stamps in Nevada. Waterfowl, being a renewable natural resource, provides a certain surplus that may be shot each year without endangering the breeding stock. The opportunity to participate in this harvest should be made available to the greatest number of shooters.

A Statewide Program

A definite program of waterfowl management for the State of Nevada would provide a blueprint for an orderly acquisition and development of management areas properly distributed and geared to other land uses and to available funds. The Commission staff envisions such a statewide plan. For example, it has a proposal for acquisition of additional waterfowl areas. This is highly desirable if the greatest good is to be obtained from the funds that will become available annually.

There is now a real need for a definite policy delineating the areas in the State that will be considered, and the order in which they will be considered. Pressures to acquire other areas could well be considered but, unless there are extenuating circumstances, such as an area of equal value (to the program) or expediency of purchase, the pressure should not disrupt or alter the established program. Such a program would eliminate indiscriminate selection of areas of lower value or located too near other areas to be of greatest usefulness. It would also prevent consideration of more areas than can be operated and financed. Gradually, the State would build up an adequate series of management areas, properly placed, developed, and functioning.

Objectives of the Program

The acquisition of new areas and the further development of existing ones should accomplish a fourfold purpose:

1. To provide for the needs of waterfowl by supplying suitable habitat upon which they can exist.
2. Provide public shooting areas for as many shooters as can be accommodated.
3. Provide a suitable distribution of such areas over the State in accordance with the lines of flight of the birds.
4. Provide living space with adequate waterfowl food to prevent depredation of crops on surrounding lands. (This is a comparatively minor problem in Nevada, but worth some consideration.)

Areas meeting only one of these aims should be considered of very low priority.

Only the extreme southeastern part of the State can be considered of value as a wintering area. The rest of the State, because of altitude

and climate, is primarily suitable for nesting, moulting grounds, and resting areas during spring and fall migrations. Selection, development, and management should be planned accordingly. Public shooting is possible on all areas, though the more northerly ones will not hold birds in any numbers after the advent of cold weather.

Selection of Additional Areas

In selecting additional areas to acquire, several criteria should be considered:

1. Enough water should be available for both marsh development and other food production.
2. Part of the area should possess soils suitable for the production of watergrass, millet, and other small grains to supplement marsh plants.
3. Part of the area may be of poorer soils for creation of shallow marsh, if the topography should be such that water spreading on this land will require a minimum of water-control structures and at the lowest possible construction cost.
4. The areas should be situated:

(a) Along established lines of flight of the birds.

(b) Near to centers of population and thus available to the greatest number of hunters.

Ducks cannot live on water alone, and a duck hotel without a dining room is of limited value. Some good land is essential. It costs as much to cultivate a poor acre of ground that produces a third of a crop as to till an acre of good land that produces a full crop. It will bear repeating that the number of acres under management is unimportant; it's waterfowl carrying capacity that pays dividends.

In nearly all sections of the State visited on this survey, hunters complained: "The birds come here, stay a few days, and then go on. They don't stay." This statement referred to fall migration. Except in southern Nevada, most of the waterfowl areas are at higher altitudes. Here, as water areas freeze over, the majority of birds move on to more suitable wintering areas.

Early movement of the birds out of these areas results from one of two things:

1. The early migrants are of a group whose ancestral wintering grounds are farther south and they are going there, regardless.
2. There isn't sufficient food to sustain them on area.

Development of acceptable food in sufficient quantity would hold some of this migrant population on the areas until inclement weather forced an almost complete evacuation.

Existing records of waterfowl use of many of the proposed areas may not be helpful in setting up an acquisition program. In the first place, the records are scanty. Furthermore, the number of birds using an area now operated as a cattle ranch bears little or no relation to the number that would use the same area if it was properly developed for waterfowl.

Wetlands of Nevada

The Wetlands Inventory of Nevada (Figure III), surveyed by the Fish and Wildlife Service and the Nevada Fish and Game Commission staff and reported May 1954, identifies the remaining wetlands of the

State that possess conditions favorable to development for waterfowl use. This inventory does not indicate all of the lands that could be developed, but it does point where to look for areas possessing the basic essentials and that can be most economically developed.

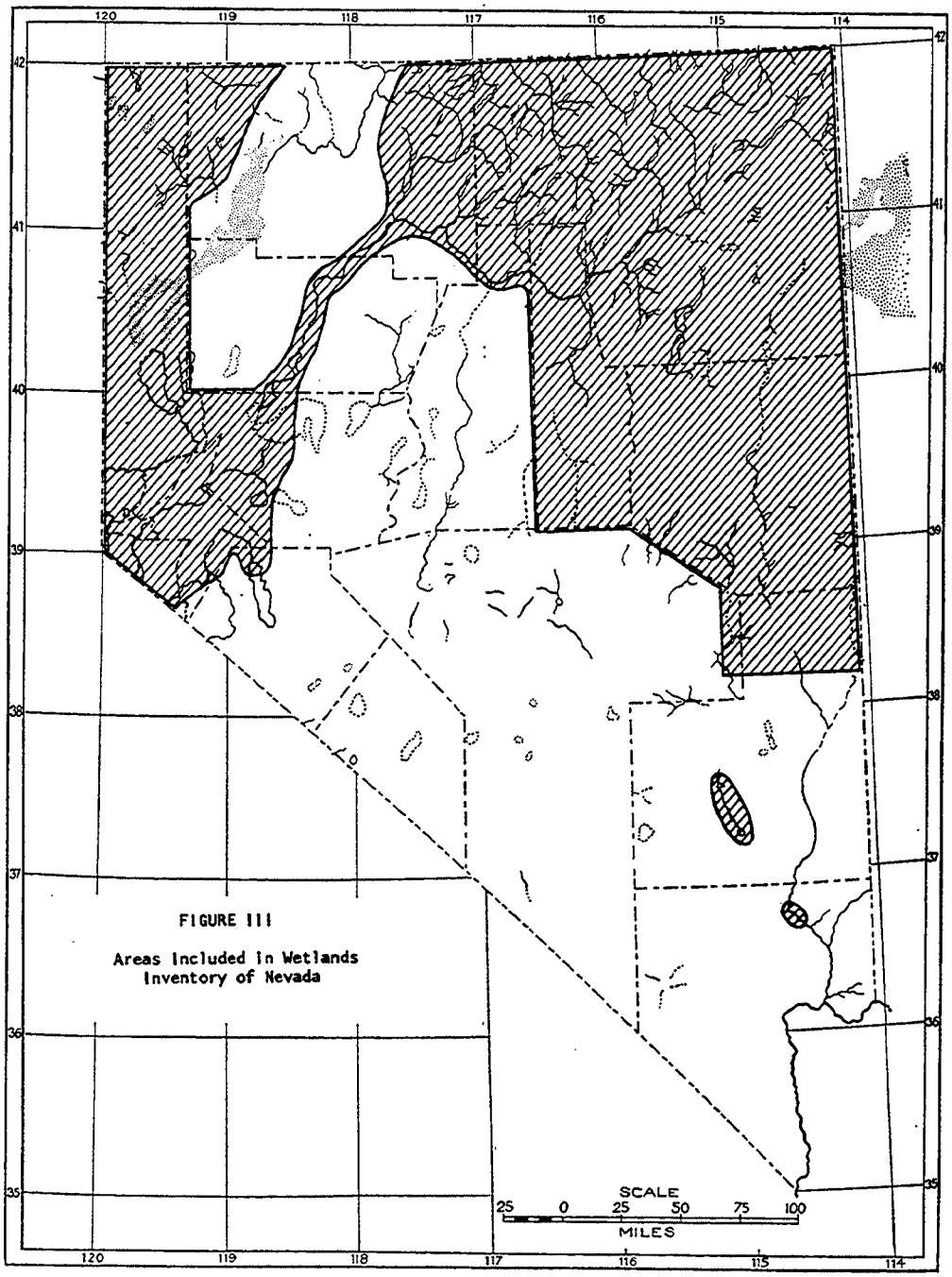


FIGURE 111

Areas Included in Wetlands Inventory of Nevada

Nevada, generally thought of as a dry, desert area, has a surprising amount of water widely distributed over the State in many of its valleys. Many springs of large size arise along the base of the mountains, and quite probably additional water could be secured from wells. Pumping from these underground aquifers might have some

effect upon the springs, if the draught upon the underground became heavy enough.

But Nevada water law does not recognize fish and game as a beneficial use of water. Consequently, the Commission, in setting up the existing management areas, had to locate them where return flow or operational spillage is available below irrigated lands, or at the sinks of the Humboldt, Carson, and Walker Rivers.

Mason Valley, receiving a certain return flow, plus a certain water right, is or should be a far better operating unit than some of the others. It should be possible to use the waters available to the Mason Valley area to develop a well-rounded waterfowl area. In the present operation of the Mason Valley area, it appears necessary to use some of the lands along the river for production of alfalfa and grains that are harvested and sold. There are trials of combinations of cereal and hay crops to determine possible benefits to upland game. Only the profit, if any, and the waste grain after harvest are of any value to waterfowl. Far more value would accrue if the same lands and waters could be devoted to producing waterfowl food.

If future acquisitions include a ranch, such as the one at Sunnyside, having a vested water right, a ranch could best be planned, developed, and operated primarily for waterfowl. Any grazing or forage surplus to the requirements of waterfowl could be sold to the highest bidder.

In the formulation of a state program for waterfowl management, then, it is recommended that the Legislature seriously consider enacting measures that would permit use of the water available to acquired areas solely for waterfowl management.

Development of Waterfowl Areas

Development of waterfowl areas must be based upon biological requirements, productivity of the land and water, the quantity of water available, *and engineering for sound development* (water impoundment and distribution). From observation of the development still needed on existing waterfowl areas and that required for new areas, the writer urges that additional engineering service be made available to the staff of the Commission. The present engineering staff is not large enough to handle all of the problems that exist. Over the years, a large saving could be made by providing sufficient help to design, lay out, and supervise needed construction.

A well-worked-out plan of development is essential. Water control structures, ditches, pond areas, and dykes all should be related to the entire plan of development. This is not possible with the present small staff of engineers. The workload is too great.

The plan can be carried out as a total development, or it can be done in steps, by selecting first those phases of the plan that are needed immediately and for which funds are available. In either case, the result would be a properly designed and constructed area with no necessity of tearing out or redoing some previous work.

Further development of the Mason Valley, Humboldt Sink, and Fernley areas should be preceded by over-all development of plan of management and engineering. The additional engineering help needed to handle all phases of the Commission's fish and game program

can best be determined by the Commission and its staff. Money spent on sound plans and designs always pays big dividends over a period of years.

Location of the area will determine the general type of development. The hunting pressure expected will indicate the size and development needed to meet this objective. Knowledge of soils and amount of water, and the topography will permit layout of shallow marsh, "farmed for duck feed" areas, and similar development.

Once developed, there is a continued need for land and water management. The Ruby Lakes and part of the Stillwater area, for example, are badly overgrown with tules and not supporting the birds they should. Experimentation in marsh management is essential.

On Humboldt Sink, the increase of duck use could create a problem of depredation upon adjacent grain lands. Planning should anticipate this possibility and include sufficient cereal grains to avoid troublesome relationship with adjacent ranches. On areas such as Fernley, major attention might be given to development of shallow marsh areas, and less emphasis could be given to cultivated food patches.

Joint and adequate planning by the waterfowl and engineering members of the staff will set the objective and details of sound development.

Existing State Waterfowl Management Areas

Seven Wildlife (or Waterfowl) Management Areas have been acquired by the Nevada Fish and Game Commission:

Area	County	Acreage	Lease or Purchase
1. Stillwater*	Churchill	153,848	Lease
2. Railroad Valley	Nye	†600	Lease
3. Fernley	Lyon	‡13,045	Lease
4. Overton	Clark	9,805	Lease
5. Humboldt	Pershing and Churchill	36,340	Lease
6. Mason Valley	Lyon	8,766	Purchase
7. Scripps	Washoe	2,659	Purchase

Five of the seven existing waterfowl management areas are clustered within 90 or 100 miles of Reno (Figure IV). One is near Overton, and the other in Railroad Valley. This distribution is not in the best interest of waterfowl management. It would be better to acquire additional areas in other sections of the State. This possibility has been considered by the Commission staff, as can be seen from the location of areas proposed for future acquisition. The well-rounded-out distribution of properly developed areas possessing suitable habitat for waterfowl existence will accomplish the best long-range results for the State. The acquisition of locally desired hunting areas is not in the best interest.

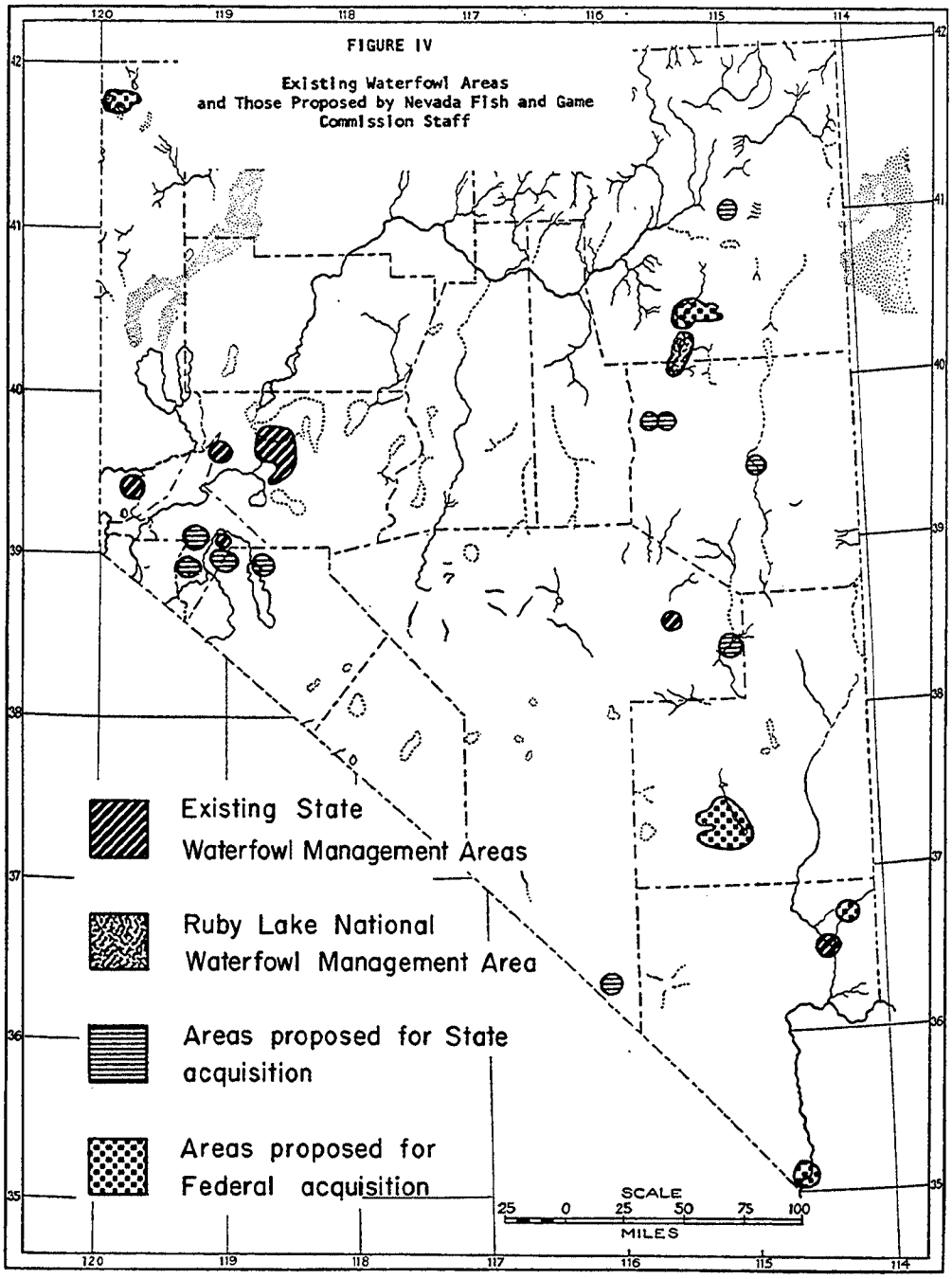
All of the seven existing areas were visited, the records reviewed, and the following comments are offered:

---

*Stillwater is jointly developed by the Nevada Fish and Game Commission and the Fish and Wildlife Service.

