OCS Study
MMS 2000-072

MONITORING SEABIRD POPULATIONS IN AREAS OF OIL AND GAS DEVELOPMENT ON THE ALASKAN CONTINENTAL SHELF

A COMPUTERIZED PELAGIC SEABIRD ATLAS FOR ALASKA

John F. Piatt
Biological Resources Division
U.S. Geological Survey
1011 East Tudor Road'
Anchorage, Alaska 99503

and

R. Glenn Ford
Ecological Consulting Inc.
2735 NE Weidler St.
Portland, Oregon 97232

Final Report to Minerals Management Service
December 2000

This study was funded in part by the U.S. Department of the Interior (USDOI), Minerals Management Service (MMS), through Intra-agency Agreement No. 14407 with the USDOI, Fish and Wildlife Service, as part of the MMS Alaska Env'ironmental Studies Program

Introduction

Seabirds are the most visible and vulnerable victims of oil pollution in marine waters. As demonstrated by the *"Exxon Valdez"* spill (Piatt et al. 1990), we cannot predict when or where an accident leading to pollution might occur in Alaska, or where oil will eventually end up traveling from a point source of pOllution. It is therefore prudent to document the abundance and distribution of seabirds throughout Alaska in order to: i) assist in the planning and development of future oil fields, ii) identify areas with significant and predictable aggregations of seabirds so that these areas might be avoided, if possible, in the extraction and shipment of oil, and, iii) mitigate and assess the impact of oil pollution if and when it occurs.

This report contains results of a pilot project funded by MMS in 1993 to compile pelagic seabird data that was available at that time and demonstrate capabilities for mapping of pelagic distribution data for Alaskan seabirds. No funding was provided by MMS to continue work on the database in subsequent years, and attempts to locate alternate funding during intervening years have also not been successful. Therefore this report only indicates the potential for a pelagic database, and shows maps of bird distribution developed from OCSEAP data only (see below).

Despite these limitations, this report contains the only broad-scale maps of seabird distribution in Alaska since Gould et al. (1982). Much pelagic data continues to be collected each year by various investigators in Alaska. It is still our hope that a pelagic database will be developed which not only allows access to historical data, but also creates an active repository for data collected in the future.

The Pelagic Database

The need for comprehensive geographic data on the pelagic and colony distribution of seabirds in Alaska has long been recognized. During the Outer Continental Shelf Environmental Assessment Program (OCSEAP) of the 1970's, unprecedented efforts were undertaken to gather and assimilate these data. Additional data were routinely collected on environmental conditions at sea (e.g., temperature, salinity), and on marine mammals. This work culminated in two atlases which are still widely used today by researchers and management agencies around the world (despite being out of date). The "Catalog of Alaskan Seabird Colonies" (Sowls et al. 1978) documented the distribution and species composition of all seabird colonies in Alaska. Shortly thereafter, Gould et al. (1982) published the atlas of "Pelagic

Distribution and Abundance of Seabirds in the Gulf of Alaska and Eastern Bering Sea" which documented. the at-sea distribution and abundance of 16 common seabird species in one degree latitude-longitude blocks. In addition to this landmark work, reports by other key investigators (e.g., Hunt et al. 1981) laid the foundation for our understanding of the pelagic biology and distribution of seabirds in Alaska.

Since these atlases were produced, a considerable amount of new data has been collected on the pelagic distribution of seabirds in Alaska and the North Central Pacific (e.g., Hunt & Harrison 1990, Piatt et al. 1991, 1993, 1997; Schauer 1992, Elphick & Hunt 1993, Hunt et al. 1993, Gould & Piatt 1993, Klosiewski & Laing 1994, Byrd et al. 1997). The USFWS maintains and updates a detailed colony database for Alaska and Russia.

We would like to develop a computerized GIS mapping system for displaying and analyzing pelagic seabird data in Alaska and other areas of the North Pacific. The original atlas by Gould et al. (1982) included about 5,500 shipboard and 1,900 aerial transects conducted in Alaska mostly between 1976 and 1981 (Table 1). For this pilot work, we re-compiled the original OCSEAP data from sources at the Fish and Wildlife Service and National Ocean Data Center, proofed these original data, and archived them in a

