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SUBSISTENCE MIGRATORY BIRD HARVEST SURVEYS
YUKON-KUSKOKWIM DELTA, 1993-2002
BRISTOL BAY, 1995-2001

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Introduction: Changes in Harvest Survey Methodology

Methodology for the Yukon-Kuskokwim Delta and Bristol Bay harvest surveys changed beginning in 2001. Further changes were implemented in 2002. This means that 2001 and 2002 harvest data are not directly comparable with previous years' data nor with each other.

The reasons for these changes are related to the mandates for the Alaska Migratory Bird Co-Management Council (AMBCC), which was formed in April 2000. The AMBCC was formed as a result of the Migratory Bird Treaty Act (MBTA) protocol amendment (1995). The letter of submittal which accompanies the Amendment, calls for the creation of management bodies "to ensure an effective and meaningful role for indigenous inhabitants in the conservation of migratory birds. These management bodies will include Native, Federal and State of Alaska representatives serving as equals".

The Migratory Bird Treaty Act (MBTA) protocol amendment (1995) provides for the customary and traditional subsistence use of migratory birds and their eggs by Alaska's indigenous inhabitants, but also states that it is not the intent of the Amendment to cause significant increases in take of migratory bird species relative to their continental population sizes. The letter of submittal specifies the need for harvest monitoring and states that harvest estimates will be collected cooperatively by the Service, the Alaska Department of Fish and Game, and Native organizations within the subsistence eligible areas: "These management bodies will develop recommendations for.....harvest monitoring..... It is the intention of DOI/FWS and the Alaska Department of Fish and Game that management information, including traditional knowledge, the number of subsistence hunters and estimates of harvest, will be collected cooperatively for the benefit of management bodies."

In late 2000, the AMBCC appointed a harvest survey technical committee to design a standardized, annual statewide harvest survey for the subsistence eligible areas of Alaska. Members of this committee knew that, in order to improve the efficiency and accuracy of the survey and cover more subsistence areas of Alaska, especially with a limited budget, changes in methodology would be needed.

The first change to be implemented, in 2001, was activity stratification. Activity stratification was used for the first time, for the Yukon Kuskokwim Delta and Bristol Bay surveys. Instead of drawing a random sample from each village, the households in each village were divided into “high” (>10 birds per year), “low” (<10 birds per year) and “none” (0 birds per year) categories. The attempt was made to put each household in the village into one of these categories, so that the total households in each category equaled the total number of households in the village. Then, 50% of the “high” category, 20% of the “low” category, and 10% of the “none” category, was drawn for the sample in 2001. If the numbers of households in any category were too low, it was sometimes necessary to draw more households to have a statistically adequate sample from that category. For the very small villages, and on the Alaska Peninsula, a census of households was conducted.

What this meant in practice was that, in communities with a lot of “high” hunting households, a larger portion of the community was surveyed than in communities with few hunting households. This differed from previous surveys, in which an equal percentage of the community was surveyed regardless of how much hunting they did. The goal was to improve statistical accuracy and precision. It was also a way to make limited dollars stretch farther, particularly in larger, less subsistence reliant communities such as Dillingham and Bethel.

In 2001, even though we went to the activity stratification method for selecting households, we continued to select villages the same way as in 1985 through 2000 (see Wentworth, 2004, “Methods: How we do the Survey”).

In 2002, after a harvest survey technical workshop and a statewide Refuge Information Technician (RIT) workshop (December 2001) more changes to survey methodology were implemented.

First, the five survey periods on the Yukon Delta and Togiak NWRs were combined and reduced to three: Spring, Summer, and Fall, with the following dates:

Spring: April 1 – June 30
Summer: July 1 – August 31
Fall: September 1 – October 31

These three survey periods were also used by Kawerak, Inc., in the Bering Strait region. On the Alaska Peninsula/Becharof NWR in Bristol Bay, the Refuge continued to use a fourth, winter survey period, with the dates of October 16 – March 9.