†A total of 134,220 acres of land is included in the lease agreement, but only 600 acres have been developed for waterfowl as of September 15, 1958.

‡5,280 adjudged to be aquatic habitat at present.



Scripps Waterfowl Management Area, State No. 7

This management area contains 2,659 acres on Little Washoe Lake and part of Big Washoe Lake. It is on Highway No. 395, 16 miles south of Reno and 6 miles north of Carson City. The area (acquired April 1957) has been fenced to provide control of grazing and provides nesting areas for geese. Some land on the east side could be developed for food patches if water for irrigation could be secured. Since the area is part of a reservoir, no water manipulation is possible. Some additional work to improve nesting is being considered.

In a statewide program, it is suggested that additional development be limited to trial of food patches, improvement of nesting conditions, and regulation of cattle grazing until such time as other phases of the statewide program have been accomplished.

Railroad Valley, State No. 2

This area, containing a total of 133,391 acres, lies in the northeastern part of Nye County about 95 miles from Tonopah and 73 miles from Ely. The main access road is U. S. Highway No. 6. The elevation is about 4,700 feet above sea level. The area was first established as a National Wildlife Refuge by withdrawal of the Public Domain Land in 1934. Water obtained from artesian wells drilled in exploration for potash doubtless prompted the idea of using the old lake as a waterfowl area. The Fish and Wildlife Service drilled six additional wells, started to fence part of the area, and then ceased further development. During negotiations for a cooperative agreement on the Stillwater Area, the Railroad Valley unit passed to the State of Nevada.

Development by the State consisted largely of road repair in 1949–1950, and then construction of ponds and ditches to secure better distribution of available water.

About 600 acres of ponds and marsh have been created. The area suitable for waterfowl is small because the present water supply is inadequate. As a shooting area, it is too small to handle many hunters. Aquatic food plants are developing, but the present total carrying capacity for waterfowl is quite limited.

During September 1958, there was not enough water to maintain the existing ponds at capacity. This resulted in a lessening of the marsh area and the food available for migrating birds. This condition could be remedied, in part at least, by drilling additional wells to supply water to those ponds that are deficient. An examination should be made of the record of water conditions over past years to determine the long-term water pattern. If this late summer and fall water shortage is normal, it might be desirable to plan some additional wells as funds become available.

At present, the acreage of waterfowl habitat is too small to mean much. It is recommended that no further funds (beyond minimum maintenance) be expended on this area until a study shows the cost and feasibility of creating a much larger waterfowl habitat. Drilling wells is somewhat expensive and, unless a yield of water from them is quite large, a considerable sum can be expended with a minimum of benefit. These funds might better be spent elsewhere.

Fernley Waterfowl Management Area, State No. 3

The Fernley Management Area lies about three miles east of Fernley within the "V" formed by U. S. Highway No. 40 on the northwest and U. S. Highway No. 95 and the Southern Pacific railroad tracks on the south. Of the 13,645 acres in the area, 5,329 were purchased in 1951 at a reported cost of $5,173.47 and 8,316 acres are leased; 5,280 acres are presently considered as waterfowl habitat.

Two ponds have been developed by building dykes, and three other ponds are planned for future construction. An area of about 500 acres is considered for development by constructing low dykes to flood a shallow marsh and produce aquatic food plants.

The water for this area consists of return flow from the irrigated lands above. The average inflow is estimated at 15,580 acre-feet annually. It is estimated that the six impoundments planned in total development will provide 824 surface acres and have about 2,352 acre-feet capacity not including the 500 acres of shallow marsh proposed for development. With an average evaporation of five feet per year, the six ponds would require an additional 4,120 acre-feet annually to maintain their level if seepage is ignored. Thus, a total of 6,472 acre-feet would be required for the ponds, and would leave about 9,100 acre-feet for spreading over shallow marsh for food production. If the present average inflow continues, the proposed developments will put all of the water entering the area to beneficial use.

What effect the Washoe project will have on the return flow into Fernley cannot be predicted. Water use by farmers above Fernley is reported to be high—probably seven feet per acre. If this were reduced, return flow would be reduced. If the Truckee ditch were lined to eliminate losses, a further reduction would be made in the flow reaching the management area. But these possibilities are problematical. It is suggested that development of some of the shallow marsh be considered first and the additional ponds later. More food would, no doubt, be more beneficial at this time than more water area.

Humboldt Waterfowl Management Area, State No. 5

The Humboldt Sink is the terminus of the Humboldt River and receives the return flow from the irrigation district around Lovelock. The inflow is uncontrollable and varies widely from season to season and year to year. The State has secured use of 36,340 acres, all of which are leased. The area is quite flat, and drainage of the lands immediately above is a serious problem. No development has been done to date, but funds were budgeted for engineering work during the current fiscal year.

The area produces considerable natural waterfowl food and could be managed to produce a great deal more. If additional suitable habitat were established, greater waterfowl use could be expected.

When this occurs, there is a grave danger of increased waterfowl depredation upon commercial crops upstream. A considerable acreage adjoining the area on the east is now farmed to produce cereal grains and alfalfa. Some depredation trouble is now experienced. It is a matter of record in the Tule Lake-Lower Klamath Basin and in the Sacramento and San Joaquin Valleys of California that no amount of natural duck food on an area will keep the ducks from going out upon cereal grain fields to feed. A planting of cereals on the management area, however, will greatly lessen the duck damage to adjacent cultivated crops.

For this reason, it is recommended that engineering and other development plans for the Humboldt unit give due consideration to setting up suitable fields for cereal grain production, as well as production of marsh aquatics. It may save many a headache in future years. The project may turn out to be too expensive since the fine soils from which the dykes will be constructed may require riprapping throughout.

Mason Valley Waterfowl Management Area, State No. 6

The Mason Valley Management Area is located north of Yerington in Lyon County. It is on the east side of the Walker River, and at the end of the Walker River Irrigation District. Water is from the return flow from irrigated lands above. A water right was established for these lands in 1864, 1865, 1875, and 1880. Except during extremely dry years, the water supply is adequate. The 8,766-acre area, operated as a ranch, was purchased by the Commission in May 1955 for development as a waterfowl management unit.

The area is divided into two distinct parts. The smaller unit (about one-third of the area) is on the west side of the property adjacent to the river. The main water supply ditch goes through this section. Part of this segment has been and still is farmed. The eastern two-thirds now contain a number of scattered ponds that provide considerable waterfowl habitat. Without dwelling further on details that are readily available in the Fish and Game offices, suffice it to say this area has a high potential for development of waterfowl.

It is recommended that a complete biological-engineering plan for development be made. As funds become available, such parts of the whole plan as can be financed should be completed. Consideration should be given to using the farmed areas not only for upland game but also for production of cereal and other food for ducks to serve as a supplement to the native food available in the ponded area. Development of the Mason Valley unit should be of high priority.

Stillwater Waterfowl Management Area, State No. 1

The Stillwater Management Area, located east and north of Fallon in Churchill County, is reached by Highways 40 and 95 from Reno and by Highways 50 and 95 from Carson City. It is easily accessible to hunters in west central Nevada. The area, containing some 153,848 acres, was made available to the Federal Fish and Wildlife Service and the Nevada Fish and Game Commission by agreement with the Truckee-Carson Irrigation District and the Bureau of Land Management. It was developed and is operated jointly by the Fish and Wildlife Service and the Nevada Fish and Game Commission for waterfowl use and to produce livestock forage as required in the agreement.

The waterfowl development is good. Increased food is being produced by planned water ponding and spreading, and the records of waterfowl use show a steady increase in the number of birds using the area since it was established. Public hunting was very good at the opening of the season this year.

The Commission staff has plans for further development of an additional pond unit to the north, and also at the mouth of the Carson River—the latter to correct a bad botulism situation.

This area appears to be developing according to plan and is good so far as waterfowl are concerned. But little more need be said than to suggest that the additional work be done if and when funds are available. However, it is suggested that this additional development be balanced against the greater needs of development of other waterfowl areas in the State.

Overton Waterfowl Management Area, State No. 4

The Overton Management Area is located in the Lower Moapa Valley of northeastern Clark County. It is in the drainage area of the Muddy River, on the Overton arm of Lake Mead, and not far west of the mouth of the Virgin River. It is 64 miles northeast of Las Vegas and reached by U. S. Highway 91 and State Highway No. 12. It is the only management area in southern Nevada. This area was originally part of the Boulder Canyon National Wildlife Refuge. Some development in the form of dykes was done during the CCC days. The Fish and Wildlife Service abandoned the entire refuge about 1947.

Geographically, this area is well located. Waterfowl from the north no doubt travel down the eastern part of Nevada, follow the White River channel, and move on down to the lower Colorado River. If adequate food and water could be provided at Overton, it would be of much value to waterfowl, and provide wintering grounds for the birds and limited shooting for the sportsmen of southern Nevada.

The Nevada Commission secured control of approximately 9,805 acres and reactivated the area in March 1953. Expenditures for development for the period March 1953 through June 30, 1957 are reported as $218,375.55. The budget for 1958–1959 provides $51,132 for the area. Water is in the form of return flow from the irrigated land above the area.

Before reactivating this area, the Commission contracted with William J. Johnson and Associates of Carson City, Nevada, to make a survey of the area and provide a development plan. A preliminary report was provided under date of January 25, 1952. A map of this work shows various areas designed for contour check flooding. Ostensibly, this development plan was utilized in the reactivation of the area. At the present time, about 524 acres have been developed and an additional 180 acres cleared.

The lower portion of the area reaching to Lake Mead has been developed into ponds of large dykes. In the operation of Lake Mead as a reservoir, these lower ponds are subject to flooding about one out of six years. Data on flooding are readily available from the Bureau of Reclamation and Fish and Wildlife Service reports. In general, they show that the water surface of Lake Mead was above the 1,200-foot contour four years out of 23 and that the maximum high-water surface at the top of the flood-control pool is at elevation 1,229 feet. Thus, the lower part of the area is subject to flooding to varying elevations; any development here is subject to inundation for a considerable period. Much of this lower area was flooded this year, and no food could be produced upon it.

Over the period of operation, the lands in the upper or "A" sections of development have become waterlogged to the point of nonproductivity of cultivated crops.

The flooding of a large portion of the lower end of the area and the waterlogging of the upper end has prevented the production of all but a little waterfowl food for the fall of 1958. Overton is a problem area and should be recognized as such.

The Soil Conservation Service was requested by the Commission to make some exploratory studies of the soils and drainage conditions,

and a certain amount of field work has been done. Members of the Soil Conservation Service consulted by the writer on September 16, 1958, stated that additional study would be required before a plan of management could be suggested

In view of the difficulties encountered, the periodic flooding of the lower areas, and the poor drainage of soils, it is *recommended that no further expenditures for development or operation be made on the area until a thorough study of possibilities of correcting the drainage has been completed.* Funds to conduct such studies seem justified in view of the $218,000 already invested in the area.

Studies should include the possibility of either draining the "A" series fields or building a dyke to segregate these fields and flooding the dyked area for shallow marsh development. If marsh development is considered, the possibility of protecting the "B" fields from waterlogging by means of deep drain ditch should be determined. If lower lands could be protected, the "A" series would probably make a good controlled marsh and provide considerable waterfowl food.

A considerable land area, as yet undeveloped, is situated on the west side of the presently developed lands and above the flood line of Lake Mead. An old pioneer ditch once carried water around the high side of these lands to two reservoirs near the lake. The character of these lands is not known, nor is it certain that water from the present diversion pool could be carried by the old ditch. It would seem expedient to do sufficient preliminary engineering to see if water could be so diverted and to have the Soil Conservation Service soil men advise as to the productivity and proper handling of these lands for production of waterfowl food.

If the "A" series of fields can either be ponded without danger of waterlogging lower lands or be adequately drained to produce crops, and if the higher lands below the pioneer ditch can be irrigated or utilized, a suitable waterfowl area might be maintained. The periodic flooding of lands by Lake Mead must be accepted.

The outcome of these studies should provide a sound basis for deciding whether to abandon the area, or to proceed with further expenditures and developments. As the area now stands, it is very doubtful if it justifies the cost.

Existing Federal Waterfowl Management Areas

The Fish and Wildlife Service controls and manages the Ruby Lake National Wildlife Refuge located in Elko and White Pine Counties. This large area is east of the Ruby Mountains and southeast of the City of Elko (see Figure I). Part of the old Fallon National Wildlife Refuge is now in the Stillwater development. The Federal Fish and Wildlife presently administers one waterfowl area and cooperates with the State of Nevada in the development and operation of the Stillwater area. Another small area at Pyramid Lake, while established as a federal refuge, offers but little habitat for waterfowl. Probably some water on the federal Sheldon Antelope Refuge are managed to some degree for waterfowl.

In view of the need for some additional waterfowl areas in various parts of Nevada, and the responsibility of the Fish and Wildlife Service to manage waterfowl in the Nation, it would appear just to

suggest greater federal participation in the acquisition, development and operation of waterfowl management areas in the State of Nevada.

It is recommended that the Nevada Fish and Game Commission intensify negotiations with the Fish and Wildlife Service, requesting that agency to acquire a fair share of such areas under the amended Duck Stamp Act, since that fund is now earmarked for land acquisition. The areas suggested by the Fish and Wildlife Service are listed and discussed later in this report.

Additional Areas Proposed for Acquisition

Over the past several years, the Nevada Fish and Game Commission staff has proposed 15 additional waterfowl areas for acquisition by both the State and the Federal Fish and Wildlife Service: The Commission has assigned a timetable for acquisition and has set priorities of high, moderate, or low. Added to the existing areas, these 15 are:

For Acquisition by State of Nevada

Area	County	Acreage	Purchase or lease	Urgency of purchase (years)	Priority
8. Sunnyside	Nye	9,700	Purchase	1–3	High
9. Ash Meadow	Nye	2,000(?)	Purchase	5–10	Low
11. Wabuska Slough	Lyon	1,300	Purchase	10	Low
12. Alkali Lake	Lyon	5,800	Purchase	5–10	Moderate
13. Walker Lake	Mineral	3,000	Lease	3–5	High
15. Warm Springs	Elko	2,866	Purchase	10	Low
16. Cold Springs	White Pine	5,120	Purchase	5–10	Moderate
17. Warm Springs	White Pine	4,800	Purchase	5–10	Moderate
18. Bassett Lake	White Pine	4,560	Lease	3–5	High
21. Mason Valley (Addition)	Lyon	2,480	Purchase	3–5	Moderate
		42,126			

For Acquisition by the Fish and Wildlife Service

10. Pahranagat	Lincoln	2,800 or 4,000	Purchase	1–3	High
14. Franklin Lake	Elko	23,000	Purchase	3–5	High
19. Ft. Mojave	Clark	3,200	Withdrawal	1-3	High
20. Virgin Valley	Clark	3,500	Purchase or withdrawal	3–5	Moderate
22. New Year Lake	Washoe	2,180	Purchase?	3–5	Mod.-High
		32,680			

A brief resume of the proposed areas for acquisition offers a means of determining how these units would fit into the state waterfowl program.