standard format. A program was written to compile these data into one degree latitude- iongitude blocks, and this database was used to produce GIS maps using CAMRIS (Computer Aided Mapping and Resource Inventory System). Since OCSEAP, a great many other pelagic surveys have been conducted by agency and university investigators, and these data need to be integrated into the database (Table 1, Appendix 1). This involves a considerable effort of reconstructing many dissimilar datasets that were collected using different protocols, and depends on collaboration with principal investigators (Table 1). These include aerial surveys (50-100 m transect widths, continuous recording of bird .observations), large vessel surveys (300 m transect widths, 10-min transects using methods described by Gould and Forsell, 1989), small-boat, shoreline transects (100 m transect widths, variable length transects), and surveys with variations on these techniques. Survey data may have been collected continuously, or binned into 10-min or transect length units of time or distance. In addition to differing in methods of collection, these various datasets are archived in different formats using different softwares, and all need to be compiled and re-formatted into a common database.

Once compiled, a software program is needed to manipulate, filter, and compile data subsets into desired outputs for mapping (with ARC-INFO, ARC-View, etc.) or data analysis (e.g., SAS). It would then possible for users to select subsets of the database by cruise, area, investigator, survey type, year, month, species or other taxonomic group for further analysis. Similar to the database archive prepared for California (Ecological Consulting Inc. 1993) a manual for use of the filtering software and generation of specific datasets is required. Ultimately, the entire database and filtering software could be made available on CD-ROM. We would ultimately like to combine all available datasets for Alaska, Russia, British Columbia, Washington, Oregon, California, and the North Central Pacific. Final products should include CD-ROM disks and user manuals for distribution to contributors, and ultimately a published hard-copy atlas of pelagic seabird distribution in the North Pacific (joint publication of the U.S. Geological Survey, U.S. Fish and Wildlife Service, Minerals Management Service, and. other major contributors [e.g., Univ. California, Irvine, Univ. of Alaska, Fairbanks]). Finally, another useful end product would be a web-based user-interface that could deliver custom made maps for any area and species of interest.

Preliminary Analyses

Preliminary analyses (Figs. 1-29) of pelagic seabird data gathered from ships and compiled for the years 1976-1984 (i.e., a fraction of the total available data; Table 1) show how pelagic seabird distribution data can be used to assess gross patterns of abundance and relationships with topographical features of the region and seabird colony distribution. Computerized seabird colony data were obtained from Art SowIs/NOAA. Analyses and mapping of seabird distribution were accomplished with CAMRIS (Computer Aided Mapping and Resource Inventory System; Copyright 1987, 1988 by R. Glenn Ford, Ecological Consulting Inc.). For mapping, transects were first grouped and averaged over 60 min latitude-longitude blocks (Piatt and Ford 1993). Density polygons were generated from blocked data, and missing blocks were filled using algorithms that extrapolate from densities of adjacent blocks.

Fig.l shows the distribution of 1° latitude-longitude blocks sampled by the existing database.' The, average abundance of murre species is indicated for each block by differential scaling (see key for density indices). Block data can be transformed by smoothing algorithms to develop density polygons (Fig. 2), which provide a better impression of seabird distribution. The density

polygons are scaled geometrically, with highest densities appearing as darker shades. Here, we have also overlain the distribution of murre colonies (filled circles, geometrically scaled into three abundance levels) and mapped pelagic distribution for the summer breeding season only. Clearly, murres are concentrated near breeding colonies in summer, and occur mostly within the boundaries of the continental shelves. Highest densities occur in the Bering and Chukchi Seas. During winter (Fig. 3), murres move south and reside in the southern Bering Sea and southeast Alaska. Zooming in for a closer look at Cook Inlet and the Alaska Peninsula, we can see (Fig. 4) that murres in this region are concentrated near major breeding colonies at the Semidi Islands, and in lower Cook Inlet. During winter (Fig. 5), the association with colonies disappears, and murres concentrate around Kodiak Islands and in Shelikof Strait.

The summer distribution of all major seabird taxa are illustrated in Figs. 6-29. Note that scaling for each species differs depending on their mode of disperion. Highly aggregated species (e.g., murres) are scaled geometrically whereas dispersed species which are typically found in very low densities are usually scaled arithmetically. Thus, different maps are not equivalent in showing distributional abundances of each species

(although they could ali be standardized to achieve this effect) In general; breeding species are most abundant during summer around their breeding colonies. Species (e.g., fulmars, storm-petrels) that forage at great distances from colonies, however, are not concentrated near colonies. Non-breeding species (e.g., albatrosses, shearwaters) are not constrained by colony location and are distributed in habitats preferred for foraging. In any case, mapping reveals that species exhibit markedly different distributional patterns, often in association with bathymetric features (e.g., coastal- Larus gulls; shelf- murres, kittiwakes; shelfedge- fulmars, storm-petrels; oceanic- albatrosses) .

