

# **Awareness by New Hampshire Anglers and Hunters of Resource Management Agencies, Programs and Funding Sources**

## **Comparison between 1994 and 1999 Hunting and Fishing License Holders**

Prepared for

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## **Introduction**

In 1996, the U.S. Fish and Wildlife Service funded a survey to determine how knowledgeable New Hampshire anglers and hunters were about various resource management agencies and programs (Loomis 1996). More specifically, the study investigated their general awareness of agencies, and how much they knew about agency responsibilities, activities, and funding sources. Results indicated low levels of awareness of the Federal Aid in Sport Fish and Wildlife Restoration Program among New Hampshire hunters and anglers. This study suggested that, in order to increase awareness and support for this program, outreach efforts targeting these important constituency groups (i.e. anglers, hunters and boaters) be developed and implemented.

Utilizing results from that research, New Hampshire Fish and Game Department (NHF&G) implemented a five-year outreach program that began in October 1997. In January 1999 NHF&G hired a full-time Outreach Specialist to coordinate this effort. The objectives of this five-year outreach grant were to increase awareness among New Hampshire residents of the existence of the Federal Aid in Sport Fish and Wildlife Restoration Program and of the importance of this program to fish and wildlife resources in the state. Since 1997, NHF&G has used a variety of media to communicate this outreach message including the Internet, television, news releases, brochures and flyers, calendars, fishing guides, videos, maps, stickers, pins, poster displays and exhibits. Depending on the specific media type, some or all of following messages are conveyed to the public in NHF&G outreach materials:

- Identification of the Sport Fish and Wildlife Restoration logos.
- Where the Federal Aid Program funding comes from (excise taxes, import duties, specific items taxed and tax rates).
- What programs and activities the money is used for.
- Total amount of money New Hampshire receives annually from the Federal Aid Program.
- History of the Federal Aid Program with emphasis on the program's 50<sup>th</sup> anniversary celebrated in 2000-2001.

In an effort to determine the effectiveness of this outreach program, New Hampshire Fish and Game funded this replication study. The purpose of this study was to conduct a longitudinal survey (1996 and 2000) of a sample of New Hampshire anglers and hunters for the sake of making comparisons on the following items directly related to the NHF&G outreach effort:

1. Angler and hunter awareness of the Federal Aid Program.
2. Angler and hunter awareness of the Federal Aid Program's funding sources.
3. Angler and hunter beliefs concerning the sources and distribution of revenue to New Hampshire Fish and Game's budget.
4. Angler and hunter beliefs concerning activities New Hampshire Fish and Game may or may not be involved in.

Comparisons were also made on the following items because they were either of interest to NHF&G or may have tangentially been affected by the outreach effort.

1. Angler and hunter awareness and perception of various federal and state resource management agencies, and private conservation organizations.
2. Degree to which anglers and hunters make use of various sources of information concerning fishing, hunting and boating.
3. Angler and hunter awareness of and participation in NHF&G volunteer outreach programs.
4. Angler and hunter knowledge of and participation in NHF&G public meetings.

## Methods

Because this study was a replication of the 1996 baseline study and intended for the purposes of making direct comparisons, every attempt was made to follow the same methods utilized for the earlier study. Thus, the sample design, survey methods, survey instrument, data handling and analysis were all nearly the same for the 2001 study as they were for the 1996 study. The population surveyed for the 2001 replication was New Hampshire anglers and hunters who purchased a license in 1999, the most recent year for which a complete license record could be obtained. There were five different license types that anglers or hunters could have purchased in 1999: fishing license, combination license (good for fishing and hunting), regular hunting-only license, archery license, and muzzleloader license. The sample design differed slightly for the 1996 study due to different fishing and hunting license types sold at that time. The population surveyed for the 1996 study was New Hampshire anglers and hunters who purchased a license in 1994. There were four different license types that anglers or hunters could have purchased in 1994: warm-water fishing, all season fishing (includes ice fishing) combination (fishing and hunting), hunting-only license. In both studies, however, the sample was stratified by license type approximately in proportion to the number of each license type sold for the particular year sampled. More detailed descriptions of the methods used in both the baseline study and the replication study are available in NHF&G technical reports (Loomis 1996, Salz and Loomis in press).

## Results

### Basic Demographics

The average age of anglers surveyed in 1996 (40.5) was significantly smaller than the average age of anglers surveyed in 2001 (43.6) (t-value 5.38,  $p < 0.0001$ ). In particular, the 1996 sample contained a larger proportion of anglers in the 25-34 year-old range, whereas the 2001 sample contained a larger proportion of anglers in the 45-54 and 55-64 year-old ranges (Table 1). The large majority of anglers were male for both 2001 (91.1%) and 1996 (89.7%).