Sunnyside, No. 8

This area consists of the Sunnyside and Hot Creek Ranches located in the White River Valley about 72 road miles from Ely and 100 airline miles from Las Vegas. A graded county road extends from the ranch 33 miles north to Lund, and thence by 13 miles of paved road to U. S. Highway No. 6, and thence east to Ely. The area is at an elevation of about 5,200 feet above mean sea level. Annual rainfall is about 7 inches, fairly well distributed throughout the year. Growing season is somewhat short, and the area would be valuable primarily for nesting and migration.

The White River flows from north to south and is a tributary of the Colorado River. It rarely flows water along its entire length. This valley appears to be a well-established flight line of waterfowl.

Water for the Sunnyside Ranch comes from three springs reported to produce about 6.5 cubic feet per second. One of the largest hot springs in Nevada supplies the Hot Creek Ranch; over a long period of years it has produced more than 15 cubic feet per second. The total water which rises on the ranch is about 22 cubic feet per second, year long, and is appurtenant to this ranch. The State Engineer has no record of a filing or adjudication of this water, and it seems the ranch has a vested water right.

Part of the water from Hot Springs is impounded in the Adams-McGill Reservoir and diverted for irrigation of lands below the reservoir. The reservoir is reported to be about 3 miles long and varies in height from 6 to 15 feet.

The Hot Creek Gun Club, composed of 60 to 65 men from Ely, rent the reservoir and some adjacent land for waterfowl shooting at $600 per year. The lease grants the club an option to purchase or to have first refusal of purchase. By a letter dated May 20, 1958 to the Commission, the club would waive this option if the State would acquire the property.

This area is used for the midwinter inventory of waterfowl in the State and the record is:

	1955	1956	1957	1958
Ducks	156	556	115	207
Geese	20	0	0	8
Swans	5	0	0	0
Coots	25	21	4	27
Totals	206	577	119	242

While these totals are not impressive, it should be remembered that these surveys are made in early January and that this is not a wintering area. It is of greatest value as a feeding and resting area for spring and fall migration and affords good shooting until the freezeup. With proper development and production of food, the area would hold a large number of birds each fall, early winter and spring.

Because of the good water supply, productivity of some of the soils, and its location in the eastern part of the State, along the White River, this area is considered of very high priority and should be considered one of the first of two new areas to be acquired and developed.

Negotiations during the current year did not terminate in purchase of the ranch, but it is recommended these negotiations be reopened. Perhaps the Hendrix Brothers would agree to consider sale based upon getting one or possibly two additional appraisals made by independent appraisers (M.A.I.—Member Appraisers Institute, or similar organization) and taking the average of all the appraisals as the value of negotiation.

Ash Meadows, No. 9

This area is in southeastern Nye County, east of Las Vegas and the Spring Mountains and north of Pahrump Valley. Its size is indefinite (listed as 2,000 acres), but the proposal is preliminary and only in the survey stage. It is reached from Las Vegas via Highways Nos. 85 and 16.

Water is from various springs and return flow from flooded natural grass areas. Soils are highly alkaline, variously reported by different owners as uneconomical to cultivate and not suitable for production of alfalfa and cereal grains. None of these crops are there at this time.

This area is considered by Nevada Commission staff as of low priority, to be considered in 5 to 10 years. In consideration of other areas in the State, and the funds available, together with the high asking price for the land and the development problems, this area could well be placed at the bottom of the list. It is far inferior to others suggested for acquisition.

Wabuska Slough, No. 11

This is a small site of about 1,800 acres in Lyon County on Highway 95A, north of Yerington. It is so close to Mason Valley and Alkali Lake that it does not warrant consideration from the standpoint of a state waterfowl area. Funds required for acquisition and development could far better be expended in acquiring Area No. 21 (an addition to the Mason Valley area); in acquiring and developing Alkali Lake, No. 12; or in more complete development of Mason Valley area.

Alkali Lake, No. 12

This area includes about 5,800 acres located in Smith Valley, Lyon County, west of Yerington, north of Smith and Wellington and southwest of the Mason Valley Management area. About 60 percent, or 3,440 acres, of the area is public domain under jurisdiction of the Bureau of Land Management. Forty percent, or about 1,360 acres, is privately owned and would have to be purchased or leased. The public land could be withdrawn for recreational use or could be purchased by the State, a parcel at a time, for recreational use. A private gun club owns or leases the private land, and it is reported this club would negotiate favorably with the State. All water would pass to the State.

Generally, the area is good, is well used by waterfowl, and could be developed into a very good unit in a statewide program of waterfowl management.

The Commission staff considers this an area of moderate priority to be acquired in the next 5 to 10 years.

The close proximity of this area to the Mason Valley area and its location in the cluster of management units 90 miles or less from Reno places it in a lower priority in a statewide program. Waterfowl, as well as all hunters of waterfowl in Nevada, may be better served by placing this area in a lower priority, unless larger sums of money become available for acquisition than have been available in the past. The potential for well-rounded-out development as a high carrying capacity waterfowl area is, no doubt, lower than other areas where soil and water conditions would permit a more diversified production of waterfowl foods.

The assignment of this area to the 5-to-10 year urgency (preferably 10 years or more) by the Commission staff is indeed logical and is recommended. The same money used for complete development of Mason Valley would probably pay greater dividends.

Walker Lake, No. 13

This proposed area at the north end of Walker Lake in Mineral County is reached by Highway No. 95 from Fallon to Hawthorne. Water is from the Walker River and irrigation return flow. Some 3,000 acres are indicated by the Nevada Commission staff as desirable, with acquisition indicated in the next 3 to 5 years, and of high waterfowl priority.

The lands are along the lower reaches of the Walker River, and within the Walker River Indian Reservation. Status of the lands is uncertain. This proposed area is within the circle of clustered existing and proposed areas within the 90–100-mile radius from Reno.

Because of this "bunching" and the uncertainty of land status, it is suggested this unit be held in abeyance until other areas are secured and developed, even if that means placing it in an urgency class of 10 years hence or longer. Acquisition costs would be negligible and estimated development about $50,000. If the purpose is to create an additional hunting area with but little development for food production (marsh), it might be acquired and held "as is" for future development.

Warm Springs, No. 15

This area located in Elko County east of Wells and containing 2,866 acres was not visited or inspected. The Nevada Commission staff rates the area as not urgent (10-plus years). Estimated cost of acquisition is $157,630 and of development $110,000, making a total of $267,630. The low rating in urgency and priority assigned by the Commission staff is accepted as justified. Acquisition and development of this area can well be deferred for 10 years or more.

Cold Creek Ranch, No. 16

Warm Springs Ranch, No. 17

Both of these areas are in the north end of Newark Valley, White Pine County. Both have a good water supply appurtenant to the respective ranches. Both have a high potential for waterfowl development. They are not too far distant from Ruby Lake National Waterfowl Refuge and from Franklin Lake, and thus would not add a great deal to the initial phases of a statewide waterfowl program, and especially if Sunnyside and Pahranagat Lake areas can be secured.

For public hunting, they are isolated, not close to large centers of population, and would therefore receive lighter hunting use.

It is recommended these areas be placed in about the third category of priority, and be held pending other acquisition and development on the east side of the State.

Bassett Lake and Slough, No. 18

This area is located in Steptoe Valley, White Pine County, a short distance northwest of McGill and north of Ely off Highway 50. It has a high potential for development. Some 4,560 acres are included in the unit. Water is impounded back of a dyke constructed by the Kennecott Copper Corporation, owners of the property. Meadow lands downstream are presently leased for cattle grazing. The braided stream

provides considerable marsh, and under management for waterfowl, it could produce both shallow marsh and patches of duck foods.

The Kennecott Copper Corporation has a 37 cubic feet-per-second water right that flows into the area in part. The water rights and use for waterfowl would require negotiation. It is well worth exploring further, and the next step would be to determine whether the area can be leased and the water used for waterfowl management purposes.

This area would fit in well in a development program for the east side of the State and should have a high priority for further consideration.

Mason Valley Addition No. 21

The Commission staff has suggested the future acquisition of 2,480 acres immediately south of and adjoining the present Mason Valley area. The present area contains 8,766 acres. The total with the proposed addition would be 11,246 acres, a good-sized unit, most of it capable of intensive development.

These 2,480 acres have a goodly number of ponds and the area borders the supply ditch from which the existing Mason Valley Management Area gets its water. The new addition is reported to carry its own water right. Ownership might be advantageous in permitting an excellent water distribution and good development of the entire unit.

To assign a definite priority is somewhat difficult. From the standpoint of an area needed to round out a statewide system of management units, it would be low, especially in view of the five management areas now clustered around this circle. It is far more valuable than Wabuska Slough, No. 11; probably more desirable than Alkali Lake, No. 12; and far higher than Walker Lake, No. 13.

Of the four proposed areas in this cluster, the Mason Valley addition would no doubt be the most valuable, with Alkali Lake second.

Pahranagat Valley, No. 10

Located in Pahranagat Valley on Highway No. 93, this area is about 110 miles from Las Vegas via Glendale and Alamo. The area suggested by the Commission staff lists 2,500 acres, while another ranch of about 4,000 acres, containing upper and lower Pahranagat Lakes now is available for purchase. The 4,000-acre ranch is discussed here.

This ranch was briefly inspected on September 13, 1958. It is operated for cattle and general farming. Crops noted were alfalfa, sugar beets, sudan grass and barley. Reportedly there is not a large acreage of dry grazing land in the ranch. Situated at the lower end of the irrigated lands in the valley, and containing two lakes and soils able to produce crops of the type noted, the ranch has a very high potential for development as a waterfowl area. It could be developed to use the lakes as resting areas, the surrounding lands for marsh with native aquatic food plants, and the farmed land for production of other duck foods. The lakes had several thousand birds using them on September 13.

While scant information was available as to exact acreage, water rights and amount available, the location is exceptionally good. It lies

along the east side flight line to the Colorado River. With proper development and increased carrying capacity for waterfowl, the area would no doubt attract and hold a large number of birds migrating through this area. It is a low enough elevation and far enough south to be a good wintering ground. There is a good possibility of the area holding a population of birds that would move to and from the Overton area and Lake Mead, especially if proper food is developed. Airline distance from Lower Pahranagat Lake to the Overton area is about 60 miles—a relatively short distance for ducks to fly.

A public hunting area could be established that would be slightly over 100 miles from Las Vegas, thus providing shooting for the sportsmen of the Las Vegas region.

This area is suggested by the Commission staff for acquisition and development by the Federal Fish and Wildlife Service. Since the State controls and operates the Overton area some 60 air miles to the south and east, it is suggested the State of Nevada give serious consideration to acquiring this area for state operation. By having both areas under state control, it would be much easier and quicker to make changes and adjustments in food production on each area to complement the requirements of the other, than to negotiate with a federal agency for operational changes.

It is strongly urged that the Commission make immediate study of both the physical and biological qualities of this area and give consideration to acquiring it as a state management unit, rather than as a federal one.

The Pahranagat Lake and Sunnyside areas are given top priority for future acquisition.

Priority for Development of Existing Areas

Before starting any further development on any of these areas, it is urged that a thorough analysis be made of development to date and existing plans for development. Then it would be well to draw up a complete plan for an entire area and base this upon a plan of management, together with the engineering and necessary structures and facilities to execute the plan of management.

The management plan should be based upon analysis of (1) soils suitable for food production, that is, shallow controlled marsh or cultivated foods, (2) quantity of water available for entire area and how much of this water can be used for each intended purpose, and (3) the best foreseeable balance between marsh, cultivated area, resting ponds and other developments. The engineering plan should provide the blueprint for construction to put the management plan into effect. This procedure would, as pointed out elsewhere in this report, require additional staff for both the management and engineering planning.

Priorities Suggested for Existing State Areas

1. *Overton.* This is the one existing problem area in the State. Immediate steps to determine what can be done should be undertaken before any additional funds are expended on the area. It will pay big dividends.
2. *Mason Valley.* Its high potential for waterfowl development

should be utilized as quickly as possible. A management-engineering plan for development is recommended as soon as possible and should precede any further construction. One good well-developed area is worth far more than several small inadequately developed areas.

3. *Stillwater.* Complete the development work now under way and for which funds are budgeted. Then postpone further expansion of state efforts until Mason Valley is further developed. The federal program on the refuge should of course be continued.

4. *Humboldt Sink.* Complete the work as budgeted for this fiscal year. A management plan should accompany and be the basis for engineering layout. If additional manpower is necessary for both phases of this survey, it should be provided, even if it means delaying similar work on some other area.

Since the funds that can be devoted to waterfowl management areas annually are limited, the other three existing areas could be held on an "if and when" basis and probably considered in this order:

5. Fernley—Shallow marsh development.
6. Scripps.
7. Railroad Valley.

Priority for Acquisition of New Areas

The suggested priority of acquisition of new areas envisions a statewide plan of waterfowl management. It considers the relationship of the proposed areas to existing ones, together with the state of development and need for further development of the existing units.

1. *Sunnyside.* Good location on eastern side of State and high waterfowl potential. Suggest negotiation for purchase be continued.

2. *Pahranagat Valley.* Recommended as a state project rather than a federal one. Biological-physical examination needed: then negotiate for acquisition. This and the Sunnyside area are of about equal value. Acquire whichever one can be secured first.

3. *Bassett Lake.* (Perhaps Fish and Wildlife Service would consider this one.)

If these three areas are acquired and properly developed along with the further development of Overton, Mason Valley, and Humboldt Sink, the funds annually available to the Commission will all be utilized for a period of years. After development of these major areas, the relative value of others suggested for acquisition may change drastically. It is somewhat academic to assign priorities to all of the other areas at this time. They are listed in numerical order of supposed importance for whatever it may be worth.

4. *Mason Valley Addition.* Would it be needed if the present area is fully developed?

5. *Alkali Lake.* If Mason Valley Addition is not needed, Alkali Lake might be considered after Mason Valley is developed.

6. *Ash Valley.* The proposed area is of low priority, but further exploration in this section of the State would be advisable. Hence, the assignment of this priority.

7. *Walker Lake.* This and any other areas that may be mentioned within the cluster near Reno might very well be placed in the distant future.

8. *Cold Springs and Warm Springs in Newark Valley.* These may

well be held pending acquisition and development of Sunnyside and Pahranagat, if these can be acquired.

9. *Wabuska Slough.* Might well be dropped from further consideration.

Areas Suggested for Federal Acquisition

1. *Bassett Lake.* If further negotiations with the Fish and Wildlife Service are productive, request that agency consider this area.
2. *Warm Springs,* Elko County.
3. *New Year's Lake,* Washoe County.
4. *Franklin Lake.*
5. *Virginia River and Fort Mojave.* Both areas are extremely doubtful and the determination should be left to the Fish and Wildlife Service.

Suggested Procedure for Land Acquisition

Criticism of the price for the Mason Valley area and negotiations for purchase of the Sunnyside Ranch strongly indicate the need for a definite system of land acquisition. It is not known how the State of Nevada handles all of its land purchases for state purposes, nor what checks and balances now exist.

In making purchases for waterfowl areas much, if not all, of the difficulty of the past can be eliminated. Basically, a state purchase should be at a fair price to both the seller and to the State. No state should purchase from one of its citizens below a fair market value, and no citizen should require nor receive an exorbitant price for his lands from the State.

The following procedure has worked very well in California and might be adapted with such modifications as are required by law in Nevada:

1. Biological, physical and preliminary engineering should first determine that the area is properly located according to the state program and is suitable for development as a waterfowl area. The study should also see that, generally, the price of lands in the locality are in line with the amount the Commision can afford to invest.

