

# Trends in seabird occurrence on stock assessment surveys (2002-2011)

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## Abstract

Seabird occurrence data have been collected during International Pacific Halibut Commission (IPHC) stock assessment surveys since 2002 from the west coast of Washington, Oregon, British Columbia (B.C.), southeast Alaska (inside and outside waters), the central and western Gulf of Alaska, Aleutian Islands, and the southeastern Bering Sea Edge. A total of 12,468 observations were conducted over the last nine years, and the number of stations where bird counts were performed ranged from a low of 1,218 to a high of 1,284 per year. More than 583,000 birds were recorded since 2002. Start dates for each year's survey ranged from May 25 to June 7 and the end dates from August 27 to September 14, but the bulk of observations took place from June through August.

The most common species during all years was the northern fulmar (*Fulmarus glacialis*), making up 73% of the sightings. Glaucous-winged gulls (*Larus glaucescens*) made up eight percent of the overall sightings, with black-footed albatrosses (*Phoebastria nigripes*) and fork-tailed storm petrels (*Oceanodroma furcata*) representing seven and two percent of sightings, respectively. Over time, the observed number of unidentified gulls has continually decreased, inversely correlated with an increased number of observations of glaucous-winged gulls and herring gulls (*L. argentatus*), the most common of the gull species on the eastern Pacific coast. This shift is likely the result of increased focus on gull identification during annual IPHC sampler training. Overall, the number of unidentified birds has decreased, indicating that the IPHC sea samplers have improved their identification skills. Black-footed albatross (*P. nigripes*) were more commonly observed in Washington/Oregon and northward into the Gulf of Alaska, whereas Laysan albatross (*P. immutabilis*) were seen in greatest numbers in the central and western Aleutian Islands and only rarely east of Kodiak Island. A total of 204 endangered short-tailed albatross (*P. albatrus*) were sighted in Area 3A and regions westward, more often in July and August than in June.

The survey is not conducted at the same time in each area, and this may affect the bird sighting information. Further work is needed to more fully examine the potential influence of charter timing on bird observation trends. Because of the large geographic scope and consistent spatial pattern of the surveys, these data are helpful to scientists studying populations of threatened and endangered birds commonly seen during the counts.

## Introduction

In 2002 the International Pacific Halibut Commission (IPHC), in collaboration with Washington Sea Grant, developed a sampling protocol for collecting seabird occurrence data on the IPHC stock assessment surveys. This was initially a collaborative project between the IPHC, Alaska Department of Fish and Game (ADF&G), and the National Marine Fisheries Service (NMFS) sablefish (*Anoplopoma fimbria*) survey. The purpose of the project was not only to populate a seabird database for Alaska that could be analyzed for population purposes, but also to make

recommendations for regulatory changes to the seabird avoidance requirements for commercial fishing vessels. Several reports that evaluated seabird occurrence using these data were published between 2002 and 2006 (Melvin et al. 2004, 2006; Piatt et al. 2006). Although the collaboration ended in 2004, the IPHC permanently incorporated the seabird data collection protocols into its survey program. Observations were conducted between the end of May and the beginning of September, on our setline stations from the west coast of Washington, Oregon, British Columbia (B.C.), southeast Alaska (inside and outside waters), the central and western Gulf of Alaska, Aleutian Islands, and the southeast Bering Sea continental shelf edge. Samplers aboard research vessels counted the number of seabirds in the vicinity of the vessel's stern immediately following gear retrieval (i.e., haul). Sampling seabird occurrence after the haul addresses the question of where and when certain seabird species occur. It also aids in the assessment of individual species at risk by providing information that may reflect population trends over time.

## Methods

A detailed description of IPHC seabird observation protocols can be found in the IPHC Standardized Stock Assessment Survey Manual (IPHC 2011). Briefly, bird counts have been conducted since 2002 at all IPHC standardized stock assessment grid survey stations, as well as experimental stations not used for assessment purposes. After hauling operations were completed at each station, samplers recorded the abundance of seabirds by taking a snapshot estimate of seabirds within a 50-meter radius hemisphere from the vessel's stern (the count zone; Fig.1). This concept is similar to performing a bird feeder count. Binoculars were provided to the samplers by U.S. Fish and Wildlife Service (USFWS) in order to aid the identifications. Data were recorded on forms and entered into the stock assessment database along with the other survey records. Data examined here were from IPHC setline grid and experimental stations only and did not include other agency data or records from winter surveys or special projects.