Conclusions

The computerized pelagic seabird database and atlas could be a valuable tool for scientists and resource managers. We estimate that it will require about two years of development to reach a stage where it can be distributed (with associated software) for general application. It can then be used to: i) interpret and improve our understanding of the pelagic ecology of individual seabird species in the North Pacific, ii) provide distibution and abundance information for mitigating and assessing impacts of offshore'oil development on the Alaskan continental shelf, iii)

develop site-specific information for agencies to provide on request from the public or other management agencies (e.g., NMFS), and, iv) provide baseline information for assessing changes in seabird distribution and abundance in the future (particularly where data have been collected systematically and repeatedly in the same geographic areas).

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Table 1. Summary of primary pelagic seabird datasets that may be incorporated in the pelagic seabird atlas. Area surveyed (km^2) was estimated from the numbers of transects conducted times transect area (length times width).

Source	Type	Years	Square km	Area
OCSEAP	Ship/Aerial	1976-1984	63,100	ALL AREAS
Hunt et al.	Ship	1976-1998	±20,000	BS, ALEU
Irons et al.	Smallboat	1984-1995	± 2,520	PWS, GOA
Kodiak NWR	Ship	1984-1998	± 8,100	KOD
Laing et al.	Smallboat	1989-1991	1,700	PWS
Gould et al.	Ship	1989-1992	3,350	NCP, GOA
Day et al.	Ship	1980-1988	10,160	BS, NCP
Schauer et al.	Ship	1988-1991	1,630	BS, CHUK
Piatt et al.	Ship	1988-1999	9,800	ALL AREAS
Byrd & Piatt	Ship	1995-1999	± 2,600	BS
Lindell	Ship	1993-1998	1,700	SE
TOTAL			± 125,890	