2. Secure an option to purchase extending for a sufficient period of time to complete the transaction. (In California, about 180 days is adequate. California now pays $1 for the option.) This requires sufficient familiarity with the land values in the particular section of the State where the areas are located to be reasonably certain that the option price will be supported by the appraisals. Some owners will agree that if the option price is above the value established by appraisal, they will negotiate the sale within the appraisal value.

If this isn't possible and the negotiator is not certain the asking price is right, it may be possible to get the landowner to agree to consider granting an option to purchase based upon the average of these independent appraisals after these appraisals are secured. The option may be recorded or not as decided by the State. Copies of California's option form have been furnished the Commission's office.

3. Secure appraisals from three professional, properly qualified appraisers. If the estimated purchase price is below $50,000, two appraisals might suffice. In the case of waterfowl management areas,

the price is often from $100,000 to $500,000 and the cost of three appraisals is fully justified.

A basic data report should be required and this could be worked up jointly by the appraisers. The appraisal value reports should be independently prepared by each appraiser.

These appraisals then form the basis either for negotiation of an option to purchase, for negotiation with the seller to lower the option price if an option has been previously granted and the price is above appraisals, or for exercise of the option if one had been secured and the price is within the appraisals.

In California, the property cannot be purchased for the state above the average of the appraisals except by approval of the Director of the Department of Finance. To date nearly all options taken have been within the appraisals. A few that were too high were satisfactorily negotiated with the seller.

4. Secure a preliminary title report of the property from a recognized title or abstract company. Carefully examine all of the exceptions to the title held by the seller. Oftentimes easements, grants of right-of-way and other encumbrances can be removed. At least it can be determined whether or not such exceptions will interfere with the State's intended use of the property.

5. If the option price is no greater than the average of the appraisals of whatever criterion the State imposes, then

(a) Direct a letter to the seller advising that the State will exercise the option. Advise the seller to open an escrow with a title company of his choice and furnish the State with:

(1) Copy (or copies) of the proposed grant deed.

(2) Copy (or copies) of a signed invoice for the purchase price.

(3) Copy (or copies) of a sample form of title insurance to be used in the transaction.

(4) Copy (or copies) of the seller's escrow instructions.

6. If all of these transactions are satisfactory to the State, then

(a) Issue a warrant to the seller for the purchase price. (Send it to the title company for delivery to the seller.)

(b) Send the title company the State's escrow instructions.

(c) Accept or reject the exceptions to the title.

Upon the meeting of the escrow instructions of both the seller and the State, the warrant is delivered to the seller and the grant deed to the State.

The advantages of this method of acquisition are:

1. A negotiated sale, satisfactory to both the seller and the State.

2. A fair market value for the property that represents the price the seller could expect to receive if he placed the property on the market for a six months' period.

3. Lifts the transaction above public criticism that the State either "paid too much for the property" or "sure robbed the seller."

The soundness of such transactions depends upon the soundness of the appraisals. Only well-qualified, experienced professional appraisers should be hired. They should be men well recognized in this field with a background and record of sound appraisals. Members of the Institute of Appraisers have to meet certain rigid requirements and

their work reflects these requirements. Opinions of value, not substantiated by basic data, are of but little value.

The State might well rely upon the appraisers hired by the State. Use of appraisals made by members of the Fish and Wildlife Service, while they may be exceptionally well done, as was true of the appraisal report by that agency on Sunnyside Ranch, may leave the State open to some criticism. The federal service appraises for the purpose of approving the use of Pittman-Robertson funds for the purchase, and it is presumed they recommend the project on that basis. The State's consideration of these federal appraisals is highly desirable, but the State would be in a sounder position by basing the purchase upon independent appraisals.

How well this system would fit into the State of Nevada's procedures for land negotiation is not known to this writer, and some modification might be necessary. Does some department of State Government other than the agency making the purchase have the responsibility of approval?

CHAPTER VII

FISH AND GAME PROTECTION

SECTION 1. LAW ENFORCEMENT

The purpose of enforcement of the game laws is, first, to prevent an excessive drain on the fish and game crop and, second, to secure a general observance of the laws, preserving its sporting qualities and giving everyone an even break. (The Sunday opening of seasons expresses the latter point.) Nothing displeases a sportsman more than a "sooner" or someone who has an advantage over him.

As to the first point, we found no evidence that poaching was causing any serious drain on either fish or game populations. With much of the game crop being underharvested, the loss is of little moment.

A high percentage of the rural population is made up of sportsmen; consequently, the attitude towards law observance is very good, and this is at times more important than the number of law enforcement officers. In thinly populated areas anywhere, it seems the word gets around when there is any infringement of legal or moral codes.

Because of budget limitations, manpower for law enforcement is at a bare minimum. Yet Nevada has developed one of the finest types of organizations for law enforcement in the western states. Every administrator and technician is a law enforcement officer. The salary of each is budgeted for at least a month or two on law enforcement work. As a result, each is being a law enforcement officer at all times even though engaged in other duties. Those whose duties are principally law enforcement have a part of their time budgeted for duties in fish and game management but, even then, they are law enforcement conscious and do not overlook evidence of violations that come within their view. The fine thing about this type of organization is that it welds together a fine team in administration, with each backing up the other man's programs.

The sportsmen and the Commission should keep open the question of the degree of law enforcement desired. If the drain from poaching becomes excessive, the needed action should be proposed.

The study group, with its rather limited knowledge, does not recommend increased law enforcement effort at this time. It does, however, recommend a law enforcement chief who might handle the combined job of Warden-Pilot. He would assist the Districts in handling cases that might involve difficulties in securing evidence or might require seeking cooperative assistance from state and national law enforcement agencies. He would also assist the Districts in their training programs.

Field officers of the U. S. Forest Service are appointed voluntary game wardens. They report violations to the nearest conservation officer or district supervisor. Should the case brook no delay, the Forest Service personnel make the arrest. Perhaps the major effectiveness of forest officers is their presence in the hunting and fishing areas, which is a strong deterrent to violations.

SECTION 2. PREDATION AND PREDATORY ANIMAL CONTROL

Predatory animal control is accomplished from several different funds, and through the cooperation of several agencies. The sheepmen of the State assess themselves 20 cents for each mature animal owned. The Fish and Game Commission contributes $30,000. A state appropriation and that of Federal Government to the U. S. Fish and Wildlife Service bring the fund to approximately $200,000. This money is for the actual work in the field. In addition, the Reno office of the Fish and Wildlife Service furnishes supervision and accounting, and hires three trapping supervisors.

The catches for the fiscal years from 1956 to 1958 are as follows:

Predator	1958	1957	1956
Coyotes	3,654	4,246	4,612
Bobcats	3,465	3,442	3,257
Mountain lions	181	116	155

As the trappers increased, the catch increased for a period. A small crew caught 1,785 animals in 1949. With 26.4 man-years effort in 1956, 8,024 animals were taken. The trapping effort was increased to 31.7 man-years in 1957, but the catch dropped to 7,804 animals. In 1958 the catch was 7,300. All of the reduction was in coyotes. These statistics have been offered as fair proof that the present effort is now reducing the population. The writer agrees with this, but the data do not indicate a decline in those species most detrimental to game: mountain lions and bobcats.

Not much hope is held for a major reduction in the numbers of these two species. Nevada's 70,000,000 acres is extremely large for 32 men to cover adequately. The evasive action of the wily bobcat will probably permit him to maintain his numbers. In our neighboring State of California the mountain lion has endured even though California has had both a bounty system and state-employed trappers, plus some control by those supervised by the Fish and Wildlife Service. In addition, some counties have augmented the state bounty payment. Yet the mountain lion has maintained its numbers, perhaps because the expanding deer population has increased its food supply.

It is predicted that the effort in Nevada will follow the same pattern. However, the animal may be more vulnerable to man's counter-attack here where the cover is much more open and accessible.

About five man-month's effort is allotted to magpie control in the main river valleys in an attempt to reduce predation on game bird nests.

The effort at control is well distributed among species. If predatory animal control is beneficial to wildlife, it appears that all of the effort is beneficial. Some accent is given where game predation appears to be more intense. Yet there should not be an all-out effort made to separate control for game and control for livestock. Both may benefit from any effort. Instead, one should look at the total program and see if all of the game and the livestock problems are being covered. Over 90 percent of the effort should be considered a joint program.

If predatory animal control is worth the money being spent, then the sportsmen and the game are getting a bargain. On this basis, the contribution should not be questioned. However, there is a point to consider and a recommendation to be made.

There is no firm foundation of written facts on which to base the program and its quarter of a million dollars a year cost. There is no compilation of food habits, no results of stomach analysis to learn accurately just what the predatory animals feed on.

No data have been found that would convince the unbeliever or protect the employees from criticism. The program is based on complaints of stockmen, the judgment of workers with long experience, the popular belief that predatory animals are robbing the sportsman of a portion of his hunting opportunity, and a less valid conclusion heard both in and out of the ranks of professional predator control workers to the effect that all predators are bad predators. The saying is: "Now that we are about to get on top of predator control, we cannot relax: with a little more money we can attain our objective."

Actually, the study group could suggest that many areas definitely do not need control of predatory animals. Surely, in areas overpopulated with big game, where hunters are not removing the surplus, the predator is not offering competition to the hunter; rather, it is doing game management and range rehabilitation a favor.

This statement is in opposition to the program of the professional control workers who maintain that an untrapped area is a reservoir from which clean areas are repopulated. This contention is only partially supported by facts. We offer as witness Ventura County, California, which, with reasonable control effort, has no predation problem. It lies on the edge of a million-acre brushfield fairly well populated with coyotes, bobcats, and mountain lions, and entirely untrapped. The drift to the clean area is quite small and by far the simplest means of control is to trap the strays after they emerge into more accessible country.

In the spectacular increase of the chukar and the extension of its range, predation was no factor. Instead, climate and weather were the major controls. Fluctuations in population are entirely independent of predator pressure. It has never been proved that coyotes control ground squirrels, in spite of all of the statements to the contrary.

The point that we are belaboring is that control of predatory animals is not a simple matter of requiring complete control in all areas. We should first know what the problem is. Whodunnit? How serious is the loss? If serious, what are the most economical methods of doing something about it?

Montana has reported a marked increase in bobcats, foxes, skunks, racoons and badgers as coyotes were poisoned with the application of 1080. A part of the increase is credited to the reduced commercial trapping because of low fur prices. However, it appears the smaller predators are filling the vacant niche created by the removal of the coyote.

It is recommended that information on food habits of predatory animals in Nevada, already existing in the office of the Director and in U. S. Fish and Wildlife Service files, be assembled to give better direction or justification of the need of such game protection, if any,

within the State. In no other segment of wildlife management in Nevada has there been so little fact-finding effort.

It is further recommended that control efforts be reduced in those areas where big game animals are in numbers in excess of the capacity of their habitat and where present hunting effort is not removing enough animals to make the herds fit their ranges.

SECTION 3. POLLUTION CONTROL

The present pollution law listed in the Nevada Revised Statutes as Section 503.430 states: "Water Pollution: Deposits of Substances Deleterious to Fish. Every person who places or allows to pass, or places where it can pass or fall into or upon any of the waters of this State at any time, any lime, gas tar, cocculus indicus, slag, acids or other chemical, sawdust, shavings, slab edgings, mill or factory refuse, sewage, garbage or any substance deleterious to fish shall be guilty of a misdemeanor."

This is a good law. Formerly mines and mills for ore extraction were excluded. This exception was stricken from the law by the 1957 Legislature.

All pollution originating within the State has been corrected, mostly through negotiation; only one case has gone to court.

Most cases are handled by the Commission staff, but the Department of Public Health Engineering has assisted on some problems.

Three serious pollution cases originate in California. One is Leviathan Creek, a tributary of the East Carson River. Here a mining company road fill was composed in part of sulfide ores. These leach into the stream and are lethal to fish. The appropriate California agencies have been contacted but there has been no effective action so far. This case has the potential of causing a lot of damage.

A large gravel plant above the town of Truckee on Donner Creek in California is allowing effluent to enter Donner Creek and thence the Truckee River. This effluent has ruined fishing for several miles downstream. It joins with a third California source of pollution, originating from construction of footings on a series of new bridges on U. S. Highway 40 between the state line and Boca. These footings will be completed the summer of 1958. The gravel plant will no doubt operate for several years as freeway construction continues on this route.

The staff of the Nevada Commission has made every effort through contacts with the appropriate California agencies to correct these conditions. There may yet be progress.

There are no recommendations to be made in regard to pollution. The basic legislation is good. It is being enforced and all necessary contacts have been made that would lead to the correction of the sources originating outside the State.

CHAPTER VIII

HABITAT PROTECTION AND IMPROVEMENT

Water, the lifeblood of the land, is a limiting factor in all phases of wildlife production. Nevada has but 2,000 miles of trout streams. Large areas devoid of water are otherwise very good habitat for upland birds. Protection of the watersheds that feed springs, streams, ponds, and lakes is a must to sustain wildlife, to maintain clarity and quantity of water in the trout streams, and to support agriculture. Flowing water is yielded mostly from watersheds on National Forest lands. These facts are of over-riding importance in considering wildlife production.

The major power and water development in western Nevada antedated the era of concern over wildlife habitats. Nevada committed herself to some developments that doomed certain wildlife species and greatly reduced the fishing and recreation values on many acres and many miles of water. Plans for further developments in this area provide inadequate protection for these values in the most important waters in the State. It is hoped that Public Law 85–624, the Federal Wildlife Coordination Act, enacted in August 1958, will permit some protection of these important resources.

Water developments need not always destroy fisheries. On the Colorado, large storage reservoirs have created new fisheries. Research resulting in the introduction of threadfin shad provided marvelous fishing for bass in Lake Mead and for trout and bass in the waters below. Federal legislation providing for a trout hatchery on Lake Mojave to replace flooded spawning areas should make the river a fisherman's paradise. With proper planning, many water developments can be designed so that the fishery is not destroyed, but improved.

Surveys on the Nevada part of the Mojave Desert indicate that only 7 percent of its area can be developed for Gambel quail. Yet this is an immense area. It should provide shooting for a large number of hunters if water facilities are developed. Less than one-half of this quail area has adequate water in average years, and the quail population is severely reduced in drought years when the natural springs dry. Artificial watering devices called "guzzlers" have been found dependable in drought years as an aid in carrying over quail and chukar populations. Surveys have shown that each guzzler may support 400 quail and that few quail travel half a mile from water. Placing one of these devices each square mile in poorly watered, but otherwise suitable quail habitat, would boost production greatly.

Thousands of guzzlers would be needed to fully develop the range of Gambel quail, valley or California quail, and chukar. Perhaps the program should be speeded somewhat as the budget sets the pace. In any event, Nevada should visualize a more ambitious guzzler program, spread over a long period of years until all of the potential upland bird habitats are supplied with water.

Another possibility for habitat improvement lies in the manipulation of vegetation on critical deer ranges. But this possibility has been studied only in connection with revegetation of livestock ranges so that domestic animals can be drawn off areas that should be reserved for deer. Surveys and delineation of such ranges are needed. After they have been identified, agreements with the Bureau of Land Managment and the Forest Service could arrange for reassignment of grazing use, reserving for deer and livestock the range each prefers.

Thousands of acres of winter deer range are in need of rehabilitation. Farming practices are expensive, and techniques for wild lands have not been fully developed. Nevada probably will not be able to inaugurate new studies on this but the California Forest and Range Experiment Station of the U. S. Forest Service is carrying on a very intensive study of this problem under a contract with the California Fish and Game Department financed as a Pittman-Robertson project. Study areas are near the Nevada line—in Modoc, Lassen and Mono Counties—within the range of bitterbrush, one of the most important winter deer foods. Though it will take time to determine what species are most suitable for planting and the most economic method of planting, the findings will be applicable over a large area of deer winter range in Nevada.