Table 1. Comparison of angler age distribution between 1996 and 2001 surveys.

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Age	1996 Survey		2001 Survey	
	n	%	n	%
16-24	60	7.2	51	6.5
25-34	223	26.9	126	16.0
35-44	251	30.2	242	30.7
45-54	176	21.2	224	28.4
55-64	91	11.0	115	14.6
65+	29	3.5	31	3.9
Total	830	100.0	789	100.0

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On average, anglers surveyed in 1996 spent more days freshwater fishing during the previous 12 months (27.7 days) than did anglers surveyed in 2001 (22.6 days) (t-value 3.43,  $p = 0.0006$ ). The average number of years fished by anglers surveyed in 1996 was 28.3, compared to 31.6 years for anglers surveyed in 2001 (t-value 4.89,  $p < 0.0001$ ).

The average age of hunters surveyed in 1996 (40.7) was significantly smaller than the average age of hunters surveyed in 2001 (43.7) (t-value  $-4.80$ ,  $p < 0.0001$ ). In particular, the 1996 sample contained a larger proportion of hunters in the 25-34 year-old range, whereas the 2001 sample contained a larger proportion of hunters in the 45-54 and

55-64 year-old ranges (Table 2). The large majority of hunters were male for both the 2001 (96.0%) and 1996 (94.1%) surveys.

Average days spent hunting during the previous 12 months did not differ significantly between hunters surveyed in 1996 (23.5 days) and those surveyed in 2001 (24.4 days). On average, years of hunting experience for those surveyed in 1996 (23.9) was, however, significantly smaller than years of hunting experience for those surveyed in 2001 (27.7) (t-value 5.42,  $p < 0.0001$ ).

Table 2. Comparison of hunter age distribution between 1996 and 2001 surveys.

Age	1996 Survey		2001 Survey	
	n	%	n	%
16-24	51	7.1	36	5.4
25-34	201	27.9	117	17.4
35-44	205	28.4	207	30.8
45-54	153	21.2	189	28.1
55-64	81	11.0	99	14.7
65+	30	4.2	25	3.7
Total	721	100.0	667	100.0

The average age of anglers and hunters surveyed in 1996 who owned a boat (41.4) was significantly smaller than the average age of those surveyed in 2001 who owned a boat (44.7) (t-value 4.89,  $p < 0.0001$ ). In particular, the 1996 sample contained a larger proportion of boaters in the 25-34 year-old range, whereas the 2001 sample contained a larger proportion in the 45-54 and 55-64 year-old ranges (Table 3). The large majority of boaters were male in both 2001 (90.4%) and 1996 (88.7%).

On average, boat owners surveyed in 1996 spent more days boating during the previous 12 months (21.3 days) than did boaters surveyed in 2001 (18.5 days) (t-value 2.16,  $p < 0.0001$ ). The average number of years of experience boating for those surveyed in 1996 was 16.2, compared to 18.9 years experience for boaters surveyed in 2001 (t-

value 366,  $p < 0.0003$ ). No significant difference was found in the average length of boats owned by New Hampshire anglers and hunters between the two survey years.

Table 3. Comparison of boaters age distribution between 1996 and 2001 surveys.

Age	1996 Survey		2001 Survey	
	n	%	n	%
16-24	40	6.2	33	6.0
25-34	154	24.0	72	13.0
35-44	195	30.4	160	28.9
45-54	156	24.3	180	32.5
55-64	76	11.8	83	14.9
65+	21	3.3	26	4.7
Total	642	100.0	789	100.0

#### Awareness of the Federal Aid in Sport Fish and Wildlife Restoration Program

Respondents were also asked to indicate if they were aware of, or had ever heard of, a number of specific programs and congressional acts related to the Federal Aid Program. Comparisons were made between responses to the 1996 and 2001 surveys to test the effectiveness of the NHF&G outreach strategy in increasing angler and hunter awareness of these programs and acts. Results indicate that the NHF&G outreach program was effective at increasing angler and hunter awareness of the fish and wildlife programs and congressional acts within the Federal Aid Program (Table 4). For 5 out of the 6 programs (or acts), a significantly greater proportion of angler and hunters surveyed in 2001 were aware of (or had heard of) that program as compared to those surveyed in 1996. Although a large proportion of anglers and hunters are still unaware of the Federal Aid Program, these results are encouraging. They suggest that continued education and outreach efforts can further increase awareness of this important program to more desirable levels.