Secondly, in 2002, statistical advice indicated we could reduce the percentages of households surveyed in the “High” and “Low” hunting categories without substantially affecting survey accuracy and precision, thereby stretching our limited budget to meet statewide survey needs. Therefore, in 2002, instead of attempting to sample 50% of the “High” hunting households and 20% of the “Low” hunting households, we reduced these percentages to 40% of the “High” hunting households and 15% of the “Low” hunting households. We continued to attempt to sample 10% of the “None” households. As in 2001, if there were not enough households in the

“None” category for an adequate sample, we sometimes sampled greater than 10% of these households.

Thirdly, in 2002, instead of randomly selecting a certain number of villages to survey, as we always had in the past, we attempted to survey every village on the Y-K Delta, assuming that each village was its own stratum.

Fourthly, in order to improve species identification as well as reflect the new survey periods, a new, full color, harvest survey form was designed and produced in 2002. This harvest survey form borrows images from the National Geographic Society. The new form also has 49 bird species on it: nine more species than were on the previous survey form. This form was used for surveys on the Yukon Delta, Togiak, and Alaska Peninsula/Becharof NWRs, and in thirteen Bristol Bay communities surveyed by the Bristol Bay Native Association. This form was also used by Kawerak, Inc. in the Bering Straits Region.

Results, Yukon Delta National Wildlife Refuge, 2001-2002

Residents of the Yukon-Kuskokwim Delta harvested an estimated 97,400 migratory birds for subsistence in 2002 (not counting ptarmigan and grouse) (Table 1). This was about equal to the ten year average of 97,000 migratory birds, and was 4,700 more birds than in 2001, when 92,700 migratory birds were harvested.

Almost one-half (49%) of these migratory birds were ducks in 2002, and another 40% were geese. About 6% were swans and cranes. The rest of the harvest (4%) consisted of other birds, including loons, seabirds, shorebirds, and gulls.

In 2001, slightly more geese were harvested than ducks, in contrast to 2002, when more ducks were harvested. Approximately 46% of the 2001 harvest was geese, and 44% was ducks. Another 7% of the harvest was swans and cranes, and 3% of the 2001 harvest consisted of other birds. Our “other bird” harvest in 2002 (4221 birds) was higher than in 2001 (2,549 birds) and the highest “other bird” harvest in the 17 year history of the survey. This higher recorded harvest was probably related to the new survey form, with its color drawings and delineation of individual shorebird species.

Migratory bird species harvested in greatest numbers in 2002 were cackling Canada geese (13,442), Pacific white-fronted geese (11,676), pintail ducks (7,807), king eiders (7,343), black scoters (6,782), greater scaup (6,385), lesser Canada geese (6,300), mallard ducks (4,815), and black brant (4,790).

Species harvested in greatest numbers in 2001 were Pacific white-fronted geese (13,904), cackling Canada geese (10,227), lesser Canada geese (8,349), king eider ducks (8,049), black brant (5,769), pintail ducks (5,573), greater scaup (5,100), black scoters (4,869), mallard ducks (4,711), and tundra swans (3,775)..

Spectacled and Steller's eider harvest estimates were 39 and 28 respectively in 2002, and 25 and 11 respectively in 2001 – below the 10 year averages of 91 spectacled and 36 Steller's eiders.

Egg harvest in 2002 was 27,500 eggs (excluding ptarmigan and grouse eggs). This was twice the ten year average egg harvest of 13,500 eggs, and was the highest reported egg harvest in the 17 year history of the survey. This may have had something to do with the new, color survey form, which hopefully helped households improve species identification and thus their incentive to correctly report egg harvests.

In 2001, 16,200 eggs were reported harvested. As in 2002, this exceeded the ten year average of 13,537 eggs.

It is important to point out that egg harvest estimates are generally not as reliable as bird harvest estimates, because they are based on such a small number of households. In any given year, only a small fraction of sampled households report any egg harvest, so statistical variances are usually higher than for birds.