As to action now, there are few projects in manipulating vegetation that can be undertaken under present budgets. A pressing need is for tule control in some waterfowl areas. Perhaps cover or upland birds could be improved around waterholes, but even this is still in the dream world except in the more heavily hunted areas in quail and chukar habitat. Better cover for birds should prevent overshooting in dry periods during the early season when birds are most vulnerable. It is not anticipated that Nevada will be ready for such programs in the immediate future.

Under present income from fishing licenses, or under that of the foreseeable future as fishing pressure continues to grow, Nevada cannot afford to plant all of its 2,000 miles of fishable streams. It must concentrate on its best and most accessible waters for efficiency and economy. Put-and-take fishing does not pay its way in all places, at least on a scale that satisfies fishermen. Perhaps fishing lakes should be developed in suitable areas where planting is economic and where there is an opportunity for fish to grow into almost trophy size; a single large fish may be ample reward for a day's fishing. This has happened in privately built reservoirs such as Wilson Sink and Wildhorse reservoirs in Elko County. Pyramid and Walker Lakes yield trophy fish and might be duplicated if good reservoir sites are found. It is recommended that surveys be intensified to find suitable sites for the further development of this type of fishing.

CHAPTER IX

COOPERATION

We wish first to discuss the relationships of the fish and game administration with those agencies and people who have jurisdiction or ownership of land and water.

Most sportsmen of Nevada have accepted the fact that most of the land and water is going to be put to some economic use. Little land can be set apart for wildlife alone and, to a large extent, wildlife can get along with economic uses that do not damage the land. It is true that a small percentage of the wildland area is needed almost exclusively for big game for certain critical periods, for example, to meet deer needs in midwinter. Many such areas can be made available for game through reseeding livestock ranges. It would then be possible to remove livestock from deer ranges on many such areas with no harm to the local economy yet providing a higher level of nutrition to deer herds when it is most needed and, as a result, greater survival and larger crop for hunters.

Neither the land-managing agencies nor livestock operators have fully considered the impact of existing numbers of big game animals on the range. We want to stress a point that we are speaking about the herds already on the ranges. They are there; they are consuming forage, and, regardless of any future policies, they should be recognized as an impact on range and their forage requirements considered.

In our brief look at Nevada rangeland, it appeared that big game and livestock are competing on a few areas of summer range; competition exists on many parts of the winter range. We do not visualize a greater demand for range for big game animals. The problem is now one of range management; reseeding, shuffling livestock in places where the combined use is excessive, dedicating to deer alone certain areas that are deteriorating, and controlling deer numbers where the range cannot continue to support existing populations. This is simple range management, the type any good rancher applies when only one kind of animal is involved.

It is apparent that game production in large part, and fish production to a considerable degree, require close cooperation with the various land and water management agencies and with sportsmen and their neighbors.

BUREAU OF LAND MANAGEMENT

The Bureau of Land Management administers 46,226,454 acres, almost exactly two-thirds of the Nevada area. Most of these acres have minor watershed value. They are the low-value leftovers that no one felt was forth patenting. Most are Grazing District lands, administered by this agency for livestock grazing.

The B. L. M. areas contain the bulk of the critical deer winter ranges. These lie in a crazy pattern. Deer move many miles through ranges that would seem acceptable, yet select only certain areas for wintering. Only a deer knows why. Perhaps the deer winter ranges are less

windy, not necessarily free from snow but mostly sunny and, of course, have choice food. Only in severe winters do deep snows force the deer to other areas. In the more-open winters deer delay their migrations but, on the average, they concentrate in the same places year after year—even though they starve on ranges they have abused.

When their numbers are high, deer do not move over to better range nearby until the first range they had selected is practically destroyed. This is one of the reasons that it is not possible to estimate the capacity of range for deer by the usual range-survey methods. For any herd unit of deer, the capacity can be estimated only on the basis of what deer are doing to the range they select during critical periods. The fact that food is abundant nearby does not increase range capacity if the deer do not move to it until they have destroyed the area they had adopted. This is the typical situation.

The Bureau of Land Management has not begun to consider the impact of big game on the ranges under its jurisdiction. A trickle of thought that has started should lead to recognition of the fact that some ranges are suffering abuse from the joint use by deer and livestock and that some means may be devised to develop capacity for the livestock elsewhere.

This is a most important and pressing job. Deer winter ranges are being destroyed, perhaps forever. Their importance to the local livestock economy is small; they include less than 10 percent of the total range area. Through better handling of livestock and through reseeding, these areas may be given the protection they need.

The immediate need is for surveys to delineate these areas. This is mostly a job for the technicians on the Commission staff. However, the Bureau of Land Management cannot relinquish all of its responsibility to administer these lands, and we would expect the Bureau to participate so that it can accept the findings of the surveys and would cooperate in the analysis of surveys.

Officials of the Bureau of Land Management state that they need to know the carrying capacity, in terms of livestock numbers, that should be set aside to take care of the game herds. At the present stage of knowledge, however, the Fish and Game staff can only express critical deer needs in terms of area—those critical habitat areas that limit the size of the deer herds. When these areas are located and mapped, the Bureau of Land Management can apply carrying capacity figures in terms of animal units and set up for the record an over-all capacity for the critical and nearby areas in the entire range unit. The job of delineating the critical deer ranges, then, is of highest priority in the field of big game management.

The Bureau has failed seriously in some small areas, and the Commission staff has been accessory to the errors through passive action or lack of knowledge. In one instance, the Bureau tore up deer winter range with good stands of bitterbrush and planted it to crested wheatgrass to improve the area for cattle. At the foot of the Sierra escarpment the Bureau has issued homestead patents and permits for five-acre home tracts, again, in the middle of deer winter ranges.

The delineation of the critical ranges should not be long delayed, and working agreements should be perfected with the Bureau.

FOREST SERVICE

The National Forests in Nevada include 5,057,533 acres. These are the better summer ranges for deer, the home of the dusky and blue grouse, and of many sage grouse, chukar, quail, and rabbits. One area boasts of a semi-successful plant of elk. In our estimation, the deer summer range on the National Forest in northeastern Nevada is perhaps the finest in the United States. The forage is abundant and in wide variety. Deer like their meals with assorted foods. The deer population per square mile here is extremely high and trophies abundant.

The Forest Service estimates there are 104,000 deer on the National Forests of the State. This estimate is surely conservative. The kill reported for 1957 was 14,000.

The deer summer ranges that we saw are mostly in good condition. However, on some there are clearcut problems. Some winter ranges are in poor condition due to herds of excessive size and, in some cases, because of conflicting livestock use. The typical trouble spots are at Forest boundaries mostly within grazing districts.

The U. S. Forest Service, the older public land managing agency, has been struggling with range problems for more than 50 years. The first one was—Are sheep grazing and timber growing compatible? This has mostly been resolved. The second question—How many livestock will a range carry?—was posed in the report of the Chief of the Forest Service in 1907 as an introduction to a fact-finding job that had been started. The writer worked off and on for 40 years on the problem. The answers have been worked out on many areas, but there are still unsatisfactory situations on the National Forests of Nevada and many of these involve big game animals.

The problem of grazing the natural forage without deteriorating wildlands is most complex. There are too many species of plants, too many different soils, too many topographic situations to get all of the answers in a lifetime. Research has learned only a part of the answers so far and, as in other enterprises, administration lags behind research. The resistance of some members of the livestock industry has also delayed the accomplishment of needed adjustments.

Nevertheless, we believe the solution of most of the major range problems resulting from livestock use on the National Forests of Nevada is in sight. Increased hunting effort is needed to solve some game range problems.

The Forest Service was the first to recognize the problem of deer herds of excessive size. Almost singlehandedly it secured local agreement to controlled shoots that would more nearly fit deer numbers to range capacities. Then a new state organization of professional people was developed and game management in the State made a lot of progress. Although two organizations have a long way to go to develop a coordinated and thoroughly professional approach to their mutual problems, they enjoy fine cooperation, most friendly relations and a desire to complete a job with parallel objectives.

The Forest Service needs to apply its planning methods to wildlife use. It should develop some graphic and written plans for habitat improvement, water development (guzzlers, etc.), range improvement that will fit into big game management plans; it should delineate critical deer winter ranges and integrate wildlife plans with range

management plans for livestock. It should develop better techniques for recording range use or abuse by deer and correlate these techniques with the efforts of state fish and game workers. At present, it seems that in spots the Service has relinquished this job to the State, although one would think that, as the land management agency, it would not do so.

There is a need for coordinating forage sampling methods. The State concentrated on some critical deer ranges within the National Forests and the Forest Service on livestock ranges. It seemed that the forest officers should have been assisting on the deer ranges if only to learn the degree of livestock use.

SOIL CONSERVATION SERVICE

Over 90 percent of the State is in Soil Conservation Districts, but only a small portion of the area, about 781,000 acres, is under specific programs of the Service. In the planning field, a pattern has been set with an outstanding job in northeastern Elko County. Here, all public land agencies and private land owners have joined in an excellent program.

The District programs usually are mostly restricted to private lands, about 11 percent of the area of the State. The program includes reseeding of wildlands and intensive work on a part of the irrigated area.

Wildlife projects are of minor nature. They include a few farm fish ponds and some duck ponds in the Fallon District and in Mason Valley. The opportunity for further work of this kind is not great and will not add measurably to hunting and fishing opportunity.

SPORTS FISHING AND WILDLIFE SERVICE

The U. S. Sports Fishing and Wildlife Service has two areas under its administration withdrawn from the public domain. The Charles Sheldon Antelope Range encloses a smaller area designated as a refuge. This refuge is inviolate. Range as a whole is open only to deer hunting. It would appear that good game management would permit the harvesting of some antelope, at least the surplus males, and perhaps some sage grouse.

Part of the Desert Game Range is open for taking bighorn. Ten tags are issued for the Pinewater District. This district is within the Tonopah-Las Vegas Bombing Range of the U. S. Air Force. The Air Force cooperates during the four-day season by curtailing operations for the period. Thirty-five tags are issued for the Sheep Range and Las Vegas District for a two-week season. Drawings are held for all bighorn permits.

The Wildlife Service has been conducting studies of antelope and bighorn on these two areas for many years. It appears that the reports and published material that have been made public are not commensurate with the work expended.

NATIONAL PARK SERVICE

The Lake Mead National Recreation Area is under the administration of the National Park Service. It covers the waters of Lake Mead and Lake Mojave and a fairly wide strip of riparian lands. The waters

are open to fishing under regulations of the Fish and Game Commissions of Nevada and Arizona. Under an agreement with the State of Nevada, most of the area is open to hunting of upland game. The exceptions are the areas near docks and other areas of intensive human use. This agreement is highly satisfactory.

INDIAN SERVICE

The Indian Reservations in Nevada were set up by treaties that gave the Indians hunting and fishing rights. For other sportsmen, therefore, hunting and fishing are privileges subject to the will of the tribal councils. Fishing on Pyramid Lake within the reservation of the same name is allowed upon the payment of a fee to the Council. An agreement with the Fish and Game Commission provides for this regulation and, in return, the Commission is to plant fish in the lake.

The Walker River Reservation is open to bird shooting upon payment of a fee. The status of the reseeded lands on the north end of the lake is under controversy because non-Indians are using this area to hunt waterfowl. A decision as to the legal status of the land is expected from Washington soon.

WATER DEVELOPMENT AGENCIES AND WATER DISTRICTS

Through the concern of the U. S. Bureau of Reclamation for power and irrigation benefits, Nevada was committed to the destruction of the Pyramid Lake trout: The ultimate drying of this lake to the extent that there will be a total loss of fishing and recreation values on the lake and on sections of the Truckee, Carson, and Walker Rivers. Adjudication of the Truckee River by the courts awarded more water to commercial interest than flows in the river in many years. As a result, the $2,000,000 provided in the Prosser Creek Reservoir project for flood control and fish life can be used only to regulate the flow of the Truckee above the upper power diversion. Then the water will augment flows through existing turbines, leaving intermediate sections as dry as they were before construction of the Prosser Creek Reservoir. Only in parts of some years will water in excess of that awarded the users bypass the turbines and wet the dried-up channels.

Some people in both the Federal and State Governments should have been more alert. It is hard to visualize Nevada at this date agreeing to the drying of Pyramid Lake, or to the drying up of sections of its finest trout streams. It may not be too late to save the streams. Public Law 85–624, the Wildlife Coordination Act, passed August 12, 1958, will require reexamination of the wildlife features of the proposed Truckee-Carson project. This act provides that the Bureau of Reclamation must consult with the U. S. Fish and Wildlife Service with a view to the conservation of wildlife resources, preventing loss of and damage to such resources, and providing for the development and improvement of these resources in connection with water-resource development. The act also gives directives to federal agencies on this subject.

The Commission should pursue this opportunity with vigor, cooperating to the fullest extent with the U. S. Fish and Wildlife Service,

and attempt to secure the enactment of such Federal and State legislation as may be needed to maintain all of the resources of the State of Nevada.

Another complication is the apparent assumption of imaginative engineers that water power and oil-fired boilers will be the source of electricity for all time. A panel of experts at the Western Electronics Show and Convention at Los Angeles this year predicted nuclear power would be developed within 30 years. David Sarnof, head of Radio Corporation of America, recently stated: "In the 20 years ahead we will learn to extract atomic fuel from inexpensive materials, making this power both plentiful and economical."

More vision should be injected into the planning of the use of our natural resources before giving away recreation values for all time.

Some problems may arise from an agreement developed for Reclamation lands in the Stillwater area. After the Federal Wildlife Refuge was established and the Commission decided to develop a public shooting ground in the area, a 50-year agreement was executed with the Truckee-Carson Irrigation District, as custodian of the Federal lands, for development of the area for waterfowl. These lands are the sandy and alkali areas below the developed land of the Fallon project. They are watered by the drainage from the project, which in some years is not great. Nevertheless an excellent area for waterfowl exists in most years.

The agreement provides for the use and development of the area for waterfowl purposes, and it also provides that the State and the U. S. Fish and Wildlife Service will develop pasturage which would be rented by the Irrigation District to livestock owners and thereby reduce the assessments on the farmers within the District.

Apparently this agreement was accepted by the wildlife agencies with the thought that it would obligate the District to continue to allow water to flow into the area. This has some foundation in principle but not in law. Wildlife has no water rights. There appears to be a continuous hassle, the District complaining that the government agencies are not fulfilling their agreement. Some sportsmen have feared that the District could consider the agreement abrogated and cancel it. There should be no fear of this. The agreement is too loosely worded to justify cancellation without a complete lack of effort to comply with the stipulation. On the other hand there is a desire to comply with it because it seems to firm up the water supply.

The question we raise is this: The obligation is in effect a rental fee, and the Irrigation District is charging public agencies rentals on Federal land. The Wildlife Coordination Act passed by Congress this year surely does not indicate that its present intent is in that direction.

MILITARY AGENCIES

About a dozen military reservations in the State include 5,280,000 acres. Several are contaminated with unexploded shells, and the area used by the Atomic Energy Commission within the Tonopah-Las Vegas Bombing and Gunnery Range is, of course, closed to civilian entry. A small part of this range is opened for hunting deer and mountain sheep. An excellent agreement has been worked out with the Navy

on the Sahawave Gunnery Range; it provides that the area will be open to hunting on weekends. The Navy has posted the area, and the Commission has publicized the opening and the restrictions. This agreement is the best we have seen between a military branch and a fish and game commission. It should serve as a pattern for future cooperative effort.