Awareness of the Federal Aid Program’s Funding Sources

While angler and hunters awareness of the existence of the Federal Aid Program in Sport Fish and Wildlife Restoration increased from 1996 to 2001, their knowledge of the Federal Aid program funding sources remained about the same. As compared to those surveyed in 1996, a significantly greater proportion of respondents surveyed in 2001 erroneously believed that excise taxes paid on binoculars, field guides, cameras, and canoes contributed to the Federal Aid Program (Table 5). No significant differences were found between the 1996 and 2001 surveys for any of the other funding sources anglers and hunters were asked about. However, a greater proportion of anglers and hunter surveyed in 2001 correctly identified hunting and fishing equipment excise taxes as a source of the Federal Aid Program as compared to those surveyed in 1996 (64.7% versus 59.0%), although this comparison was not statistically different at the 0.05 level (p=0.074).

Table 4. Comparison between 1996 and 2001 of angler and hunter awareness of various USFWS Federal Aid Programs.

	1996		2001		Chi-square	
	% Yes	n	% Yes	n	value	p
Wildlife Restoration Program.....	46.6	912	56.3	851	16.47	0.000*
Federal Aid Program.....	31.6	906	37.7	851	7.35	0.007*
Sport Fish Restoration Program.....	29.8	905	37.4	852	11.40	0.001*
Pittman Robertson Program.....	12.0	898	16.7	853	7.63	0.006*
Dingell-Johnson Program.....	4.3	897	6.8	848	5.16	0.023*
Wallop Breaux .....	3.0	900	2.1	848	1.34	0.247

\* Denotes significantly different proportions at alpha = 0.05.

Knowledge of Sources and Distribution of Revenue to NHF&G’s Budget

An important question addressed in this study was angler and hunter knowledge of the role of the Federal Aid Program in funding fish and wildlife conservation in New

Hampshire. In both the 1996 baseline and 2001 replication surveys, respondents were presented a list of funding sources, and asked to indicate what percentage of New Hampshire's Fish and Game budget comes from each source. One objective of the replication study was to determine the effectiveness of New Hampshire Fish and Game's outreach program in educating anglers and hunters about the agency's funding sources.

Table 5. Comparison between 1996 and 2001 of angler and hunter beliefs concerning the contribution of various funding sources to the Federal Aid in Sport Fish and Wildlife Restoration Program.

	1996		2001		Chi-square	
	% Yes	n	% Yes	n	value	p
Hunting and fishing license sales.....	91.6	509	90.5	545	0.38	0.536
Motorboat license and registration fees .....	75.3	461	75.3	497	0.00	0.994
Special permits and fees paid by corporations (forestry, mining, etc.)..	66.1	905	67.0	475	0.07	0.797
Corporate donations .....	61.2	433	61.0	464	0.00	0.949
Excise taxes paid on hunting and fishing equipment and motorboat fuels .....	59.0	446	64.7	484	3.20	0.074
General taxes .....	54.7	455	53.3	477	0.20	0.651
Excise taxes paid on binoculars field guides, cameras, and canoes ....	24.1	407	31.3	444	5.52	0.019*
Income tax checkoff.....	21.3	403	19.1	424	0.64	0.423
A percentage of property taxes .....	18.8	410	18.7	434	0.00	0.965

\* Denotes significantly different proportions at alpha = 0.05.

Anglers and hunters perceptions about the sources of New Hampshire Fish and Game's budget did not change from 1996 to 2001 (Table 6). A significant difference in the percent attributed to a funding source was found for only one source (excise tax paid on binoculars, field guides, cameras, canoes etc.) out of eleven. In both survey years, the

Table 6. Comparison between 1996 and 2001 surveys of angler and hunter knowledge about the funding of fish and wildlife conservation in New Hampshire.

	1996		2001		t-value	p
	Mean <sup>a</sup>	n	Mean <sup>a</sup>	n		
Hunting and fishing license sales.....	47.9	737	49.0	668	0.80	0.427
Motorboat license and registration fees .....	10.6	734	10.3	668	0.97	0.333
General taxes .....	10.3	735	9.5	667	0.93	0.354
Special hunting permits (moose, etc.).....	8.2	733	8.4	667	0.59	0.557
Excise taxes paid on hunting and fishing equipment and motorboat fuels.....	5.0	733	5.2	668	0.57	0.567
Special permits and fees paid by corporations (forestry, mining, etc.).....	5.2	733	4.8	667	0.91	0.365
Private donations.....	4.4	734	4.3	667	0.25	0.803
Corporate donations .....	3.4	734	3.8	667	1.41	0.159
Motorboat fuel tax.....	2.1	732	2.1	667	0.17	0.862
Excise tax paid on binoculars, field guides, cameras, and canoes .....	1.1	732	1.6	667	2.60	0.010*
Income tax checkoff.....	1.4	734	1.2	667	1.08	0.281

<sup>a</sup> Values are the percentage of New Hampshire Fish and Game’s budget that comes from each source. Respondents were informed that the total for all sources combined should add to 100%.