In 2002, 35% of the migratory bird eggs reported taken were goose eggs, 32% were gull eggs, and 19% were duck eggs. The remaining 14% were eggs of swans, cranes, shorebirds, loons, and other birds. In 2001, 41% of the eggs were goose eggs, 28% were gull eggs, and 14% were duck eggs. The remaining 17% were eggs of other birds.

No spectacled eider eggs were reported taken in either 2002 or 2001. In fact, no spectacled eider eggs were reported taken in any year since 1993, when the (expanded) estimate was 67 eggs.

In 2002, the Steller's eider egg (expanded) estimate was 122 eggs. No Steller's eider eggs were reported taken in 2001, nor in any year since 1998, when the estimate was 11 eggs. In 2002, the Steller's eider egg estimate came from a total of four households on the Y-K Delta: one household in the north coast region, one household in the Kuskokwim region (a tundra village), and one household in the south coast region, all in the spring; and in the fall, one household in the mid coast region. The largest egg take reported by any of these four individual households, was 20 eggs. Because only four households reported any Steller's eider egg take, the variance, while not yet calculated, will undoubtedly be high.

In 2001, of the 38 communities on the Yukon Delta NWR, 24 participated in the harvest survey, including the hub of Bethel. We had adequate or more than adequate village participation from every stratum (region) except the south coast and the Yukon River. In the south coast region, only two villages participated, when we needed three for an adequate statistical sample. However, one of the villages that did participate, Kipnuk, is a village where significant emperor and brant hunting occurs and which had participated in the survey only twice previously (1993 and 2000). Thus, this was regarded as an improvement in the statistical accuracy of our survey.

In the Yukon River region in 2001, only three villages participated when we needed four. One of these, Russian Mission, dropped out after the first two survey periods.

Total household participation in 2001 was 720 households, or 21% of all households (excluding Bethel). This was a decline from the 28% of all households that participated, on average, between 1995 and 2000, and was lower than the statistical goal of 25% of all households set in 1985.

This drop in household participation may have been related to the inherent difficulties in implementing a new sampling strategy. Also, implementing activity stratification changed the statistical goal from attempting to survey 25% of all households, to attempting to survey 50% of all “High” hunting households, 20% of “Low” hunting households, and 10% of “None” households. If there were very few hunting households on the Y-K Delta, so that most households fell into the “None” category, then obviously, less than 25% of all households would be selected. However, based on the fifteen years of previous data as well as the activity stratification itself, we know this is not the case. There were an estimated 3407 households in the Yukon Delta NWR survey area in 2001, and, of the 69% that were categorized, almost one-half (48%) fell into the “High” category. An additional 30% of the categorized households fell into the “Low” category. This meant that more than 25% of the households on the Delta should have been surveyed with the new activity stratification system.

In 2002, we attempted to survey all 38 villages on the Delta. We actually surveyed 31 of them, including Bethel. We had more than adequate village participation from all regions except the Yukon River, where we needed four villages in all three survey periods but had only three villages for the summer and fall survey periods. Still, however, the overall village participation was a big improvement from previous years, even given that we were attempting to survey all villages. It was especially significant that, for the first time in the history of the harvest survey, we had the participation of both Kipnuk and Kongiganak in the south coast region. Also, for only the second time on the history of the survey, the Kuskokwim village of Kasigluk participated in the survey. These gains were due to the persistence and tenacity of our Yup’ik speaking staff on the Refuge.

In 2002, 26% of all Y-K Delta households participated in the survey. This was a big improvement from 2001, and above the 25% target set in 1985, even though it was still below the average of 28% of all households participating between 1995 and 2000.

Our survey data show that in 2001, in regions other than Bethel, 71% of all households caught birds and/or gathered eggs during the spring survey period. In early summer, 43% caught birds and or gathered eggs. In midsummer, only 16% took birds/eggs. In late summer, this figure was 17%. During the fall survey period (September 1 – October 15) the figure increased to 26% of all households.