## Results

A total of 12,468 observations were conducted on the IPHC stock assessment survey over the last nine years (2002-2011). Seabird counts were taken on 99% of the IPHC setline stations. Annually, the number of stations where bird counts were performed ranged from a low of 1,218 to a high of 1,284 (Table 1). More than 583,000 birds (composed of 32 unique species) were recorded, with the number of species identified each year, varying between 17 and 21, and the average being 19 (Table 1). Start dates for each year's survey ranged from May 25 to June 7 and the end dates from August 27 to September 14, but the bulk of the surveys took place from June to August (Fig. 2)

The most common species during all years was the northern fulmar (*Fulmarus glacialis*), making up 73% of the cumulative sightings. Glaucous-winged gulls (*Larus glaucescens*) and black-footed albatross (*Phoebastria nigripes*) made up eight and seven percent of the overall sightings, respectively. Fork-tailed storm petrels (*Oceanodroma furcata*) represented two percent, and Laysan albatross (*Phoebastria immutabilis*) and black-legged kittiwakes (*Rissa tridactyla*) one percent, of all sightings (Fig. 3). Counts per year have remained relatively consistent since 2002 (Table 1) and there has been no obvious trend in abundance of the most commonly-observed species (Fig. 4), with the exception of glaucous-winged gulls. The number of the glaucous-winged

gulls has increased while the unidentified gull numbers has decreased (Fig. 5). The ratio of unidentified birds to total number of individual birds (Fig. 6) has also decreased greatly since 2002.

A geographic pattern of occurrence was observed in the abundance of the three albatross species. Black-footed albatross were observed far more frequently in Washington/Oregon and northward into the Gulf of Alaska, whereas Laysan albatross were seen in greatest numbers in the central and western Aleutian Islands, and only rarely east of Kodiak Island (Fig.7). A total of 204 of the endangered short-tailed albatross (*Phoebastria albatrus*) were observed. Most of these birds are seen in IPHC Regulatory Area 3A and regions westward, but in 2011, two birds were seen in Washington waters and one sighted in B.C. off the northern end of Haida Gwaii. These data are of particular importance because the short-tailed albatross is a rare species and one of considerable interest to management agencies. Regulations surrounding its protection and recovery affect the North Pacific longline fisheries.<sup>1</sup>

## Discussion

The number of unidentified birds within the count zone has decreased since the start of the seabird data collection program in 2002, indicating that the IPHC sea samplers have improved their identification skills. A specific case was seen with glaucous-winged gulls, where observation rates were inversely correlated with observation rates of unidentified gulls; as glaucous-winged gull sightings increased, unidentified gull sightings decreased (Fig. 5). This is likely because IPHC instructors increased their focus on gull identification during annual field staff training and samplers have become better-skilled at identification.

The survey is not conducted at the same time in each area, and this can skew the bird sighting information. Caution should be exercised when using the data, because short-term changes in observed abundance might not necessarily reflect changes in population abundance, but could instead reflect spatio-temporal shifts in distribution that are not captured by the “snapshot” survey. Further work is needed to more fully examine charter timing and its effect on the bird occurrence data.

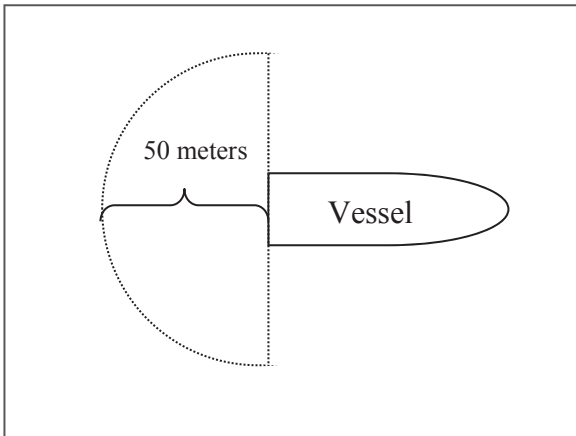
Population sizes of many birds species vary from year to year and trends up or down can be indicative of a change in diet, weather, and/or timing of chicks fledging from the nest. Though the surveys offer only a snapshot in time of bird occurrence, they are broad in geographic scope (conducted coastwide) and are repeated in the same spatial pattern annually. By continuing to accumulate data, we hope to eventually determine how observations relate to actual abundance levels; specifically, for birds of concern such as the albatrosses. With continued, consistent gathering of these data for all species seen, trends in abundance may be determined that will help predict a species’ decline or recovery.