THE LIVESTOCK INDUSTRY

Until a generation ago the use of range by big game did not appear significant. Numbers were low, and the number of hunters was seldom sufficient to cause complaint because of their shooting or disturbing livestock. Now big game numbers have trebled. They are making a notable impact on range in places, special shoots to control the numbers have been needed, and range capacity for deer has become a question.

Livestock operators are wondering where the increase in game use is going to stop, not only the impact on range but also the increasing number of hunters overrunning their range areas. They are asking "How many deer can Nevada support?" The answer to this one is simple: "Just about as many as it is supporting now, except a few less in abused areas." Nevada's ranges are well stocked with deer, most of the herds are undershot, and many winter ranges are being abused and cannot continue to carry herds of present size. In order that they be most productive we have recommended that the herds be kept at or below present numbers.

At this time there is resistance within the livestock industry to the recognition of range use by game animals. In one area stockmen opposed the participation of the Fish and Game Commission in range reseeding—apparently on the grounds that they didn't want the Commission to get its foot in the door. This is just sticking one's head in the sand and saying the deer aren't there.

With the thought expressed above that no more than the present number of deer should be maintained, the livestock industry can lose its fears, admit there are deer on the ranges and that they have an impact on range, and start planning to manage range use for all animals. In other words, the use is there and, if the use isn't evenly spread over the ranges, let's shuffle it around. If there is over-use, then let's reseed some areas with any kind of money we can scare up. If this doesn't do the job, we'll take off some of the animals that are responsible for the damage. What we are trying to say to the livestock industry is that we are not recommending additional range capacity. We want to see better management of the present use.

Our recommendation is that we recognize the use that is presently being made of the range, regardless of the kind of animals that are causing the impact, and that the Commission and the stockmen get together with public land agencies and agree upon the kind of management needed, adopt plans, and carry them out.

THE FARMER

As the number of hunters increases, the area of farm land closed to hunting seems to increase at a more rapid rate. There are a number of ways to utilize these game crops, but it is hard to anticipate that

any large part of the farmed area will ever be opened to general public hunting; in fact the areas will not produce sufficient game to justify more than special permit hunting.

The nearest approach is the Cooperative Game Management area. The State makes arrangements with landowners, manages the hunts, and determines the number of permits to be issued. This system usually provides good success to the fortunate applicants, harvests the game crop, increases sport, protects the landowner, and yields good information for management. On the other hand, the unsuccessful applicants are dissatisfied, the local sportsmen who had most of the shooting privileges are unhappy, and a lot of manpower is required. It is expensive and perhaps should be the responsibility of sportsmen's organizations to handle the job.

In places in other states such shoots have been handled by private organizations; one such was a church, another the town baseball team. Their members negotiated for the land, posted the farms accessible, sold arm-band permits in a limited number far in advance on a first-come basis, and patrolled the hunt. The main objections to these shoots has been inadequate patrol and flagrant trespass. They were financial successes when patrol was adequate. Otherwise sales dropped off in succeeding years as hunters found it was cheaper to trespass.

In the smaller valleys it will always be the responsibility of the individual or of a group to make his own arrangements for hunting on private land. A government agency can't do the job for him. In fact there is a question whether the agency should do it for him in any case, particularly when the expense is usually greater than the income.

In two areas, however, the State should definitely work. The first is in educating the hunters in the ethics of proper behavior with landowners. The other is in giving advice to landowners who wish to increase production of fish and game on their lands and in their waters.

INTERSTATE COOPERATION

There has been excellent cooperation among the States of Nevada, California and Arizona in developing uniform laws and regulations on the Colorado River. A Colorado River Wildlife Management Committee has been formed which meets each year. It also includes members of the U. S. Sports Fishing and Wildlife Service and the National Park Service.

This Committee has grown too big to work effectively and its tendency is to grow still larger as new problems present themselves. In addition there are suggestions to include up-river states in the group.

Our recommendation is to confine the efforts of the Committee to tri-state regulations and legislation and form other committees for other subjects.

CHAPTER XI

INFORMATION AND EDUCATION

A great disappointment in this study was the general public's lack of understanding of Commission policies and programs. Misunderstanding was particularly true of the sportsmen from the more populous areas; it seemed that knowledge spread better in the rural areas. Here people knew what the Fish and Game staff was doing, knew of the facts they were collecting, and had a better idea of the policies that the Commission had adopted. Elsewhere too much information was really misinformation, and this was less than a benefit to the standing of the Commission.

A number of suggestions received from the public could be readily recognized as not founded on fact. Others caused us a loss of time to run down what appeared to be poor policy when it actually was not policy at all. This is not stated to disparage anyone but to indicate that the Commission is not getting through to as many people as it should.

Two or more steps should be taken. First, all policy matters should be sifted from the various reports and programs, summarized, and gathered together with those that have been formally adopted. These stated policies should provide a basis for extension work which would afford a better public understanding of the direction the Commission plans to go.

Second, fish and game programs should be written up and made available to the Commission before its budget session. This type of material should be going to the public from time to time. The democratic processes need to operate more by foresight. Public action based on hindsight is tough on a Commission and its staff. They have just experienced some such action.

A third field, that of creating an interest in wildlife and an understanding of the principles of conservation, is being handled well by the staff, in public and sportsmen's groups and in schools. There is no end to the volume of this work that can be done but it is doubtful if the budget would permit any great expansion of the program.

Then there is the everyday job of answering inquiries by phone, by letter, and by personal calls. This causes a job load on each member of the organization, one the public does not recognize: 70,000 sportsmen can do a lot of talking and take up a lot of time.

In the field of day to day contacts with people, the Commission has developed a unique organization. Although the State is divided into districts, there is not an assemblage of all district personnel in a single office. Instead they are distributed among the communities within the district. They are, of course, placed near centers of work, but at the same time the personnel is at most times accessible to the people and is a part of most communities. This has resulted in some excellent relationships in the rural areas. We recommend the policy be continued. However, all of the staff need to fully understand their duties

in public relations. This, too, is a professional job, and some programming is needed to see that all policies are explained to the people interested and the program understood. The job comes naturally to many people, others need to be shown the job and to have it programmed. The Director should provide the leadership as needed.

In addition to the need for a full summation of policies, there is a need for an expansion of the bulletins on the wildlife of Nevada into a handbook type of publication for distribution to personnel, Commissioners, and members of county boards. Possibly the handbooks should go to schools and be distributed among sportsmen. Those already prepared for mammals and birds are too brief and contain little on management problems. The handbook should cover the essential information on the life history of each game species, the possibilities of habitat improvement, and the basic principles of the management.

A write-up for the chukar which presents our ideas has been prepared and furnished the Director.

CHAPTER XII

FACT FINDING

Research is a naughty word in sportsmen's parlance in Nevada. In some sections of the State, the word increases blood pressure of listeners, and casts doubt on the person who uses it. Yet all professional jobs must be founded upon a set of facts. New facts are ardently sought to strengthen the Nation's industries and defense. Wildlife management is a young profession, so young that many management principles have been adopted with little proven information as a foundation. What's more, Nature's laws are complex, difficult to ferret out, and sometimes seem conflicting. Ideas gleaned from hunting experiences and some hot stove conversation are not always enough to guide a million dollar business.

The orderly collection and analysis of observations is most essential to sound game management. Brood counts, strutting ground counts, young-adult ratios, and range sampling—done in the same manner and in the same places year after year—can give accurate pictures of trends and let wildlife managers give the County Game Management Boards a fairly true picture on which to base recommendations for the harvest. Most of the Boards recognize that such fact finding is giving them much better information from which to draw conclusions than they ever had before.

Not anglers' luck, but careful studies, resulted in the introduction of the threadfin shad and made bass fishing in Lake Mead famous across the Nation. Studies in Walker and Pyramid lakes are yielding fine results in rehabilitating the fishery in these lakes.

Clipping fins of fish that are to be planted and following up with a census of the creels tell fishery managers what sizes of different species to plant, and the facts reveal how Nature is doing at stocking of streams and lakes.

Then there are more fundamental questions that require more detailed attention, and often long-time, follow-up trials and analysis of errors as well as successes. What are the habits and needs of game animals? How seriously do big game and livestock compete for food? What is the role of predation: Is it perhaps beneficial on underhunted game ranges? How do we improve game habitats—food, cover, and water?

For example, recent work is showing that the nutritional level of big game is the key to production. Overstocked ranges produce less food and less game than those somewhat understocked. Probably, the utilization of critical ranges at the end of the grazing season will be the guide to optimum herd size. We need to know.

Next January 1, every 100 does will be carrying 170 embryos. By December they will have only 50 fawns; perhaps 10 or at most 15 of them will reach the hunters' bag. Are we losing 90 percent of our deer crop? We need some fact finding.

In fisheries we need to know how to rehabilitate our fine native cutthroat, why they hold their own in some lakes and not in others. Cutthroat developed in our waters should not be made to give way to other trout. We have some of the needed facts; we need more. We need more knowledge on the control of trash fish.

We have studied livestock raising for a hundred years and over. We have many years work to do in learning how to maximize the production of fish and game.

Several fact-finding projects being pursued in adjoining states should have application in Nevada. The proper use and regeneration of bitterbrush is being studied in Oregon, Idaho, Utah and California. The most ambitious project is in the latter state. There, tests of planting methods are being tried in three climatic belts. Other possible browse species are also being tried. The answers obtained in all of these states should be helpful in Nevada.

In Utah a cooperative wildlife research unit is studying the management of a deer herd and making experimental browse plantings on critical deer winter ranges. The Utah unit is also studying the diseases of big game animals. This work is supplemented by studies by the Utah Fish and Game Department on other range problems. Montana is also trying to find out some facts on the problem ranges of the mule deer.

The Utah unit is trying to learn how to census the chukar partridge. The Idaho unit is studying the productivity and management of the sage grouse. The Montana Unit is studying bighorn. The Idaho and Montana units are studying magpie predation.

The Forest Service Experiment Stations are working on livestock-big game conflicts, on browse revegetation, and on methods of sampling and measuring range vegetation and its use.

The Bureau of Sports Fishing and Wildlife is heading up a study throughout the western states on the mourning dove. This is an ambitious project because the bird migrates in large numbers between states. This Bureau is also continuing studies of predation and of the food habits of coyotes and bobcats in the western states.

All of the states are doing research on fish production in hatcheries and their survival after planting. Of particular interest is the study of the natural reproduction of the cutthroat by the Utah unit.

All of this work will be of particular value to Nevada and preclude the necessity of duplicating much of it.

Fundamental and long-time studies cannot be done by men engaged in administration of fish and game management. These require continuity of effort and cannot afford the risk of a studies technician having to rush off to a trouble shooting job or deciding that something else has higher priority.

Jobs like creel census and brood studies are a necessary part of administration. The basic studies, however, should be farmed out to the University or other research agencies under Pittman-Robertson and Dingell-Johnson projects. Another alternative is to create a Cooperative Wildlife Unit in cooperation with the University. This action was briefly explored and has possibilities. Such units exist in Oregon, Idaho, and Utah. We strongly recommend that this proposal be followed up to develop within Nevada a firm foundation for professional work in fish and game administration.

CHAPTER XIII

SUMMARY OF MAJOR RECOMMENDATIONS

Scattered throughout the previous chapters are recommendations for legislative action, and recommendations that may be accomplished by administrative decision. In order to facilitate a comprehension of the many recommendations, it has been suggested that they be combined together in one chapter. The report has been examined and every recommendation listed verbatim as follows:

Recommendations for Legislative Action

(1) It is the feeling of this study group that more consideration should be given to a smaller Commission.

(2) We believe in the continuance of the county boards, but believe their action should be advisory only.

(3) The survey team is opposed to increased legislative control of expenditures of the Fish and Game Commission.

(4) The survey team favors the prohibition or control of fish or game contests, it recommends the enactment of a statute, and recommends that it contain a clause that no more than a prize of nominal value be awarded in any case.

(5) A law should be enacted creating a five-man Fish and Game Commission, appointed by the Governor on a non-political basis, and for staggered terms. The Commission should have full authority over budgetary matters, seasons, and bag limits and broad policies only.

(6) In order to prevent domination of the Commission by any section, the law should state that no more than one Commissioner could serve from any county at any one time.

(7) In order to prevent powerful political forces, which might develop from dictating the appointments to the Commission, it is recommended that the following qualifications be met by any person who is a candidate for appointment.

(a) Must have had at least five years' interest and demonstrated service in wildlife affairs.

(b) Must not, during the year preceding the appointment date, have been a candidate for a local or state political office.

(c) Must have the endorsement of the statewide sportsmen's organization.

(d) Must have successfully demonstrated his ability in business or vocation.

(8) Commission members should be appointed at large so they may feel their statewide responsibilities and to eliminate any obligation to districts or local communities. The wildlife resource must be managed on the basis of the greatest results for the money expended, regardless of county, district, or local boundaries. The philosophy of the greatest good for the greatest number should apply in game and fish management, and this stipulation should be provided in the law. It is absolutely essential that well qualified persons be appointed to the Commission—men who are capable of rising above petty personal politics

and can serve the best interest of the entire State, not merely the local communities in which they live. The success or failure of wildlife resource management in Nevada will depend upon the ability and quality of those serving as Commissioners.

(9) Commission members should be unsalaried but should be allowed adequate traveling expenses, and should not be bound by per diem limitations for salaried state employees unless such limitations still allow proper reimbursement. Commissioners who receive no compensation should be able to perform this public service at no out-of-pocket expense to themselves.

(10) There should be created a Nevada Department of Fish and Game charged with the direct responsibilities of carrying out the policies of the Commission. The administrative authority heretofore held jointly by the Commission and county boards should be vested in the Department. All fish and game properties held by the counties should be turned over to the Department for administration.

(11) There should be created a position of Executive Director of the Nevada Department of Fish and Game. The Executive Director should have the following duties and responsibilities:

(a) To carry out policies of the Commission.

(b) To have complete administrative authority over Department activities and personnel.

(c) To enforce laws and rules and regulations of the Commission.

(d) To prepare a budget for Commission approval or modification.

(e) To supervise all officers and employees of the Department.

(f) To gather factual data and information on the status of game and fish for presentation to the Fish and Game Commission as an aid in setting the seasons and bag limits.

(g) To plan a long-range program of fish and game management for the approval of the Commission.

(h) To collect license revenues and to make disbursements according to the budget approved by the Commission.

(12) Fish and game management is a science requiring skillfully trained and competent personnel. To maintain professional standards, it is recommended that the Director be included in the classified service and that the following minimum qualifications be written into the law creating such a position:

(a) Graduation from an accredited college or university with a degree in wildlife management or related subjects.

(b) At least 10 years of paid experience in the wildlife field, the last five years of which the applicant must have held progressively responsible positions in the field of fish and game management.

(c) The incumbent should be removed from office only for inefficiency, neglect of duty, or misconduct in office after a public hearing before the Personnel Commission.

(13) That a law be enacted creating a "Sportsmen's Advisory Council," composed of 17 members which might be developed in one of several ways, one of which would be to have a member of each county game management board serve as a member. The Council would be charged with the responsibility of establishing and maintaining a close liaison between the Fish and Game Commission and presenting the wishes of sportsmen and local communities at the grass root level.

The law should provide that the Advisory Council meet with the Commission as frequently as is necessary. In order to assure full participation, individual members should be paid their traveling expenses for a maximum of two meetings per year. The Fish and Game Commission should allow the Advisory Council sufficient time on its agenda to discuss whatever business is desired or recommendations to be made. The Commission should attempt to develop policies sufficiently in advance of Council meetings to give the sportsmen of the State sufficient time to study proposals and make comment before final action is consummated. Wherever possible, the Department of Fish and Game should furnish factual data and information to the Council upon which wildlife programs will be developed, and seasons and bag limits set.