These percentages are similar to previous years, even though they are not directly comparable due to change in survey methodology beginning in 2001. Because the adoption of the activity stratification methodology targets the active hunters, it would follow that more of those surveyed actually caught birds than in previous years. The above percentages actually are higher than 1995-2000 averages for the spring, early Summer, and midsummer survey periods, (Wentworth, 2004) but lower than 1995-2000 averages for the late summer and fall survey periods. This

would indicate a fairly substantial decline in successful hunting in late summer and fall 2001, compared with 1995-2000.

In 2002, 72% of all households caught birds and/or gathered eggs during the spring survey period (April 1- June 30). During the summer survey period (July 1 – August 31), 30% of all households took birds/eggs, and during the fall survey period (September 1 – October 31, 43% of households took birds/eggs).

The figures are not directly comparable to earlier years, due both to the activity stratification which targets hunting households (which began in 2001, as just described) and also, to the switch from five to three survey periods, with differing survey period dates, beginning in 2002. However, the figure of 72% of all households participating in the spring harvest is very close to the 1995-2000 average of 69% of all households and the 2001 figure of 71% of all households participating in the spring harvest. Similarly, the 2002 figure of 43% of all households participating in the fall harvest is close to the 1995-2000 average of 36% of all households harvesting birds in the fall. Again, all other factors being held constant, we would expect these percentages to be slightly higher than the 1995-2000 averages due to the fact that, with activity stratification, we are surveying more of the active hunters.

Results, Bristol Bay, 2001

Residents of Bristol Bay harvested approximately 20,800 migratory birds for subsistence in 2001. This included residents of the Togiak and Alaska Peninsula National Wildlife Refuge areas, and people in 13 more communities in the Dillingham, Nushagak River, and Iliamna Lake areas. This 2001 harvest of 20,800 migratory birds was somewhat below the six year (1995-2000) harvest of 25,200 migratory birds.

Over half (61%) of this harvest was ducks. Another 35% of the harvest was geese. Tundra swans, sandhill cranes, gulls, shorebirds, and loons composed the remaining 4% of the harvest.

Migratory bird species taken in greatest numbers in Bristol Bay were mallards (3,920), pintail ducks (2,670), Pacific white-fronted geese (2,416), cackling Canada geese (1,948), lesser Canada geese (1,597), and black brant (1,106).

Residents reported taking 61 spectacled and 9 Steller's eiders in 2001. These numbers were both below the six year (1995-2000) averages of 87 spectacled eiders and 42 Steller's eiders.

Bristol Bay households took approximately 28,600 migratory bird eggs for subsistence in 2001. This was slightly below the six year average of 30,000 migratory bird eggs. The vast majority (86%) of these eggs were those of gulls. Another 8% were murre eggs. Only 3% of the eggs were waterfowl eggs. No spectacled nor Steller's eiders eggs were reported taken in Bristol Bay in 2001.

Even though 2002 data for Bristol Bay is not yet available, harvest patterns for Bristol Bay can be contrasted with those on the Y-K Delta. People on the Y-K Delta take about four times as

many migratory birds as people in Bristol Bay. But people in Bristol Bay take more eggs than people on the Y-K Delta! (The Y-K Delta had 21,700 people in the 2000 U.S. Census; Bristol Bay had 8,800 people). The species composition of the egg take is very different between the two regions. On the Y-K Delta, the majority of the eggs taken are waterfowl eggs. In Bristol Bay, the vast majority of the eggs taken are those of gulls and murre.

Bristol Bay harvest results for 2002, and village and household participation information for Bristol Bay for both 2001 and 2002, will be available at a later date.