## References

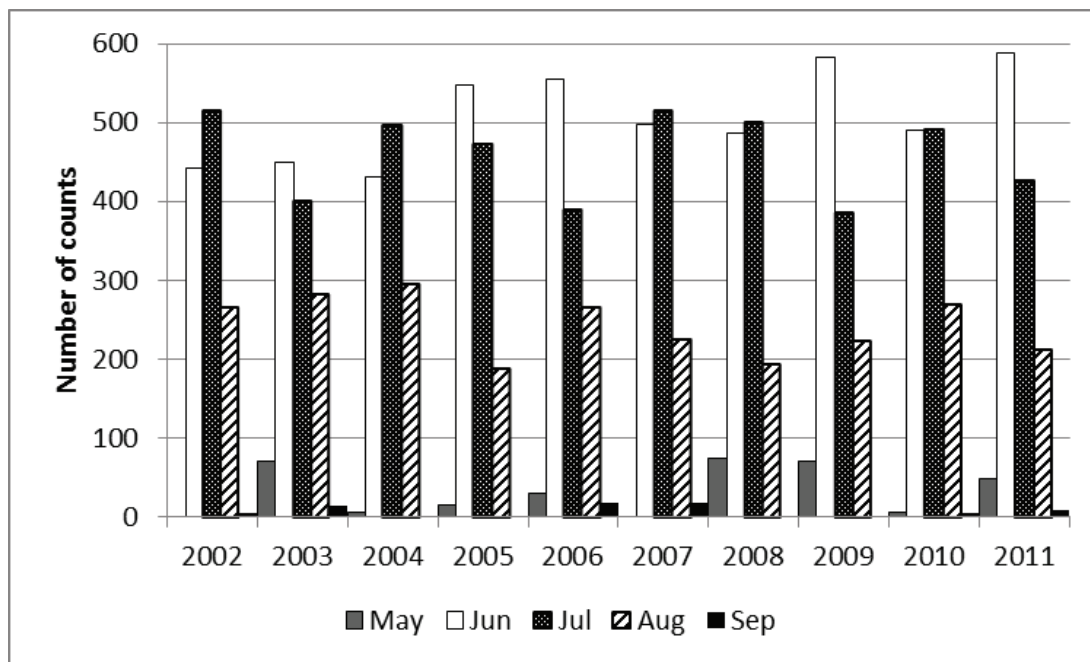
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**Table 1. Number of individual birds (by species) observed in post-hauling counts 2002-11.**