(14) Rewriting some of the fish and game laws of the State to provide clarification, eliminate conflicting clauses, and to state more accurately the intent of the law with regard to the responsibilities of the Commission and the county game management boards. The Commission staff can give references to the sections involved. This job should not be confused with any attempt to write new laws, otherwise the job would not get done.

(15) Providing per diem rates in the form of salary or expense reimbursement to the members of this and perhaps other state commissions, whereby they would be fully compensated and could enjoy the kind of food and lodging justly due leaders in the State Government.

(16) Provision should be made for the Commission to employ or otherwise be provided with special legal council.

(17) A five- or seven-man Commission, each member with a statewide perspective.

(18) Their duties should cover budgetary matters, seasons and bag limits, and policy making. With a Commission of smaller size there should be no more than one member appointed from any one county. This could be included in the legislation. However, the State should not be divided into districts. There should be an informal understanding as to general areas concerning which individual Commissioners have a better knowledge, and whose opinions on these would demand respect. However, these areas could change with succeeding appointments.

(19) The code should provide for their appointment by the Governor, and the staggering of terms so that no one Governor would appoint a majority.

(20) There should be created a Department of Fish and Game which would administer the policies of the Commission and the fish and game laws and become the administrative body in fact.

(21) Nevada should eliminate the administrative authority of the county game management boards. They should be advisory with the Commission empowered to take all necessary action.

(22) We favor continuation of the present budgetary system which provides flexibility with the budget.

(23) Changing the state laws to provide for issuance of licenses on a fiscal year basis will further help to simplify accounting for license receipts.

Recommendations That May Be Accomplished by Administrative Decision

(1) Management must perfect the ability to determine harvestable surpluses accurately and provide full opportunity for the taking.

(2) More adequate surveys are needed, particularly of big game ranges and waterfowl areas, both those proposed and those under development.

(3) A broader fact-finding program is a prime need for full production of wildlife in Nevada.

(4) A fresh look is needed at the size of the administrative job in fish and game.

(5) Have staff members make proposals for a five-year program.

(6) Study habitat carefully before making additional plantings of chukar and quail.

(7) Abandon the costly game farm for chukar and pheasant.

(8) Install additional bird watering devices in carefully selected places.

(9) The program for mapping potential range for chukar and Gambel quail should be stepped up.

(10) Continue waterfowl flyway studies and development of Stillwater project.

(11) Survey state to select land acquisition areas for public shooting grounds.

(12) Continue beaver program.

(13) Install either-sex deer law for herds already too large for their ranges; acquire deer winter range where needed.

(14) Capitalize on opportunities to increase antelope and mountain sheep.

(15) Abandon introduction of elk.

(16) Concentrate predatory animal control in areas where game herds need building up.

(17) Study hatchery and fish planting programs to get essential facts.

(18) Study reservoirs not yet covered.

(19) Study and act on pollution, especially by mining industry.

(20) A biologically sound program, meshed with the problems of land ownership and landowners' attitudes and aims will, beyond doubt, be required. On the whole, perhaps the most important forward-looking steps, other than further centralizing authority, would be to build up the corps of professional workers to develop a strong fact-finding program and to work hard at securing public understanding of Commission policies and programs.

(21) Two out of three favored continuation of the Information and Education program. The study endorses this policy.

(22) It is recommended that qualified fish and game managers be selected for the principal field positions, with specialist technicians to assist them in performing all the functions and duties of the Department. The conservation officer should have the necessary qualifications to complete in a satisfactory manner most if not all of the operational needs of the Department.

(23) Fact-finding jobs should be supervised and directed by the staff officers. Basic research should be carried on by the University of

Nevada or other accredited agencies by cooperative agreements or contracts. Technicians working on applied research should devote their principal efforts toward improving techniques of gathering factual information on the game and fish resource and management and in demonstrating these improved methods to the conservation officer in order that he may obtain more reliable information from the area he serves.

(24) The applied research, or fact-finding program should be designed to develop techniques which will provide irrefutable facts with which to answer sportsmen's questions and take wildlife management affairs out of category where opinions must be used for a guide.

(25) We should not get into the trap of having a policy that requires demonstration of range damage to justify antlerless shoots.

(26) It is proposed to shuffle positions with the result that the position of Assistant Director is eliminated and the duties reassigned to appropriate divisions. The job of Acting Director would then be rotated among Division heads.

(27) Realign federal aid work eventually, assigning game and fish functions to the respective divisions.

(28) Create a new position of Warden-Pilot if qualified personnel can be found.

(29) Eventually assign automotive equipment management and building construction and maintenance to the Division of Engineering. This is not timely at present.

(30) Assign the safety program and disposal of surplus property to the Administrative Services Division.

(31) Prepare organization charts for the Director and his staff group and for each district organization. Distribute copies of these charts to all employees concerned. Revise such charts annually, or as often as may be necessary to keep them reasonably up to date.

(32) Periodically review the staff divisions and district organizations. Adjust as necessary to avoid conflicts, to take care of new responsibilities, to equalize workloads and responsibilities, and to keep in tune with changing times.

(33) The Director should be able to follow through all the way and spend less time on jobs which can be turned over to his top assistants. He should concentrate on high level contacts, long-range planning, coordination of staff work, and over-all supervision to see that basic laws and policies are followed.

(34) That the Commission develop realistic long-range (five-to-ten-year) plans and goals for the management of the fish and game resources of Nevada.

(35) That the Director and his staff set up annual programs of work to accomplish the long-range objectives established by the Commission.

(36) That the Director determine and adjust the manning (based on realistic estimates of workloads for divisions and districts) of the Administrative units of his organization as necessary to accomplish the Commission's long-range program.

(37) That uniform work planning and scheduling procedures be designed by the Director and used effectively by the divisions, and on

the districts to get maximum day-to-day accomplishment of high priority work.

(38) That periodic checks be made on the travel of all field personnel by their superiors to insure that (a) it is all necessary and (b) that it is well planned.

(39) It is suggested that a summary of allocations by districts be prepared and set up on a simple form to give a complete picture of district finances at a glance.

(40) Provide one full-time clerk-stenographer for each district headquarters to reduce the amount of clerical work now done by administrative and professional people and allow them more time for higher caliber fish and game jobs in the field.

(41) Study the filing scheme critically and streamline it as much as possible.

(42) Review all forms in use, standardize them and eliminate duplication or obsolete ones. Set up a system of tight controls on any new forms added.

(43) Get a bookkeeping machine for use in the accounting section.

(44) The Commission should seriously consider building an office adequate to take care of present and unforeseeable future needs.

(45) Strengthen the system of consolidating Fish and Game purchases statewide. Operate on a planned basis.

(46) Provide adequate storage or locked enclosures for protection of official automotive equipment where needed, particularly at Reno.

(47) Issue written permission to staff for storing state cars at their homes and specify conditions.

(48) Revise the base for rentals charged employees for occupancy of state-owned dwellings.

(49) Set up and maintain a good directives system (looseleaf manuals or handbooks) which will cover all operating policies and procedures used by the Commission and the administrative employees.

(50) Make more integrated inspections of field activities. Reduce the frequency of some of the routine functional inspections. Record the findings and recommendations of all inspections in writing in a clear, concise, and constructive manner. Provide copies for all personnel concerned. Keep in mind that training is a part of inspection.

(51) Expand the use of radio for field employees as much as possible. When funds are available to install the needed equipment, get a separate frequency for the Commission, distinct from other state agencies. Maintain a central set at the Director's office.

(52) The Chief of Information and Education feels that an interdepartmental newsletter should be prepared at two-week intervals. This sounds like a good idea, but may be too frequent.

(53) The Elko Fish Hatchery in Ruby Valley site offers the best possibilities for expanding trout rearing operations. The present capacity could easily be doubled if and when justified on the basis of statewide requirements. Such expansion would only be justified under full state, and not county control, as at present.

(54) The Verdi and Spring Creek State Fish Hatcheries are fairly efficient units, but certain improvements at each will increase their fish rearing capacities considerably.

(55) The Washoe Fish Hatchery in Idlewild Park should be abandoned and its fish cultural activities transferred to the Verdi and Elko hatcheries.

(56) The Washoe County Ponds are productive units but without an adequate water supply. Steps should be taken toward finding a more suitable site or an additional source of cold water.

(57) The efforts toward development of cutthroat brood and planting stocks at the Smith Valley Station are commendable and worth the cost as another major and necessary step toward saving the native Nevada cutthroat trout from extinction, as well as improving its availability for stocking Nevada waters.

(58) From the evidence derived from test stocking, it is recommended that less emphasis be placed upon stocking reared, hatchery trout. More emphasis is recommended for work aiding and abetting the contribution of wild, naturally propagated trout to anglers' catches. A fact-finding study should be instituted under Dingell-Johnson funds to find out more precisely the contribution of wild fish.

(59) The planting of larger numbers of reared, hatchery trout into lakes and reservoirs is recommended along with a parallel reduction in the numbers stocked in streams. That reduction in stream plants can be made is evidenced by the stream sampling tests. Hatchery fish grow and really become "wild" fish in lakes and reservoirs, but stocking them in streams often leads to the vicious "put and take" cycle that results in anglers following planting trucks and highly competitive fishing along with a general lowering of the quality of angling.

(60) To parallel the recommendation made in item 11 above, it is recommended that an experimental program be developed for stream improvements that are badly needed in Nevada. A mobile crew of four men could be used to set up "demonstration streams" in the various districts where different types of improvements could be installed and tested under controlled conditions. Such work will pay off better returns in the long run that planting more hatchery fish.

(61) Adequate flows must be set aside for maintenance of fish life in the Truckee, Carson and Walker Rivers and Pyramid and Walker Lakes.

(62) Many winter ranges and some summer ranges are being abused by deer or by deer and livestock. The Commission staff should locate and map these and determine the degree of over-use that is taking place.

(63) Means should be found to maintain and rejuvenate browse ranges that are going down the road to destruction.

(64) Deer are far undershot. Hunters are not beginning to take the full crop. In the past ten years Nevada probably reared close to a million deer. Hunters took less than one-fourth of them. The rest went down the rat-holes of starvation, disease, etc.

(65) A sound program of deer management must be based on accurate knowledge of deer and their ranges. The Commission has been criticized for having too many technicians, especially in the big game field. Actually, more manpower is needed to do the job at hand.

(66) Upland game is grossly over-managed with a superabundance of seasons and bag limits and other restrictions. Fortunately there are only 17 counties.

(67) Seasons should be more uniform on all species throughout the State and adjustments to fit annual production should be made by varying the bag limit.

(68) The Nevada Commission has made a good start upon a waterfowl management program. Seven areas have now been acquired, totaling 225,663 acres. Five of the seven existing areas are clustered within 100 miles of Reno. One area is in southern Nevada near Las Vegas, Railroad Valley in the east central part of the State is small and affords very limited habitat.

(69) A statewide program of acquisition and development of additional management areas should give consideration to a more general distribution of these areas statewide. Further clustering of additional areas in the west central part of the State is not in the best interest of sound waterfowl management. What is actually needed to best manage waterfowl in Nevada and where management areas could be located to accomplish this objective are basic questions for consideration.

(70) Development of a sound management plan for each area should precede any expenditure for development of area. It should not be hit and miss. More time or assistance is needed by the waterfowl technicians to do the necessary biological and physical evaluation of the areas and to work out a sound management plan for the development of acquired areas. The members of the Commission staff assigned to waterfowl management are sound, well-trained, dedicated workers who recognize the problems and know how to solve them. But they are spread out too thin, shuttled into too many duties to do the kind of a job they are capable of doing.

(71) Far more engineering and designing is needed for the best development of acquired areas. The management plan developed by waterfowl management technicians should show what is needed, adequate engineering will show how to secure the management objectives and provide the blueprint for construction. Would anyone think of investing half a million dollars in a building without sound plans drawn by an architect? A waterfowl area is no different in principle. More engineering help is needed by the Commission to secure adequate plans. It is humanly impossible for the present small staff to provide the necessary engineering for all phases of the Commission's program.

(72) There is need for a definite procedure for land acquisition that will permit purchase of land at a fair value. One such procedure is suggested.

(73) The Overton Management Area should be carefully examined and evaluated and the soundness of any development plan determined so far as is possible before any additional funds are expended for further development. Immediate expenditures could best be for solution of the difficulties now encountered.

(74) A caution flag should be raised against dashing all over the state trying to acquire more areas than can be handled or financed. Better select fewer, sound projects and push them to an orderly completion.

(75) Further development of the Mason Valley, Humboldt Sink and Fernley areas should be preceded by over-all development of plan of management and engineering.

(76) The sportsmen and the Commission should keep open the question of the degree of law enforcement desired. If the drain from poaching becomes excessive, the needed action should be proposed.

(77) The study group, with its rather limited knowledge, does not recommend increased law enforcement effort at this time. It does, however, recommend a law enforcement chief who might handle the combined job of Warden-Pilot.

(78) Neither the land-managing agencies nor livestock operators have fully considered the impact of existing numbers of big game animals on the range. We want to stress a point that we are speaking about the herds already on the ranges. They are there; they are consuming forage, and regardless of any future policies, they should be recognized as an impact on range and their forage requirements considered.

(79) Nevada's ranges are well stocked with deer, most of the herds are undershot, and many winter ranges are being abused and cannot continue to carry herds of present size. In order that they be most productive we have recommended that the herds be kept at or below present numbers.

(80) Our recommendation is that we recognize the use that is presently being made of the range, regardless of the kind of animals that are causing the impact, and that the Commission and the stockmen get together with public land agencies and agree upon the kind of management needed, adopt plans, and carry them out.

(81) Two or more steps should be taken. First, all policy matters should be sifted from the various reports and programs, summarized, and gathered together with those that have been formally adopted. These stated policies should provide a basis for extension work which would afford a better public understanding of the direction the Commission plans to go.

(82) Second, fish and game programs should be written up and made available to the Commission before its budget session. This type of material should be going to the public from time to time. The democratic processes need to operate more by foresight. Public action based on hindsight is tough on a Commission and its staff. They have just experienced some such action.

APPENDIX

TEST SHOCKING ON SELECTED STREAMS IN NEVADA

Submitted September 30,1958

The following materials are included below:

(a) Comparison of A.C. and D.C. generators in sampling fish in Kingston Creek, Elko County.

(b) Number of trout per mile of stream in Birch Creek, Lander County.

(c) Number of trout per mile in Soldier Creek, Lamoille Creek, and South Fork of the Humboldt River in Elko County.

KINGSTON CREEK, LANDER COUNTY

The stations selected for shocking are numbered in sequence from Station 1 in the headwaters, to Station 7 on the Jones Ranch at the mouth of the canyon.

The techniques used were as follows: A stop-net was first carefully placed across the lower end of the stream section to be shocked in order to catch any fish that might be stunned or to prevent unstunned fish from escaping downstream. The generator being used was then started and the electrodes were placed in use shocking upstream or downstream, depending upon the amount of bottom silt and mud. In silty bottoms we usually work upstream in clear water where the fish can be seen while the mud and silt disturbed by walking is washed downstream below the operator.

At Stations 1 and 2, the direct current (D.C.) shocker was used first in each case. After collection, the fish were held in a live box, counted and measured, and returned to the same section alive. Then the alternating current (A.C.) shocker was used and the same procedure followed. At Stations 3 and 4, the A.C. was used first, followed by D.C. The first use of either A.C. or D.C. current could produce a difference in the results obtained in that both the fish and the habitat are much stirred up by the first operation. This was especially true at Station 3 where A.C. was used first and where the weedy, muddy bottoms were much disturbed by walking over the streambed. Further, the A.C. current may have killed a few small trout which, if alive, would have been drawn to the anode of D.C. system.