Table 1. Migratory bird subsistence harvest estimates, Yukon-Kuskokwim Delta, 1993-2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001 ¹	2002 ²	10 YEAR AVERAGE
GEESE											
White-fronted Geese	8,207	9,570	11,388	14,582	8,528	12,359	13,320	15,438	13,904	11,676	11,897
Cackling Canada Geese	7,087	9,780	13,799	14,983	9,921	15,173	11,145	11,533	10,227	13,442	11,709
Emperor Geese	2,602	1,493	2,041	2,374	1,469	1,899	818	1,352	1,078	1,250	1,638
Black Brant	2,502	2,326	4,995	3,302	3,572	4,100	2,721	4,002	5,769	4,790	3,808
Lesser Canada Geese	7,086	9,541	14,931	14,734	7,877	11,338	9,352	7,909	8,349	6,300	9,742
Lesser Snow Geese	2,119	2,115	2,305	3,834	1,379	2,135	1,339	1,495	3,072	1,871	2,166
TOTAL GEESE	29,603	34,825	49,459	53,809	32,746	47,004	38,695	41,729	42,399	39,329	40,960
Tundra Swans											
Tundra Swans	5,767	8,030	9,529	8,860	5,501	5,916	5,107	3,578	3,775	3,349	5,941
Sandhill Cranes	2,282	3,118	5,340	3,899	2,370	3,907	3,539	2,517	2,899	2,648	3,252
DUCKS											
Pintails	7,474	6,895	12,579	10,952	5,685	8,085	5,473	5,881	5,573	7,807	7,640
Mallards	4,671	4,949	6,971	5,041	3,568	5,859	4,509	4,029	4,711	4,815	4,912
Unidentified ducks	1,993	1,881	2,615	1,427	996	2,107	1,368	1,855	2,408	1,145	1,780
Wigeons	4,358	2,950	4,525	2,967	3,128	2,526	2,169	1,087	1,611	2,255	2,758
Shovelers	925	770	1,314	804	813	1,171	1,469	469	833	1,693	1,026
Canvasbacks ³										1,151	1,151
Green-winged Teals	1,103	1,268	1,557	1,910	1,833	1,480	1,079	996	1,203	1,454	1,388
Buffleheads	319	400	363	139	156	533	119	164	41	332	257
Harlequins	354	116	144	163	95	350	105	89	147	104	167
Greater Scaup	2,891	4,357	7,347	3,460	3,189	8,225	10,229	2,595	5,100	6,385	5,378
Goldeneyes	1,364	1,287	1,894	1,232	832	2,560	2,846	960	1,438	984	1,540
Long-tailed Ducks	1,709	1,355	2,403	1,609	2,042	3,159	2,300	575	1,360	2,188	1,870
White-winged Scoters	2,153	1,572	1,918	2,511	2,011	3,053	2,511	913	2,205	2,119	2,097
Black Scoters	7,974	4,936	6,946	6,982	4,634	7,579	6,289	3,219	4,869	6,782	6,021
Surf Scoters	493	713	409	685	217	421	489	402	687	434	495
Common Eiders	583	157	113	615	494	326	340	529	508	429	409
King Eiders	3,753	1,540	1,625	2,752	3,424	2,262	4,808	6,992	8,049	7,343	4,255
Spectacled Eiders	28	150	206	126	95	82	78	84	25	39	91
Steller's Eiders	0	18	95	43	15	104	42	8	11	28	36
Common Mergansers	123	60	70	74	27	185	180	81	70	147	102
Red-breasted Mergansers	297	148	256	145	183	293	142	83	258	200	201
TOTAL DUCKS	42,565	35,522	53,350	43,637	33,437	50,360	46,545	31,011	41,107	47,834	43,573
Ptarmigan (non-migratory)											
Ptarmigan (non-migratory)	19,557	9,458	16,095	14,794	13,022	16,244	21,502	14,955	16,594	19,023	16,124
Spruce Grouse ³										149	149
OTHER BIRDS											
Yellow-billed Loons	172	93	34	188	68	72	40	43	21	183	91
Red-throated Loons	25	94	18	36	17	38	20	15	38	29	33
Common Loons	657	263	390	424	273	237	170	125	87	272	290
Pacific Loons	142	44	20	26	39	53	0	17	350	278	97
Auklets ³										0	0
Murres	29	307	29	42	87	6	76	3	57	117	75
Cormorants ³										90	90
Kittiwakes ³										2	2
Guillemots ³										2	2
Mew Gulls	15	0	134	54	0	16	72	13	188	247	74
Sabines Gulls	41	8	101	78	18	20	4	11	1	92	37
Glaucous Gulls	98	184	72	72	602	307	116	188	17	246	190
Arctic Terns	0	0	15	1	271	87	6	34	0	150	56
Puffins ³										361	361
Bristle-thighed curlews ³										92	92
Godwits ³										1,479	1,479
Whimbrels ³										34	34
Golden Plovers ³										90	90
Small shorebirds	599	53	118	76	84	88	87	155	76	402	174
Large shorebirds	145	174	138	774	485	1,867	1,696	2,014	1,714		
Other Birds ³										55	55
TOTAL OTHER BIRDS	1,923	1,220	1,069	1,771	1,944	2,791	2,287	2,618	2,549	4,221	3,323
TOTAL (w/o Ptarm/Grouse)	82,140	82,715	118,747	111,976	75,998	109,978	96,173	81,453	92,729	97,381	97,049
TOTAL (w/ Ptarm/Grouse)	101,697	92,173	134,842	126,770	89,020	126,222	117,675	96,408	109,323	116,553	113,322