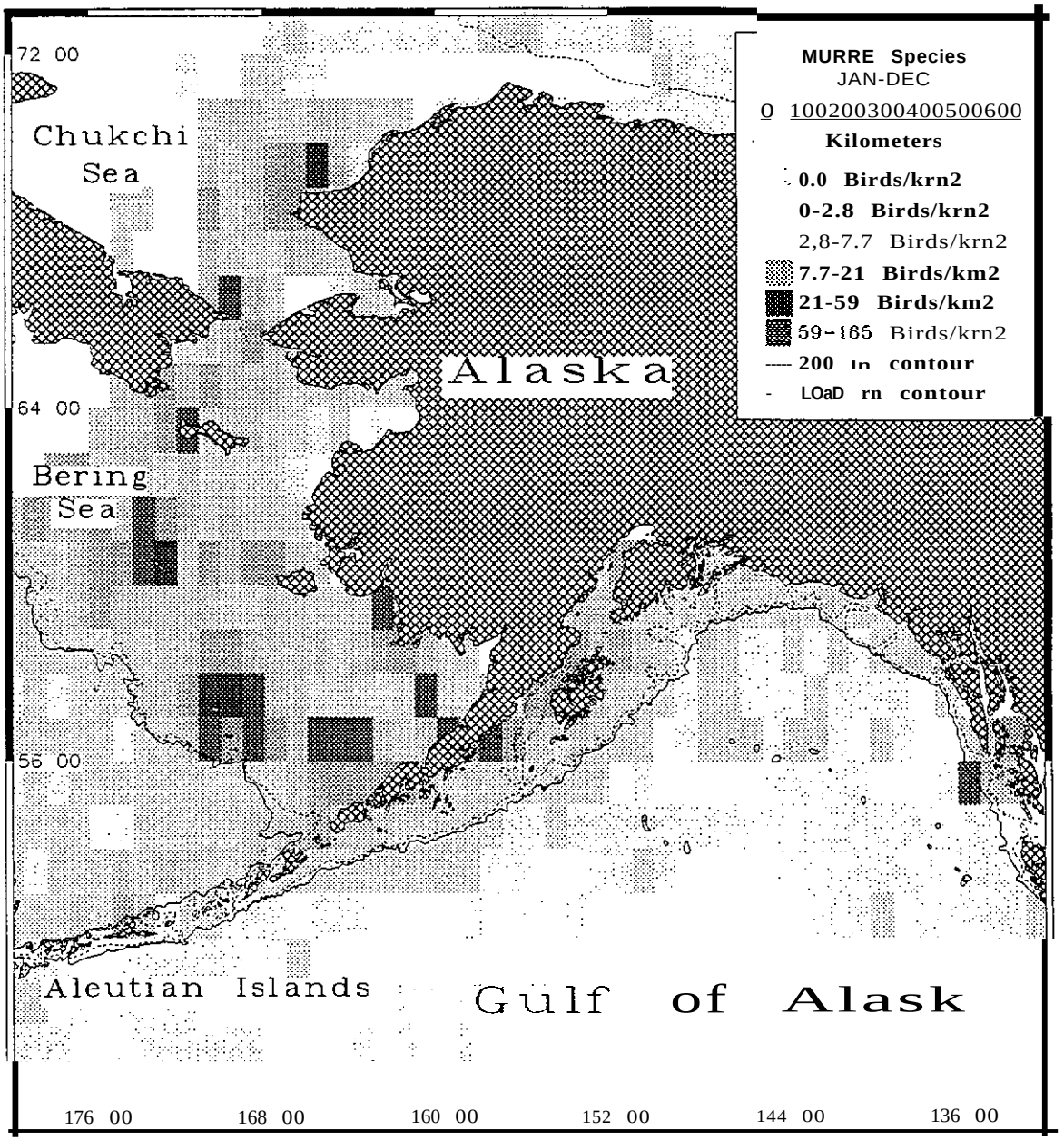

Figure 1. Map of the distribution and abundance of murres (Uria spp.) in Alaska throughout the year. Each 1° latitude-longitude block is shaded to show the average density of murres (see key) in that block. Shaded blocks reveal where ship-based pelagic seabird surveys have been conducted during the time period included for this preliminary analysis (1976-1984).