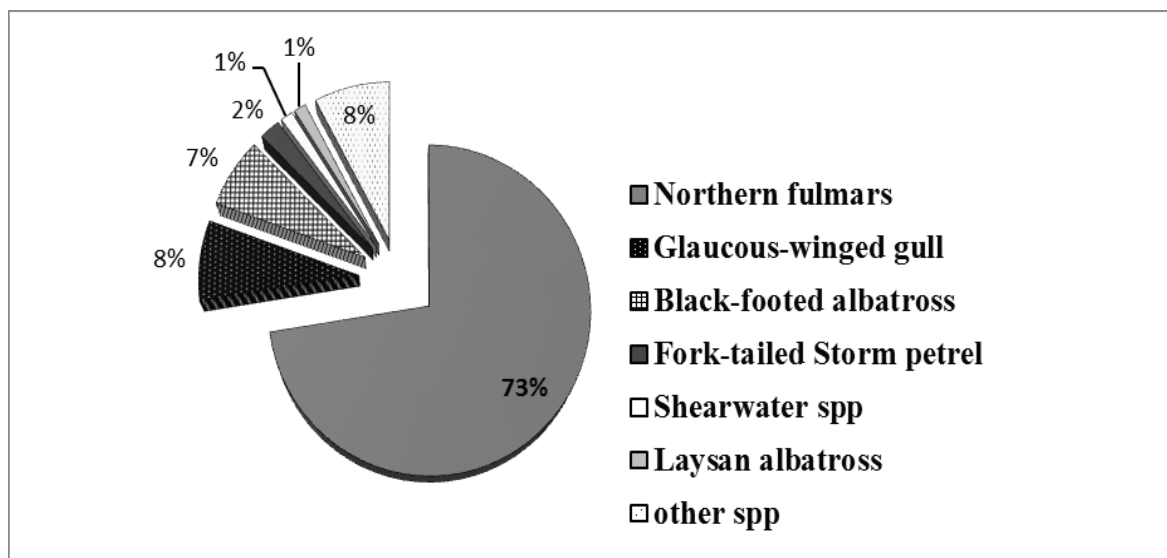
Species	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Northern fulmar	40918	40150	31966	42345	45661	47775	43427	42346	46372	41784	422744
Black-footed albatross	2465	3071	5520	4125	4507	4443	3314	4337	4630	4325	40737
Laysan albatross	964	742	806	487	621	221	612	816	775	1211	7255
Short-tailed albatross	6	19	22	10	30	22	30	14	27	24	204
Glaucous-winged gull	1375	1688	896	2310	4740	7067	6606	6642	8287	6816	46427
Herring gull	9	-	20	274	276	98	144	26	686	1228	2761
Mew gull	-	100	-	-	-	-	-	14	-	-	114
Glaucous gull	-	-	-	-	30	3	-	33	-	16	82
Sabine's gull	-	3	-	-	-	2	-	5	2	6	18
Slaty-Backed gull	-	-	-	-	7	-	-	-	-	-	7
Ring-billed gull	-	-	-	-	-	-	5	1	-	-	6
Heermann's gull	-	-	-	4	-	-	-	-	5	4	13
Bonaparte's gull	-	-	-	-	-	1	-	-	-	-	1
Unidentified gull	4348	6373	8531	9109	1976	250	372	358	782	118	32217
Arctic tern	1	-	-	-	-	-	-	2	-	-	3
Unidentified tern	20	3	-	-	-	-	5	-	-	-	28
Pomarine jaeger	3	-	1	2	3	3	3	1	2	2	20
Parasitic jaeger	3	1	4	1	1	-	2	-	6	5	23
Long-tailed jaeger	-	-	-	-	-	-	-	3	-	-	3
Unidentified jaeger	8	5	10	-	-	-	-	3	12	-	38
South Polar skua	-	-	-	-	-	-	1	-	-	-	1
Fork-tailed Storm petrel	1052	920	1748	1171	1891	776	937	1416	1840	839	12590
Leach's Storm petrel	11	5	9	326	34	119	92	10	5	22	633
Unidentified storm petrel	973	754	541	669	642	495	359	140	32	8	4613
Black-legged kittiwake	211	271	78	185	817	661	317	357	380	205	3482
Red-legged kittiwake	3	17	3	5	25	4	9	2	10	21	99
Unidentified kittiwake	51	5	271	283	3	5	3	243	1	63	928
Short-tailed shearwater	15	511	-	10	47	595	327	38	8	13	1564
Sooty shearwater	77	90	15	130	276	15	4	88	77	150	922
Pink-footed shearwater	-	-	62	-	1	-	-	-	6	3	72
Unidentified shearwater	418	174	636	676	1020	750	20	327	381	558	4960
Common murre	-	-	-	-	-	-	2	-	2	-	4
Unidentified murre	19	9	9	4	28	67	18	1	13	6	174
Rhinoceros auklet	1	-	-	-	-	-	-	-	-	-	1
Parakeet auklet	-	-	-	-	-	-	2	-	-	-	2
Horned puffin	-	1	-	-	3	1	-	-	2	-	7
Tufted puffin	-	5	5	7	11	8	1	15	11	4	67
Unidentified puffin	1	15	16	28	7	11	9	13	27	6	133
Bald eagle	-	1	1	-	-	-	-	-	-	-	2
Unidentified alcid	72	1	1	-	-	-	-	-	-	-	74
Unidentified bird	32	16	1	53	-	3	-	3	-	10	118
Unidentified cormorant	1	-	-	-	-	1	-	-	1	1	4
Grand Total	53057	54950	51172	62214	62657	63396	56621	57254	64382	57448	583151
Number of counts	1228	1218	1227	1222	1257	1255	1257	1260	1260	1284	12468
Number of unique species	19	19	17	17	20	20	20	20	21	21	32