¹ Activity stratification and a new estimation method were employed for the first time in 2001² An expanded survey form and slightly different survey periods were employed for the first time in 2002³ Species added to survey form in 2002

Table 2. Egg subsistence harvest estimates, Yukon-Kuskokwim Delta, 1993-2002

	1993	1994	1995	1996	1997	1998	1,999	2000	2001 ¹	2002 ²	10 YEAR AVERAGE
GOOSE EGGS											
White-fronted Geese	598	667	848	454	635	1,730	1,514	3,634	1,603	3,372	1,260
Cackling Canada Geese	375	1,005	845	793	1,068	2,984	983	4,885	2,349	3,350	1,617
Emperor Geese	411	351	408	488	284	448	267	154	89	235	351
Black Brant	176	801	524	622	630	1,063	460	1,296	1,217	1,267	697
Lesser Canada Geese	681	763	816	762	792	1,766	1,731	1,590	1,387	1,381	1,113
Lesser Snow Geese	0	0	0	5	0	0	19	0	27	53	3
TOTAL GOOSE EGGS	2,241	3,587	3,441	3,124	3,409	7,991	4,974	11,559	6,672	9,658	5,041
Tundra Swan Eggs	961	293	856	565	531	1,379	766	728	571	735	760
Sandhill Crane Eggs	467	276	460	373	326	920	376	582	404	641	473
DUCK EGGS											
Pintails	1,100	705	649	611	291	1,358	573	1,769	708	2,558	882
Mallards	612	321	409	272	175	609	236	650	520	836	411
Unidentified ducks	373	301	1,140	756	260	582	85	364	532	371	483
Wigeons	121	199	54	59	37	73	23	317	51	26	110
Shovelers	65	0	17	0	0	170	0	149	0	82	50
Canvasbacks ³										16	16
Green-winged Teals	147	50	33	88	58	276	129	307	188	353	136
Buffleheads	46	0	0	0	0	0	0	19	0	0	8
Harlequins	0	0	0	3	0	0	38	0	0	13	5
Greater Scaup	0	119	0	79	0	140	154	31	221	461	65
Goldeneyes	0	0	0	30	0	148	144	22	11	11	43
Long-tailed Ducks	70	137	154	158	30	162	273	112	22	58	137
White-winged Scoters	0	0	11	0	0	0	36	29	0	0	10
Black Scoters	0	0	127	0	0	105	48	0	7	0	35
Surf Scoters	0	0	59	0	0	0	0	161	0	7	28
Common Eiders	33	30	64	27	0	144	3	29	0	320	41
King Eiders	29	0	0	20	2	0	0	0	0	15	6
Spectacled Eiders	0	0	0	0	0	67	0	0	0	0	8
Stellers' Eiders	0	0	0	0	0	11	0	0	0	122	1
Common Mergansers	0	0	0	0	0	0	0	0	0	17	0
Red-breasted Mergansers	6	0	0	0	0	0	0	0	0	2	1
TOTAL DUCK EGGS	2,602	1,862	2,717	2,103	853	3,845	1,742	3,959	2,260	5,268	2,460
Ptarmigan Eggs	1,694	532	559	994	729	1,933	1,027	1,243	1,111	2,204	1,089
Spruce Grouse Eggs ³										66	66
OTHER BIRD EGGS											
Yellow-billed Loons	37	0	0	10	9	38	19	10	5	6	15
Red-throated Loons	12	0	0	8	0	32	0	21	0	22	9
Common Loons	263	11	29	59	0	109	49	117	93	110	80
Pacific Loons	0	0	0	10	0	0	3	19	20	172	4
Auklets ³										0	0
Murres	204	0	0	1,740	0	0	0	7	10	26	244
Cormorants ³										0	0
Kittiwakes ³										61	61
Guillemots ³										0	0
Mew Gulls	1,338	1,004	364	347	107	695	613	315	315	4,059	598