\* Denotes significantly different means at the alpha = 0.05 level.

source anglers and hunters believed contributed most to the agency’s budget was hunting and fishing license sales. New Hampshire anglers and hunters believed that this source made up about one-half of the agency’s total budget. Respondents clearly believed that license sales are the major source of funding, with all other sources making far smaller contributions.

An important source of revenue to the New Hampshire Fish and Game Department is the Federal Aid Program. Anglers and hunters surveyed in both 1996 and 2001 believed that excise taxes paid on hunting and fishing equipment and motorboat fuels contributed just 5% to the agency’s budget. This suggests that the agency’s

outreach program was not very effective at educating these stakeholders about the significance of the Federal Aid Program in funding New Hampshire Fish and Game activities.

Beliefs Concerning NHF&G Involvement in Various Activities

The New Hampshire Fish and Game Department is involved in a number of fishing-related activities. One objective of the replication survey was to determine the effectiveness of the agency’s outreach program in making anglers more aware of such agency activities. New Hampshire angler awareness of the agency’s involvement with fish stocking, law enforcement, and fisheries research was already very high in 1996 (more than 95%), so there was little room for improvement with these. A greater proportion of anglers surveyed in 2001 were aware of the agency’s involvement in aquatic resource education and boating safety programs compared to those surveyed on 1996 (Table 7). This increased awareness could possibly be attributed to the outreach

Table 7. Comparison between 1996 survey and 2001 survey of angler awareness of New Hampshire Fish and Game Department involvement in fishing-related activities.

	1996 % Yes	2001 % Yes	Chi-square value	p
Stocking fish in streams and lakes .....	98.6	99.2	1.69	0.193
Law enforcement .....	98.3	98.7	0.50	0.482
Research on fish and fish habitat .....	95.5	96.6	1.13	0.288
Boating safety programs.....	89.2	92.2	4.20	0.041*
Aquatic resource education .....	81.8	86.6	6.49	0.011*
Building public boat ramps .....	75.3	78.8	2.59	0.107
Purchasing land for fish and wildlife habitat .....	76.2	74.5	0.60	0.441
Raising fish for commercial sale .....	21.0	22.0	0.27	0.606
Selling fishing equipment to the public.....	5.0	5.4	0.10	0.757

\* Denotes significantly different proportions at alpha = 0.05.

effort. The outreach program was also somewhat effective at increasing angler awareness of New Hampshire Fish and Game’s involvement in building public boat ramps (p=0.107).

The New Hampshire Fish and Game Department is involved in a number of hunting-related activities. One objective of the replication survey was to determine the effectiveness of the agency’s outreach program in making hunters more aware of such agency activities. Hunter awareness of the agency’s involvement in law enforcement and wildlife research, which was already very high in 1996 (over 96%), increased slightly in 2001 (Table 8). A significantly smaller proportion of the hunters surveyed in 2001 incorrectly believed the agency bred endangered animals (32.3%), as compared to those surveyed in 1996 (37.9%).

Table 8. Comparison between 1996 survey and 2001 survey of hunter awareness of New Hampshire Fish and Game Department involvement in hunting-related activities.

	1996 % Yes	2001 % Yes	Chi-square value	p
Hunter education programs .....	99.3	99.2	0.02	0.894
Law enforcement .....	99.0	99.9	4.04	0.040*
Research on wildlife and wildlife habitat.....	96.2	98.6	7.76	0.005*
Stocking game animals.....	81.4	81.1	0.03	0.862
Purchasing land for fish and wildlife habitat .....	73.9	69.5	3.10	0.078
Captive breeding of endangered animals .....	37.9	32.3	4.59	0.032*
Selling wild animals to the public.....	2.8	1.9	1.45	0.229
Raising wild animals for fur products.....	1.7	1.2	0.52	0.471

\* Denotes significantly different proportions at alpha = 0.05.

The New Hampshire Fish and Game Department is also involved in a number of boating-related activities. One objective of the replication survey was to determine the

effectiveness of the agency’s outreach program in making boaters more aware of such agency activities. There was no significant difference in boater awareness for 7 out of 9 boating-related agency activities between survey years (Table 9). The biggest change in boater awareness was for New Hampshire Fish and Game’s aquatic resource education programs (74.6% in 1996, 82.0% in 2001). Otherwise, the agency’s education outreach program appeared to have no real effect on boater awareness of agency activities.

Table 9. Comparison between 1996 survey and 2001 survey of angler awareness of New Hampshire Fish and Game Department involvement in boating-related activities.