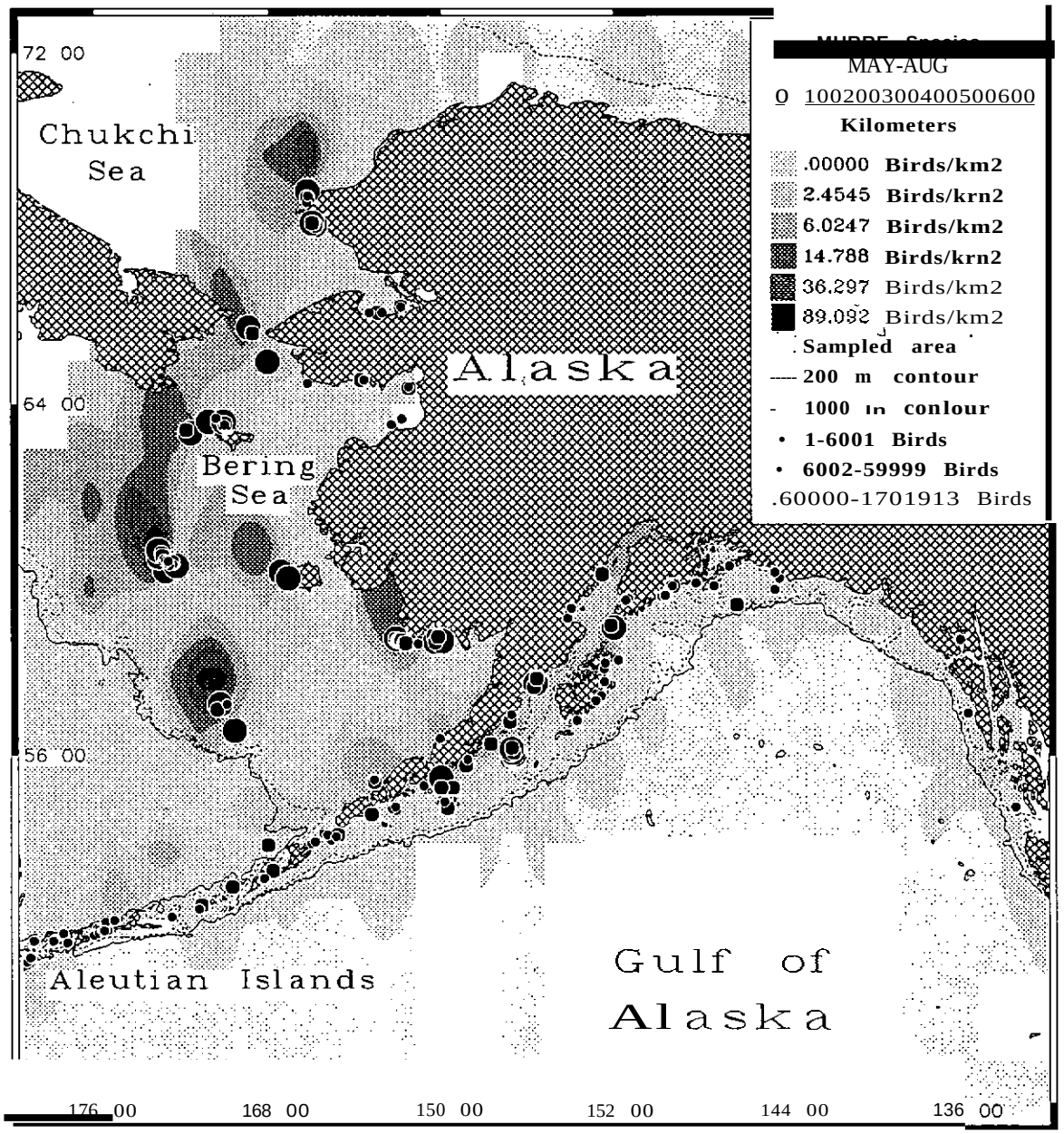

Figure 2. Distribution and abundance of murres CUria spp.) in Alaska during the summer breeding season. Abundance data contoured geometrically and smoothed for aid in visual interpretation. The key indicates the density of murres at the edge of the contour, e.g., the lowest density contour ranges from 0.0 murresjkm' at the edge of that contour polygon to 2.45 murresjkm' at the edge of the next highest density polygon. All known murre colonies are plotted as filled circles and scaled into three size categories.