Sabines Gulls	277	145	33	408	242	791	85	502	1,092	457	310
Glaucous Gulls	797	845	1,031	914	564	1,958	1,831	3,364	3,207	4,251	1,413
Arctic Terns	597	362	647	442	27	769	168	233	468	807	406
Puffins ³										13	13
Bristle-thighed curlews ³										54	54
Godwits ³										89	89
Whimbrels ³										36	36
Golden Plovers ³										102	102
Small Shorebirds	1,286	1,994	1,418	2,169	680	1,153	431	1,493	901	846	1,328
Large Shorebirds	115	174	120	245	92	220	54	192	186		
Other Birds ³										42	42
TOTAL OTHER BIRD EGGS	4,926	4,535	3,642	6,352	1,721	5,765	3,253	6,273	6,297	11,153	4,804
TOTAL EGGS (w/o Ptarm/Grouse)	11,197	10,553	11,116	12,517	6,840	19,900	11,111	23,101	16,204	27,455	13,537
TOTAL EGGS(w/ Ptarm/Grouse)	12,891	11,085	11,675	13,511	7,569	21,833	12,138	24,344	17,315	29,725	14,692

1 Activity stratification and a new estimation method were employed for the first time in 2001

2 An expanded survey form and slightly different survey periods were employed for the first time in 2002

3 Species added to survey form in 2002

Table 3. Migratory bird subsistence harvest estimates, Bristol Bay, 1995-2001

	Bristol Bay Avg. 1995-2000*	Bristol Bay 2001**	Weighted average 1995-2000, 2001
GEESE			
White-fronted Geese	1,649	2,416	1,759
Cackling Canada Geese	1,886	1,948	1,895
Emperor Geese	397	122	358
Black Brant	1,236	1,106	1,217
Lesser Canada Geese	2,010	1,597	1,951
Lesser Snow Geese	127	59	117
TOTAL GEESE	7,305	7,248	7,297
Tundra Swans	371	138	338
Sandhill Cranes	413	247	389
DUCKS			
Pintails	3,448	2,670	3,337
Mallards	4,927	3,920	4,783
Unidentified ducks	941	753	914
Wigeons	684	805	701
Shovelers	177	192	179
Canvasbacks	8	23	10
Green-winged Teals	2,155	984	1,988
Buffleheads	123	196	133
Harlequins	291	239	284
Greater Scaup	66	34	61
Goldeneyes	791	600	764
Long-tailed Ducks	372	238	353
White-winged Scoters	335	208	317
Black Scoters	548	333	517
Surf Scoters	84	120	89
Common Eiders	170	129	164
King Eiders	1,456	838	1,368
Spectacled Eiders	91	61	87
Steller's Eiders	48	9	42
Common Mergansers	244	144	230
Red-breasted Mergansers	511	196	466
TOTAL DUCKS	17,470	12,692	16,787
Ptarmigan (non-migratory)	7,889	8,177	7,930
Spruce Grouse	936	2,483	1,157
OTHER BIRDS			
Yellow-billed Loons	44	26	41
Red-throated Loons	3	15	5
Common Loons	30	24	29
Arctic Loons	1	4	1
Common Murres	15	9	14
Small shorebirds	27	25	27
Large shorebirds	44	12	39
Mew Gulls	57	20	52
Sabines Gulls	19	0	16
Glaucous Gulls	103	341	137
Arctic Terns	11	0	9
TOTAL OTHER BIRDS	354	476	371
TOTAL (w/o Ptarmigan & Grouse)	25,913	20,801	25,183
TOTAL (with Ptarmigan & Grouse)	34,738	31,461	34,270