	1996 % Yes	2001 % Yes	Chi-square value	p
Stocking fish in streams and lakes .....	96.5	98.9	7.34	0.007*
Law enforcement .....	96.5	97.6	1.36	0.244
Boating safety programs.....	88.5	90.8	1.58	0.209
Building public boat ramps .....	77.9	81.1	1.83	0.177
Aquatic resource education .....	74.6	82.0	9.08	0.003*
Purchasing land for fish and wildlife habitat .....	71.1	67.3	1.98	0.159
Selling boats to the public .....	3.3	3.0	0.10	0.755
Cleaning services for boats.....	2.6	3.7	1.16	0.282
Teaching water skiing .....	1.6	2.4	0.87	0.351

\* Denotes significantly different proportions at alpha = 0.05.

Awareness and Perception of Natural Resource Agencies and Private Organizations

Another objective of the study was to determine if angler and hunter awareness and perceptions of various natural resource organizations changed from 1996 to 2001. Significant differences (using alpha=0.05) in New Hampshire angler awareness of various organizations between 1996 and 2001 were found for the U.S. Forest Service, U.S. Fish and Wildlife Service, and the Nature Conservancy (Table 10). Slightly less

significant differences were found for the National Park Service ( $p=0.067$ ) and B.A.S.S. ( $p=0.069$ ). These five organizations, for which differences were detected, were all more recognizable to anglers surveyed in 2001 than they were to anglers surveyed in 1996. However, although results were statistically significant, the actual percentage point differences were small (Table 10). Angler perceptions of various organizations did not differ significantly between 1996 and 2001 for 8 out of 10 organizations (Table 10). Angler perceptions of New Hampshire Fish and Game were, on average, more positive in 2001 compared to 1996. Although only a small proportion of anglers were aware of the Future Fishermen Foundation (8.6% in 1996 and 7.6% in 2001), this organization showed the greatest improvement in terms of organization perception among those anglers who were aware of their existence.

Table 10. Comparison between 1996 survey and 2001 survey of angler awareness and perception of various organizations.

	<u>Awareness ( % Yes)</u>			<u>Perception<sup>a</sup></u>		
	<u>1996</u>	<u>2001</u>	<u>p</u>	<u>1996</u>	<u>2001</u>	<u>p</u>
New Hampshire Fish and Game Dept.....	99.5	99.5	0.928	1.29	1.23	0.027*
U.S. Forest Service.....	96.8	98.3	0.055	1.34	1.39	0.118
National Park Service.....	95.3	97.0	0.067	1.33	1.43	0.001
U.S. Fish and Wildlife Service .....	89.7	93.2	0.014*	1.33	1.36	0.322
B.A.S.S. (Bass Anglers Sportsmen Society).79.8	79.8	83.4	0.069	1.55	1.56	0.797
Trout Unlimited. ....	69.0	68.3	0.741	1.39	1.34	0.198
American Sportfishing Association .....	46.3	48.2	0.442	1.61	1.62	0.812
The Nature Conservancy .....	34.9	41.0	0.014*	1.60	1.64	0.578
USFWS, Division of Federal Aid .....	28.4	31.2	0.233	1.59	1.52	0.176
Future Fishermen Foundation.....	8.6	7.6	0.496	1.45	1.26	0.029*

<sup>a</sup> Mean value measured on a three point scale, with 1=Positive, 2=Neutral, 3=Negative.

\* Denotes significant differences at  $\alpha=0.05$  (based on the Chi-square test for awareness and t-test for perception.)

Significant differences in New Hampshire hunter awareness of various organizations between 1996 and 2001 were found for 7 out of 12 organizations (Table 11). The trend for all 7 organizations was an increase in hunter awareness between 1996 and 2001. Hunter awareness of the USFWS, Division of Federal Aid increased from 29.8% to 33.7% during this period, although the results were not statistically different at the 0.05 level. In general, hunters surveyed in 2001 appeared to be more aware of the majority of organizations as compared to those surveyed in 1996. Increased hunter awareness, however, only translated into a more positive perception for two organizations. Hunter perceptions of the U.S. Forest Service and National Park Service were, on average, more positive in 1996 compared to 2001 (Table 11). Hunter perceptions of various organizations did not differ significantly between 1996 and 2001 for 10 out of 12 wildlife related organizations.

#### Sources of Information about Fishing and Hunting

New Hampshire anglers made use of a variety of sources to obtain information about sport fishing in both 1996 and 2001. Comparison between the two years show virtually no difference in the extent to which angler used various sources of information about freshwater sport fishing in New Hampshire from 1996 to 2001 (Table 12). The only source of information for which there was a significant difference was “Comments and opinions of other anglers”, which angler surveyed in 1996 made more use of than those surveyed in 2001.

New Hampshire hunters made use of a variety of sources to obtain information about hunting in both 1996 and 2001. Comparison between the two years show significant differences in the extent to which hunters used the following sources: magazine articles, outdoor writer columns / newspaper articles, television shows, and advertisements for hunting equipment (Table 13). On average, hunters surveyed in 2001 made slightly more use of these four information sources than those surveyed in 1996.