Air and water temperatures were collected during the shocking along with notes on each type of habitat relating to average width and depth, speed of current, volume of flow, bottom foods, plant beds, if any, and other features. These data will not be presented here in detail except where it is felt such factors influenced the numbers of fish obtained with each type of shocker.

Station 1

Station 1, the first stream section shocked, was 100 feet in length and located close to a sign, "Spring Canyon," at the upper end of

Kingston Creek. Here the stream is small, averaging about 3½ feet in width, with but little shelter, being largely flat, shallow riffles. Here both types of shockers produced exactly the same number and size of trout; namely, one 6-inch and five 2–4-inch eastern brook trout.

Station 2

Station 2, the next station downstream, was located just below a bridge and road that led to some tent frames and cabins on the west side of the stream. It was 60 feet in length. The volume of flow was at least three times as much as was present in the upper section and there was an abundance of thick aquatic plant beds *(Potamogeton)* and filamentous algae. The results obtained here with each type of shocker are listed below:

STATION 2—KINGSTON CREEK TEST SHOCKING

Size of Fish (inches)	Eastern Brook Trout		Brown Trout		Hatchery Rainbow	
	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.
0– 2	4	1	0	0	0	0
2– 4	3	4	13	20	0	0
4– 6	3	4	0	0	0	0
6– 8	1	1	2	6	0	0
8–10	0	0	0	0	1	1
10–12	0	0	0	1	0	0
Totals	11	10	15	27	1	1

The A.C. generator took 27 fish here while the D.C. took 38. The results were approximately the same with each shocker except with the brown trout. The D.C. generator took seven more 2–4-inch browns and four more in the 6–8-inch group than the A.C. machine. The reason for this is easily explained. In dense weed beds or under cut-banks, stumps, or logs where one cannot see, both because of turbidity and angle of vision, the A.C. generator stuns fish that simply lay there unobserved by the operator, while the D.C. current pulls them out of such places directly to the positive electrode at the surface of the water where they are easily seen and netted by the operator. The directive action of the D.C. current in forcing fish, in spite of themselves to swim directly toward the positive electrode, is a great advantage when working in weedy, muddy, slow-water stream areas. As will be shown later, in swift riffles, the stunning action of A.C. current is advantageous where the rush of the water immediately sweeps them downstream into the stop-net at the lower end of the section where they are easily captured.

It was also noted that the A.C. current frequently kills fish, and five were found dead after its use at Station 2. D.C. current can also kill fish if they are not netted promptly and removed from the electric field.

No wild rainbow trout were taken here but one obviously hatchery-reared rainbow was collected. It is easy to distinguish 8–10-inch wild rainbow from hatchery-reared rainbow trout by their coloration, fin erosion, and other characteristics. It is also easy to recognize pure cutthroat from pure rainbows as well as hybrids between the two.

Station 3

This station was located approximately one mile below Station 2. It was in an open pasture-meadow area where the stream abounded in watercress *(Nasturtuim)*, moss and other plants. The flow was moderate over mud and silt bottoms, except in the riffles. The shrimp *(Gammarus)*, an excellent trout food, was abundant. Here the A.C. shocker was used first, followed by D.C. The length of stream shocked was 100 feet. The results were as follows:

STATION 3—KINGSTON CREEK TEST SHOCKING

Size of Fish (inches)	Eastern Brook Trout		Brown Trout	
	A.C.	D.C.	A.C.	D.C.
0– 2	0	9	0	0
2– 4	10	12	1	0
4– 6	28	33	0	0
6– 8	15	29	2	1
8–10	2	1	0	0
Totals	55	84	3	1

The total trout taken with the A.C. shocker was 58, while the D.C. current produced 85. The results clearly indicate the advantage of using a D.C. shocker in weedy, muddy, shallow, slow-flowing waters where it is difficult for the observer to see the fish. If the D.C. had been used first here instead of the A.C., the chances are the former would have produced even more than the 85 trout taken, because some of the fish present might have been killed by the use of the A.C. and, hence, were not affected by the D.C. current.

The trout collected from the 100-foot section of Station 3 indicate a tremendous population to be present. Using the numbers taken with the A.C. shocker, the population would total 3,004 trout per mile of stream. If the numbers taken with the D.C. are used, they would total 4,403 per mile of such stream.

Station 4

Station 4, the last station where the two types of electric current were tested, was 75 feet in length. It was located just below the bridge over the road leading into the Kingston Forest Camp Ground. This station was quite different from Stations 2 and 3 above. Instead of a fairly slow, quiet, meandering stream, the water flowed swiftly over a rubble and coarse gravel bottom. Rooted aquatic plants like watercress were absent and only swift-water-dwelling algae was present. The stream both above and below the actual sampling area is covered by a dense growth of birch, willows and other plants, making it difficult to reach with a rod. Such areas provide fine escape shelter for spawning adults and, no doubt, aid in the contribution of naturally spawned, stream-hatched fishes to the creel. The results of sampling at Station 4 follows:

STATION 4—KINGSTON CREEK TEST SHOCKING

Size of Fish (inches)	Eastern Brook Trout		Brown Trout		Wild Rainbow Trout	
	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.
2– 4	6	6	0	0	1	1
4– 6	5	3	0	0	1	0
6– 8	2	1	1	0	2	*5
8–10	0	0	0	0	1	2
Totals	13	10	1	0	5	8

Here, A.C. current took a total of 19 trout, while D.C. produced 18 fish. These data confirm the point made earlier that A.C. current probably is more accurate for collection of fish from swift water than D.C.

The fact that the figures obtained by myself and students are generally much higher than those given in the Frantz-King Report does not invalidate those presented in the latter for several different reasons. In the first place, those in the Frantz-King Report are based upon many more samples than ours which were taken at different times of year and in different years. In other words, the table on page 16 of the Frantz-King Report reflects the combined data over a period of several years and, for this reason, is much broader and more inclusive than ours. We may have hit Kingston Creek in a peak year. Trout, like many animals, display cycles of abundance and scarcity. At Sagehen Creek near Truckee, California, for instance, where we have been sampling 10 stream sections a year for seven years, a severe flood in late 1955 destroyed the eggs of fall-spawning browns and brooks so that the 1955 age-class of these species was almost completely wiped out. Other factors such as cloudbursts, severe winter conditions, diseases, and parasites can cause abrupt and severe reductions in populations. Another factor that is of importance is the amount of fish planting in 1958 prior to the time the sampling was done.

The following discussion covers the details of the conditions under which Stations 5, 6, and 7 were run on Kingston Creek using only D.C. current.

Station 5

This station was located about one mile below Station 4 in a swift water, semi-exposed section closely covered by willows, nettles, chokecherries, sweet clover, thistles, and rabbitbrush. The section sampled was 50 feet in length. The character of the stream here was much like that at Station 4.

STATION 5—KINGSTON CREEK TEST SHOCKING

Size of Fish (inches)	Eastern Brook Trout	Wild Rainbow Trout	Rainbow X Cutthroat Hybrids
2– 4	0	1	1
4– 6	0	1	0
6– 8	1	1	1
8–10	0	1	0
10–12	0	0	1
Totals	1	4	3

*This figure includes 3 rainbows that were observed to bypass the downstream stop-net.

The table on p. 156 shows that a total of eight fish was taken from this 50-foot section. Five of these were over six inches in length. Expansion of these data to a per-mile basis would show 528 fish over six inches, or 845 per mile when both large and small fish are included. No hatchery-reared trout were taken, the rainbows and rainbow x cutthroat hybrids being derived from natural spawning in the stream.

Station 6

This was located 0.8 of a mile below Station 5 in an area consisting of three large, deep pools right next to the road and from the paths and other signs. This point in the stream is evidently fished intensively. The stream here is quite open near the water but is shaded above by a canopy of tall birch trees lining the banks. From the standpoint of ease of angling, this section was one of the few we observed on lower Kingston Creek where almost impenetrable brush did not blanket the stream.

The following fish were taken:

1—2–4-inch Eastern Brook Trout
1—4–6-inch Wild Rainbow Trout
1—6–8-inch Wild Rainbow Trout
1—2–4-inch Wild Rainbow X Cutthroat Hybrid
2—6–8-inch Wild Rainbow X Cutthroat Hybrid
1— 13-inch Brown Trout

Total—— 7

The three large, deep pools here must have been pretty well fished-out to produce only four trout over six inches from 75 feet of stream. The cool shade here, ease of angling and deep pools must attract many fishermen and proof of this lies in the few large trout taken.

Station 7

This station was at the lower end of Kingston Creek where it emerges from the canyon on the Jones Ranch. More precisely, the section was about one-quarter of a mile below the road leading into the Jones Ranch on the north side of the valley close to the main road. Here the stream flows at a moderate pace down a fairly deep, man-made ditch lined by dense growths of willows, rosebushes, vines and other vegetation. The section shocked was 75 feet in length.

STATION 7—KINGSTON CREEK TEST SHOCKING

Size of Fish (inches)	Brook Trout	Wild Rainbow	Rainbow X Cutthroat Hybrids	Brown Trout
2– 4	1	4	0	0
4– 6	2	1	0	0
6– 8	0	3	0	0
8–10	1	1	1	0
10–12	0	0	0	0
12–14	0	0	0	1
Totals	4	9	1	1

A total of 15 trout was collected, of which seven were over six inches. One was a beautiful 13-inch brown trout that would make any angler happy with it in his creel. Conversion of these data into numbers per mile produce a high figure of 493 fish six inches or longer with total trout summing to 1,056 per mile.

BIRCH CREEK, LANDER COUNTY

NUMBER OF TROUT PRESENT PER MILE OF STREAM

One section only was shocked in this stream which waters ranches north of Kingston Creek. The section selected was in an old burn just below a fence line that bisects the stream in about its midsection. The stream here is uninviting in appearance, with many dead, partially burned snags along the banks, fairly shallow, sandy pools but with good shelter provided by piles of debris, stumps and dead willow clumps. Prior to shocking, we anticipated that this rather unattractive bit of stream would have a poor population. But its appearance was highly misleading, for, out of this small brook averaging four feet in width, we captured 41 trout from a 54-foot section. Of these, 37 were brown trout, 2 were wild rainbow, and 2 were hatchery-reared rainbows. No eastern brook trout, cutthroat, or cutthroat x rainbow hybrids were taken. Of the brown trout, 22 were less than six inches, which indicates much natural propagation is going on in Birch Creek by this species.

The amazing fact here is that, of the 41 fish taken, 19 of them were over six inches (15 browns, 2 wild, and 2 hatchery rainbow). Expanding these data to a per-mile basis gives figures for total fish of 4,008 per mile and, for fish over six inches, of 1,857 per mile. Assuming that Birch Creek is equally well populated in other areas not shocked by us, I would say that this stream is overpopulated with trout for its size and, rather than being stocked with additional hatchery fish, it should be fished more heavily to reduce the population to keep it within the limits of its food supply. Some of the larger fish were somewhat thin and skinny, indicating that competition was fierce for available foods and a reduction in numbers by more intensive angling would improve the condition of those surviving. The following table summarizes the results of the Birch Creek shocking:

BIRCH CREEK TEST SHOCKING
Fish Shocked From One 54-foot Section

Size of Fish (inches)	Brown Trout	Wild Rainbow Trout	Hatchery-reared Rainbow Trout
2– 4	12	0	0
4– 6	10	0	0
6– 8	8	1	0
8–10	5	1	0
10–12	2	0	2
Totals	37	2	2

SOLDIER CREEK, LAMOILLE CREEK AND SOUTH FORK OF THE HUMBOLDT RIVER, ELKO COUNTY

Number of Trout Per Mile of Stream

Following completion of the work in Lander County, we moved to Elko County to test-shock in Soldier Creek, the Lamoille Creek and the South Fork of the Humboldt at the town of Lee.

SOLDIER CREEK, ELKO COUNTY

A 45-foot section was sampled about a mile above the canyon mouth with the following results:

SOLDIER CREEK TEST SHOCKING

Size of Fish (inches)	Eastern Brook Trout
0– 2	2
2– 4	2
4– 6	6
6– 8	3
8–10	2
10–12	1
Total	16

A total of 16 eastern brook trout was taken at this station. Of these, six were over six inches in length. There were three pools in the section, one very good one at the head from which 14 of the 16 fish were taken. The other two pools were wide and shallow, offering poor shelter for fish and only two fish were obtained from one of these pools.

This sample expanded would run 1,877 in total numbers, or 704 fish above six inches per mile of stream.

Don Seegrist fished while the shocking was in progress and he caught eight eastern brook trout in 1½ hours of fishing, which gives a return rate of catch over 5.3 fish per angling hour. Don is an expert angler but even he could not have taken fish so easily unless they had been abundant. Another point should be made here and that is that the equatic insect foods were quite scarce in Soldier Creek. A poor food supply, coupled with an abundant fish population, would naturally tend to keep the trout hungry, so they would bite readily. The stream is in need of heavier fishing rather than any further stocking, at least for the present.

LAMOILLE CREEK, ELKO COUNTY

September 8, test shocking was done in the Lamoille Creek at one station just above the bridge that leads over the stream to the Boy Scout Camp. Two large pools were sampled over a distance of 50 feet.

Only two eastern brook trout were taken, one of which was in the 6–8-inch group and the other was between 2 and 4 inches in length. In other words, the Lamoille Creek, at this heavily fished location, was practically fished out. Recalculation to a mileage basis, this sample represented only some 211 trout of all sizes per mile of stream, which is far below other population estimates given here.

Don Seegrist and Bob Behnke fished a total of three hours and caught only three fish, which gives a rate of 1.0 fish per angling hour. This provides further evidence of the lack of trout in this stream at the close of the summer angling period.

Examination of Lamoille Creek above the shocking station in beaver dams near the Forest Camp, revealed fair numbers of eastern brook trout. These occurred under masses of logs and debris in situations where it would be almost impossible to take them with a rod. Like Soldier Creek, bottom dwelling foods were scarce. In fact, this seems to be generally true of streams draining the west side of the Ruby Mountains. All are fairly steep in gradient with much granitic sand and boulders. The sand scours the streambed during flood periods, thus grinding up and destroying much of the bottom fauna upon which trout are dependent for food.

SOUTH FORK OF THE HUMBOLDT RIVER, ELKO COUNTY

A single-shocking station was run on this stream in one large pool just below the bridge at the town of Lee. Only a 50-foot section of undercut bank on the north side of the pool was shocked. On the opposite side, the bottom "feathered" up to a gravel bar, offering no shelter whatsoever for trout. The fish taken here was an "eye-opener," to say the least. We captured 20 trout, of which 17 were eastern brook and three were rainbows. The surprising thing was that 18 out of the 20 trout caught were above six inches in length. The following table lists the fish collected:

SOUTH FORK, HUMBOLDT RIVER TEST SHOCKING

Size of Fish (inches)	Eastern Brook Trout	Hatchery-reared Rainbow Trout
4– 6	2	0
6– 8	7	0
8–10	2	0
10–12	6	3
Totals	17	3

No brown trout, wild rainbow, or hybrid rainbow x cutthroat were taken. Three of the eastern brook trout and two of the rainbows had clipped dorsal fins, indicating they were marked fish planted from hatcheries. These made up some 28 percent of the 18 fish that were over six inches. A few fish were missed in the shocking so the figures above may be considered minimal estimates.

While Needham and Gard did the shocking, Seegrist and Behnke fished. They caught three nice trout, two brooks and one rainbow, all over 10 inches, in a total of one hour of fishing. This gives a return rate of 3.0 trout per angling hour, which is excellent angling.

Folks in the town of Lee must not fish very much, for to find 18 trout under one cutbank, in one pool, all over six inches, and nine of them over 10 inches, would be an answer to most anglers' prayers. Here, again, we saw another fine Nevada trout stream badly in need of heavier fishing.