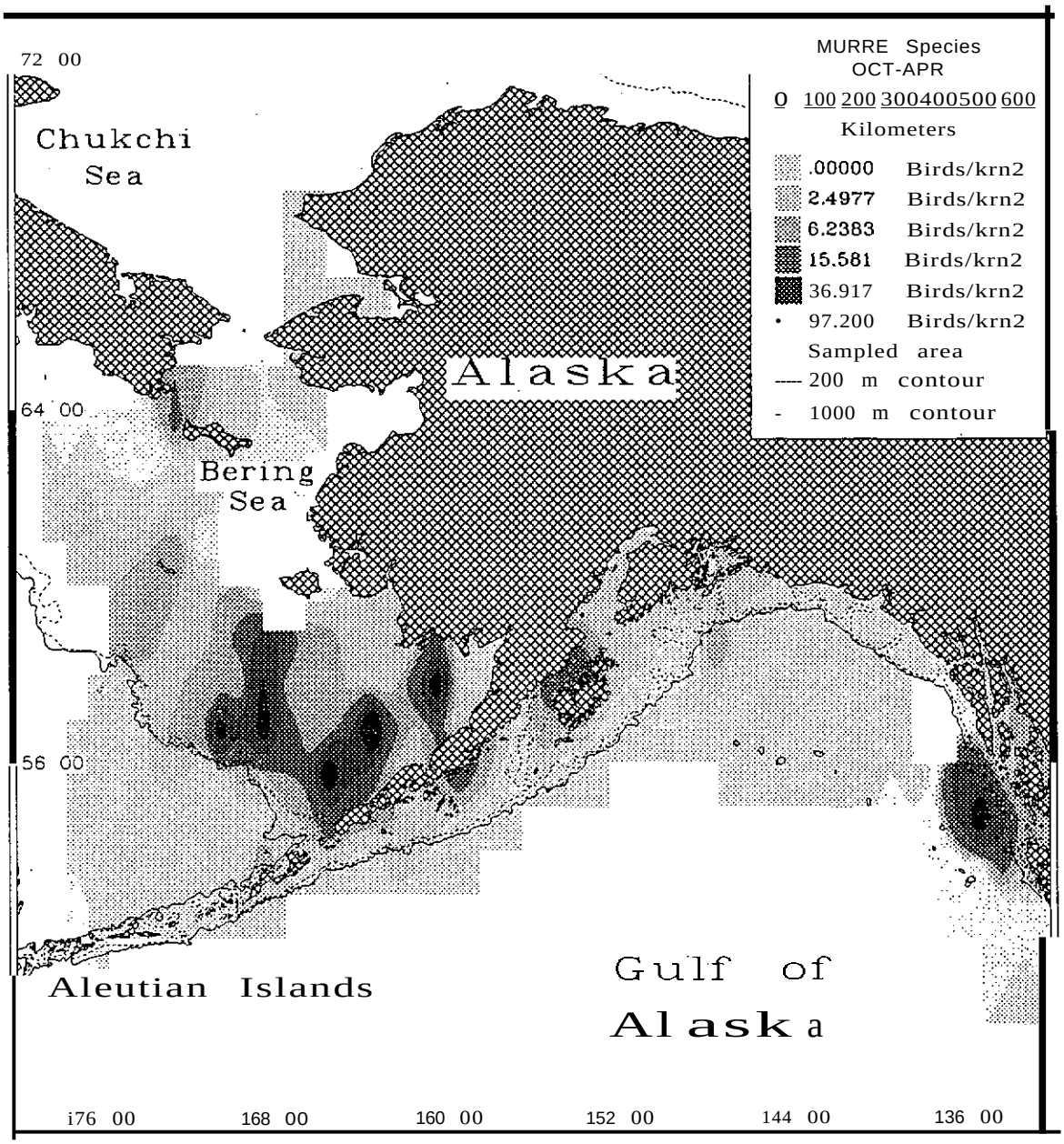

Figure 3. Distribution and abundance of murres (Uria spp.) in Alaska during winter.