Table 11. Comparison between 1996 survey and 2001 survey of hunter awareness and perception of various organizations.

	Awareness ( % Yes)			Perception <sup>a</sup>		
	1996	2001	p	1996	2001	p
National Rifle Association .....	99.9	99.9	0.951	1.28	1.33	0.095
New Hampshire Fish and Game Dept.....	99.7	99.9	0.615	1.26	1.25	0.721
U.S. Forest Service.....	96.3	98.5	0.014*	1.34	1.43	0.008*
National Park Service.....	94.8	98.2	0.001*	1.35	1.47	0.001*
Audubon Society.....	92.1	94.3	0.101	1.54	1.49	0.217
U.S. Fish and Wildlife Service .....	90.1	96.0	0.000*	1.32	1.36	0.246
National Wildlife Federation .....	85.4	89.7	0.020*	1.44	1.39	0.150
Ducks Unlimited. ....	83.0	89.9	0.000*	1.33	1.36	0.463
Society for the Protection of New Hampshire Forests .....	58.0	63.9	0.027*	1.48	1.53	0.196
The Nature Conservancy .....	36.4	40.3	0.000*	1.71	1.77	0.266
USFWS, Division of Federal Aid .....	29.8	33.7	0.129	1.56	1.54	0.762
Izaak Walton League.....	12.8	10.9	0.279	1.85	1.79	0.503

<sup>a</sup> Mean value measured on a three point scale, with 1=Positive, 2=Neutral, 3=Negative.

\* Denotes significant differences at alpha=0.05 (based on the Chi-square test for awareness and t-test for perception.)

New Hampshire anglers and hunters who own boats made use of a variety of sources to obtain information about boating both in 1996 and 2001. Comparison between the two years show virtually no difference in the extent to which boaters used various sources of information about boating in New Hampshire from 1996 to 2001 (Table 14). The only source of information for which there was a significant difference was the U.S. Coast Guard. Boaters surveyed in 1996 made slightly more use of the U.S. Coast Guard as a source of information about boating than did those surveyed in 2001.

Table 12. Comparison between 1996 and 2001 surveys of the extent to which anglers made use of various sources of information about freshwater sport fishing in New Hampshire.

	1996		2001		t-value	p
	Mean <sup>a</sup>	n	Mean <sup>a</sup>	n		
New Hampshire fishing regulations.....	3.72	821	3.70	775	0.30	0.767
Comments and opinions of other anglers .....	3.57	827	3.43	782	2.69	0.007*
Bait and tackle shops.....	3.01	807	2.96	767	0.98	0.329
Outdoor writer columns and newspaper articles .....	2.58	824	2.67	771	1.66	0.098
New Hampshire Fish and Game Department publications.....	2.65	810	2.64	769	0.09	0.930
Magazine Articles .....	2.62	809	2.58	765	0.41	0.684
Television shows.....	2.39	819	2.31	772	1.30	0.194
New Hampshire Fish and Game Department employees.....	2.19	808	2.19	764	0.08	0.940
Advertisements for fishing equipment and supplies .....	2.06	814	2.03	767	0.48	0.628
Sporting good trade shows .....	1.85	808	1.84	765	0.25	0.799
Fishing clubs or organizations .....	1.76	810	1.81	762	0.80	0.424

<sup>a</sup> Measured on a five point scale, with 1=No use, 2=Little use, 3=Some use, 4=Moderate use, 5=A lot of use.

\* Denotes significantly different means at the alpha = 0.05 level.

#### Awareness of and Participation in NHF&G Volunteer Outreach Programs

New Hampshire Fish and Game has a volunteer program where participants can assist with fish stocking, surveys and other projects. For this study, New Hampshire anglers and hunters were asked if they knew of such programs, if they ever served as a volunteer, and if they would be interested in participating in such a program in the future. A greater proportion of respondents surveyed in 2001 (36.1%) indicated familiarity with such volunteer programs as compared to those surveyed in 1996 (30.5%) (Chi-square

Table 13. Comparison between 1996 and 2001 surveys of the extent to which hunters made use of various sources of information about hunting in New Hampshire.