*Dillingham, Nushagak, Iliamna regions of Bristol Bay surveyed 1995, 97, 99 only, so 3 year average used for these regions. Togiak and Alaska Peninsula/Becharof Refuge regions of Bristol Bay surveyed 1995-2000, so 6 year average used.

** Activity stratification and a new estimation method were employed for the first time in 2001

Table 4. Egg subsistence harvest estimates, Bristol Bay, 1995-2001

	Bristol Bay Avg. 1995-2000*	Bristol Bay 2001**	Weighted average 1995-2000, 2001
GOOSE EGGS			
White-fronted Geese	51	26	47
Cackling Canada Geese	87	20	77
Emperor Geese	1	0	1
Black Brant	23	0	20
Lesser Canada Geese	68	0	58
Lesser Snow Geese	0	0	0
TOTAL GOOSE EGGS	230	46	204
Tundra Swan Eggs	28	47	31
Sandhill Crane Eggs	29	0	25
DUCK EGGS			
Pintails	127	171	133
Mallards	218	166	211
Unidentified ducks	423	357	414
Wigeons	0	0	0
Shovelers	0	0	0
Canvasbacks	0	0	0
Green-winged Teals	0	0	0
Buffleheads	0	0	0
Harlequins	1	0	1
Greater Scaup	2	0	2
Goldeneyes	5	49	11
Long-tailed Ducks	54	0	46
White-winged Scoters	0	0	0
Black Scoters	5	0	4
Surf Scoters	15	0	13
Common Eiders	1	0	1
King Eiders	36	0	31
Spectacled Eiders	49	0	42
Stellers' Eiders	1	0	1
Common Mergansers	65	0	56
Red-breasted Mergansers	16	24	17
TOTAL DUCK EGGS	1,018	767	982
Ptarmigan Eggs	181	0	155
Grouse Eggs	0	0	0
OTHER BIRD EGGS			
Yellow-billed Loons	4	0	3
Red-throated Loons	0	0	0
Common Loons	19	0	16
Arctic Loons	240	0	206
Common Murres	5,352	2,420	4,933
Small Shorebirds	19	0	16
Large Shorebirds	45	0	39
Mew Gulls	3,099	5,840	3,491
Sabines Gulls	2,910	1,136	2,657
Glaucous Gulls	13,527	17,633	14,114
Glaucous -winged Gulls	2,160	0	1,851
Arctic Terns	1,662	735	1,530
TOTAL OTHER BIRD EGGS	29,033	27,764	28,852
TOTAL EGGS (w/o Ptarmigan & Grouse)	30,338	28,624	30,093
TOTAL EGGS (with Ptarmigan & Grouse)	30,519	28,624	30,248

*Dillingham, Nushagak, Iliamna regions of Bristol Bay surveyed 1995, 97, 99 only, so 3 year average used for these regions. Togiak and Alaska Peninsula/Becharof Refuge regions of Bristol Bay surveyed 1995-2000, so 6 year average used.

** Activity stratification and a new estimation method were employed for the first time in 2001