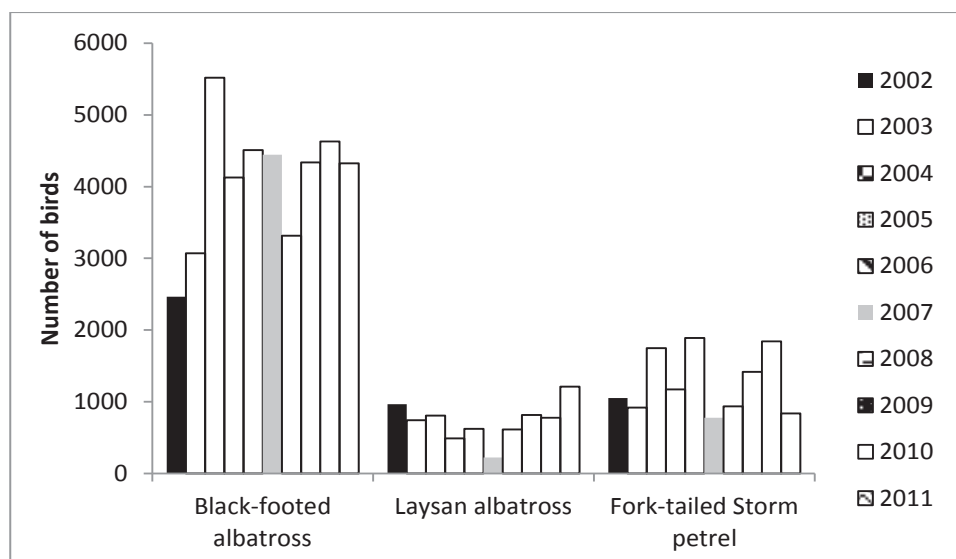
**Figure 1. Seabird counts were performed within a 50-meter hemisphere (count zone) at the stern, immediately after longline gear was hauled.**



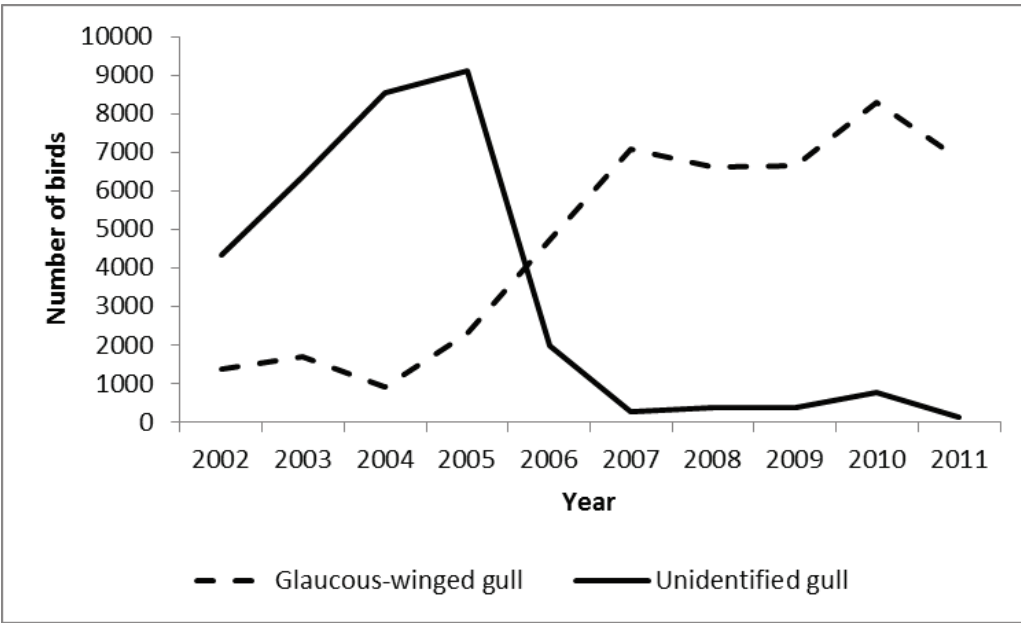
**Figure 2. Seabird counts conducted at IPHC setline survey and experimental stations, by month and year, 2002-2011.**