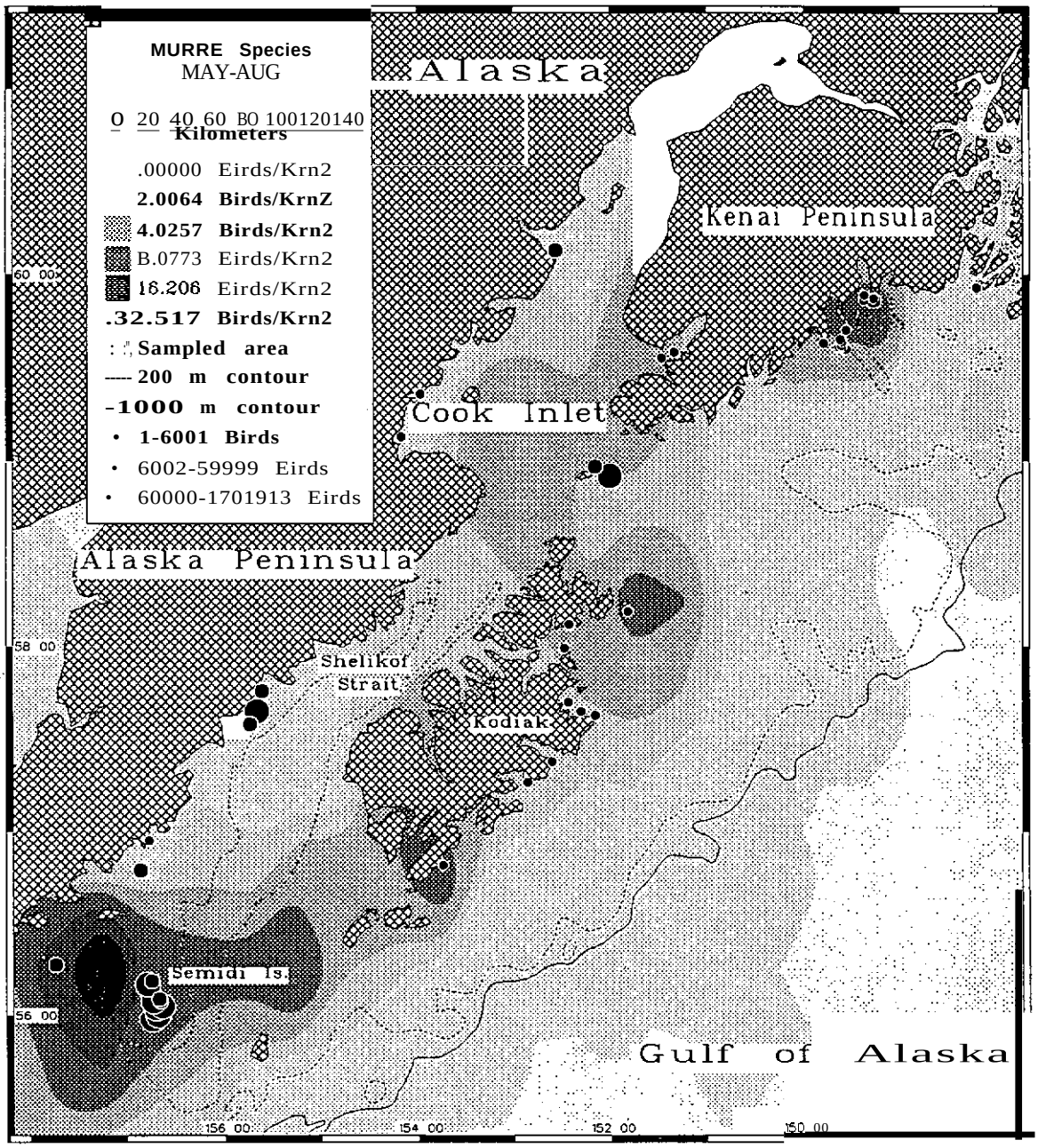

Figure 4. Distribution and abundance of murres (Uria spp.) in southcentral Alaska during the summer breeding season.

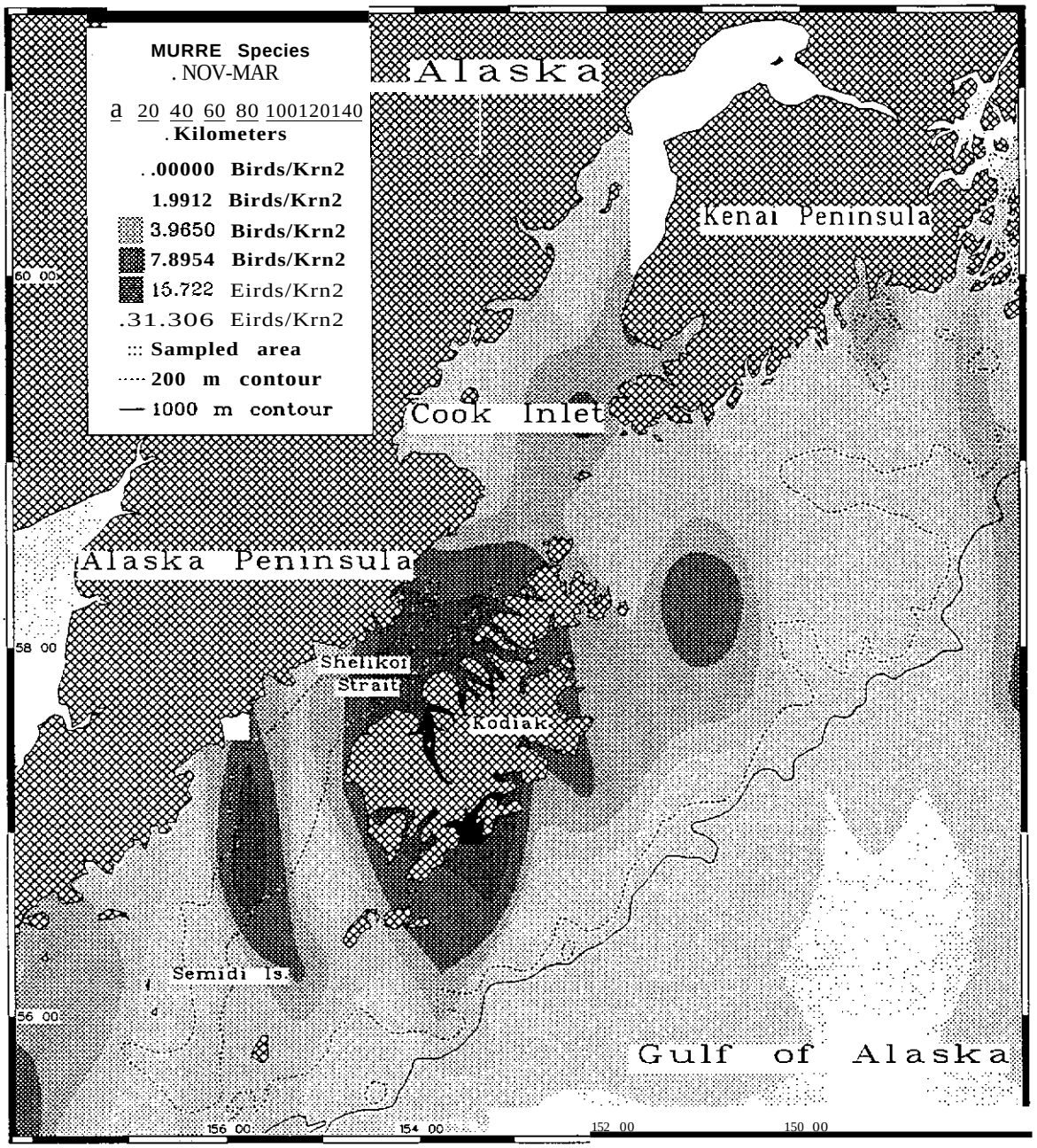

Figure 5. Distribution and abundance of murres CUria spp.) in southcentral Alaska during winter.