	1996		2001		t-value	p
	Mean <sup>a</sup>	n	Mean <sup>a</sup>	n		
New Hampshire hunting regulations.....	3.90	705	3.94	660	0.75	0.452
Comments and opinions of other hunters.....	3.68	713	3.61	659	1.18	0.239
New Hampshire Fish and Game						
Department publications.....	2.83	714	2.72	667	1.57	0.117
Magazine Articles .....	2.66	706	2.81	659	2.28	0.023*
Sporting goods shops .....	2.64	701	2.67	651	0.57	0.568
Outdoor writer columns / newspaper articles .....	2.56	711	2.72	662	2.63	0.009*
Television shows.....	2.31	713	2.47	657	2.32	0.020*
New Hampshire Fish and Game						
Department employees.....	2.30	705	2.31	659	0.02	0.982
Hunting clubs or organizations.....	2.05	711	2.13	658	1.24	0.214
Advertisements for hunting equipment and supplies .....	2.05	708	2.19	654	2.35	0.019*
Sporting good trade shows .....	1.91	703	1.95	659	0.71	0.478

<sup>a</sup> Measured on a five point scale, with 1=No use, 2=Little use, 3=Some use, 4=Moderate use, 5=A lot of use.

\* Denotes significantly different means at the alpha = 0.05 level.

value 6.26, p=0.012). Over half (60% in 1996, 54% in 2001) of the respondents for both survey years indicated that they would be interested in serving as volunteers.

#### Knowledge of and Participation in NHF&G Public Meetings

Anglers and hunters were also asked questions regarding their knowledge of and participation in New Hampshire Fish and Game public meetings. A greater proportion of respondents surveyed in 2001 (48.7%) indicated familiarity with such public meetings as compared to those surveyed in 1996 (42.7%) (Chi-square value 6.61, p=0.010).

However, a greater proportion of the 1996 survey respondents indicated they had

attended one of these meetings (28.7%) as compared to the 2001 respondents (22.5%) (Chi-square value 3.98, p=0.046).

Table 14. Comparison between 1996 and 2001 surveys of the extent to which boaters made use of various sources of information about boating in New Hampshire.

	1996		2001		t-value	p
	Mean <sup>a</sup>	n	Mean <sup>a</sup>	n		
Comments and opinions of other boaters .....	2.81	618	2.78	543	0.45	0.650
Boat dealers and shops .....	2.30	614	2.30	538	0.05	0.950
U.S. Coast Guard .....	2.26	621	2.08	544	2.21	0.027*
Magazine Articles .....	2.19	611	2.14	539	0.81	0.421
Outdoor writer columns / newspaper articles .....	2.11	618	2.04	540	1.16	0.246
Television shows.....	1.80	620	1.84	539	0.75	0.454
Advertisements for fishing equipment and supplies .....	1.78	617	1.89	545	1.91	0.056
Boating trade shows .....	1.70	617	1.65	542	0.87	0.385
Boating clubs or organizations .....	1.56	620	1.52	542	0.90	0.369

<sup>a</sup> Measured on a five point scale, with 1=No use, 2=Little use, 3=Some use, 4=Moderate use, 5=A lot of use.

\* Denotes significantly different means at the alpha = 0.05 level.

## Discussion

A longitudinal survey was used in this study to assess changes in New Hampshire fishing and hunting license holder knowledge, beliefs and awareness related to fish and wildlife conservation from 1994 to 1999. In order to accurately assess the influence of the NHF&G outreach effort on such changes, all other factors must, ideally, be held constant within the pre-test and post-test time frame. However, because it is not possible to conduct a controlled experiment with this type of survey research, some uncertainty remains regarding the actual effect of the outreach effort as compared to other unknown or uncontrolled variables.

Since the research objective here was to detect changes due to a particular treatment (i.e. NHF&G outreach program), it was important that the populations sampled prior to and following the treatment were nearly identical. Longitudinal panel surveys, which gather data from the same individuals over a period of time, are one method to increase consistency between pre and post-treatment populations. However, panel studies can be difficult to conduct and suffer from high attrition rates (i.e. people drop out of the study). Instead, this study utilized a longitudinal trend survey approach whereby the same individuals are not sampled. In order to assess treatments effects, we must assume that the sample population of 1999 license holders was nearly identical to the population of 1994 license holders, and did not change much due to immigrations or emigrations. This is probably a good assumption since sampling was conducted only five years apart. In addition, our results indicate that the average age of anglers, hunters and boaters surveyed in 1996 was about three years less than the average age of anglers, hunters and boaters surveyed in 2001. This supports the fact that the population sampled in 1996 aged along with the study and was nearly identical to the population sampled in 2001. Further evidence of this is the fact that the average years of experience hunting (for hunters) and fishing (for anglers) also increased by a few years between the 1996 and 2001 surveys (+3.3 average years fishing, +3.8 average years hunting).

Our results suggest that the NHF&G outreach effort was successful at increasing awareness of the Federal Aid in Sport Fish and Wildlife Restoration Program. Percentage changes in angler and hunter awareness were most significant for the Wildlife

Restoration Program (+9.7%) and the Sport Fish Restoration Program (+7.6%). Percentage changes in angler and hunter awareness were also significant, although somewhat smaller, for the Pittman Robertson (+4.7%) and Dingell-Johnson (+2.5%) acts. These results make sense since the NHF&G outreach program focused heavily on awareness and name recognition of the Sport Fish and Wildlife Restoration Program. Increased awareness of Pittman Robertson and Dingell-Johnson may also be attributed to the outreach effort, although in a less direct manner.