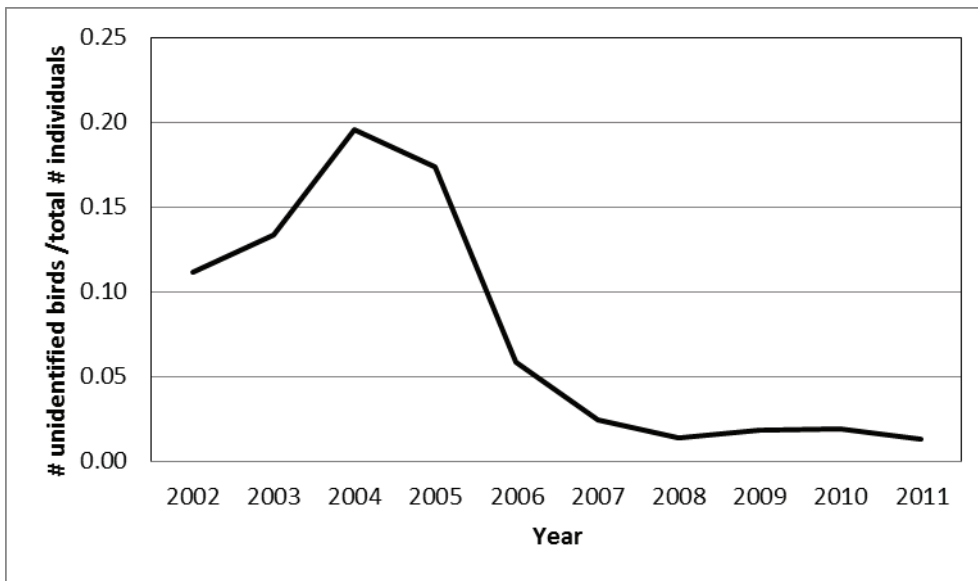
**Figure 3. Frequency of observation (%) of common seabird species observed at IPHC setline survey and experimental stations, 2002-2011.**



**Figure 4. Observations of common birds at IPHC setline survey and experimental stations, by year.**

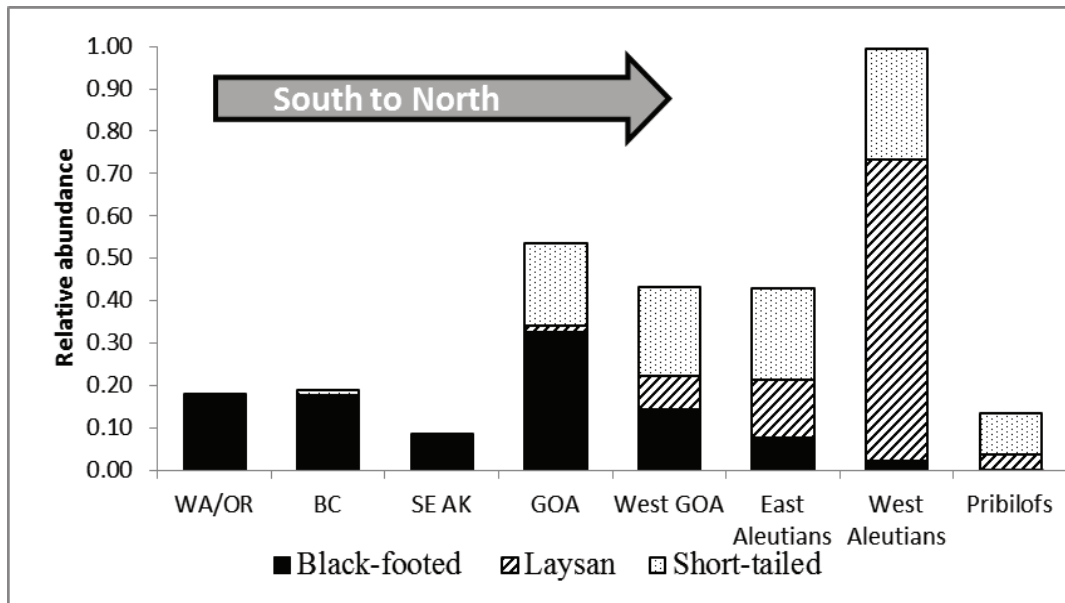


**Figure 5. Glaucous-winged gull numbers versus unidentified gull numbers observed at IPHC setline survey and experimental stations, by year.**



**Figure 6. The ratio of number of unidentified birds to total individuals observed at IPHC setline survey and experimental stations, by year.**





**Figure 7. Relative abundance of the 3 albatross species over the IPHC survey. Abbreviated locations are as follows: WA/OR = Washington and Oregon, BC = British Columbia, SE AK = southeast Alaska, GOA = central Gulf of Alaska, West GOA = western Gulf of Alaska.**