Despite improvements, the overall awareness of the Federal Aid in Sport Fish and Wildlife Restoration Program remains low among New Hampshire anglers and hunters. Only about one-half (56.3%) were aware of the Wildlife Restoration Program and about one-third were aware of the Sport Fish Restoration (37.4%) and Federal Aid (37.7%) Programs. The NHF&G outreach program was about half way into its fourth year (out of five) when this survey was implemented between February and March 2001. Based on our results, we anticipate that awareness of the Federal Aid In Sport Fish and Wildlife Restoration Program will continue to increase throughout the rest of the five-year outreach grant period. Since the outreach strategy appears successful at increasing general awareness, it may be possible to achieve significantly higher levels of awareness with continued outreach efforts beyond this time frame.

The NHF&G outreach program was somewhat less effective at changing angler and hunter knowledge level, beliefs (and especially misperceptions) regarding funding sources for the Federal Aid Program or for the NHF&G Department. Although a greater percentage of hunters and anglers surveyed in 2001 correctly identified hunting and fishing equipment excise taxes and motorboat fuels as a source of the Federal Aid Program as compared to those surveyed in 1996, the difference was not significant at the 0.05 level. New Hampshire angler and hunter misperceptions about the contribution of various funding sources to the Federal Aid Program were high in 1996 and remained high in 2001. For example, in both surveys 90% mistakenly believed that hunting and fishing license sales contribute and over 75% mistakenly believed that motorboat license and registration fees contribute to the Federal Aid Program. Over one-half of the anglers and hunters surveyed in 1996 and 2001 mistakenly thought that general taxes contributed to the Federal Aid Program. Surprisingly, in both survey years about one out of five anglers

and hunters believed that an income tax checkoff contributed to Federal Aid even though New Hampshire does not even have such a funding source.

The NHF&G outreach effort appeared to have little effect on angler and hunter beliefs regarding funding sources for the Department. In both 1996 and 2001, anglers and hunters on average attributed only 5% of the Department's budget to excise taxes paid on hunting and fishing equipment and motorboat fuels. In reality, about 28% of the NHF&G budget comes from this source (personal communication, Anne Hewitt, NHF&G Department, Concord, NH). In both survey years New Hampshire anglers and hunters correctly identified hunting and fishing license sales as the primary source of funding for the NHF&G Department. New Hampshire angler and hunter confusion about the sources of funding for the Federal Aid Program may have contributed to their confusion regarding the sources of funding for the NHF&G Department.

Overall, our results indicate that New Hampshire anglers and hunters are not very knowledgeable about funding sources for the Federal Aid in Sport Fish and Wildlife Restoration Program or for the NHF&G Department. The NHF&G outreach effort, to date, appears to have had little noticeable effect in terms of increasing this knowledge level. This is, perhaps, not too surprising considering that a large proportion of New Hampshire's anglers and hunters are still unaware of the existence of the Federal Aid in Sport Fish and Wildlife Restoration Program. Thus, it may be necessary to first increase public awareness of the existence of the program before educating the public on the details.

Another possible explanation is that New Hampshire anglers and hunters may not be interested enough to thoroughly read and process the detailed information presented in NHF&G outreach materials regarding Federal Aid. According to the Elaboration Likelihood Model when motivation and/or ability to process information is low, peripheral cues become relatively more important while scrutiny of the message is simultaneously decreased (Petty and Cacioppo 1986). Peripheral cues refer to stimuli that can affect attitudes or beliefs without necessitating processing of the message itself (Petty and Cacioppo 1986). An example would be if New Hampshire anglers mistakenly associated fishing license sales revenue with the Federal Aid Program because they saw the Sport Fish and Wildlife Restoration logo on the back of a NHF&G Freshwater

Fishing Guide. Such anglers may have been in this peripheral processing mode because they lacked the motivation to read the accompanying text that explained the source of Federal Aid Program funds (i.e. excise taxes). Thus, while the NHF&G outreach effort increased the ability of anglers and hunters to learn about funding sources for natural resource conservation programs, their motivation to do so may still be lacking. The fact that the outreach effort was somewhat successful at increasing awareness of the Federal Aid Program suggests that anglers and hunters were motivated enough to process the fact that such a program exists. In other words, they got the basic gist of the Federal Aid Program but were less inclined to search for or process details information concerning how the program functions. However, more research is needed to determine why this aspect of the outreach message was less effective than expected.

## References

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## **Appendix A**

2001 Survey of New Hampshire Anglers and Hunters Survey Instrument