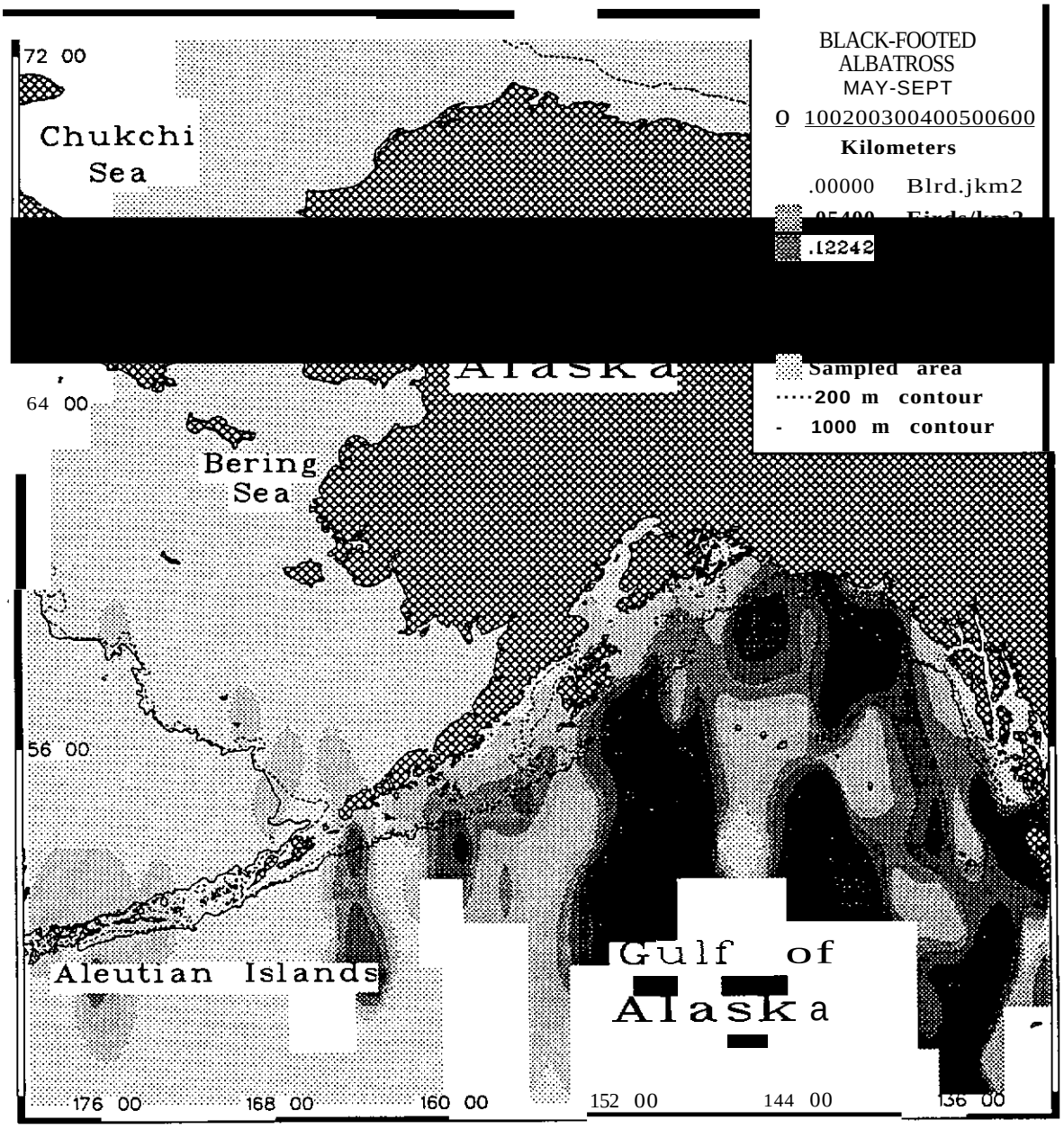

Figure 6. Distribution and abundance of Black-footed Albatross in Alaska during summer. Note arithmetic scaling of density.

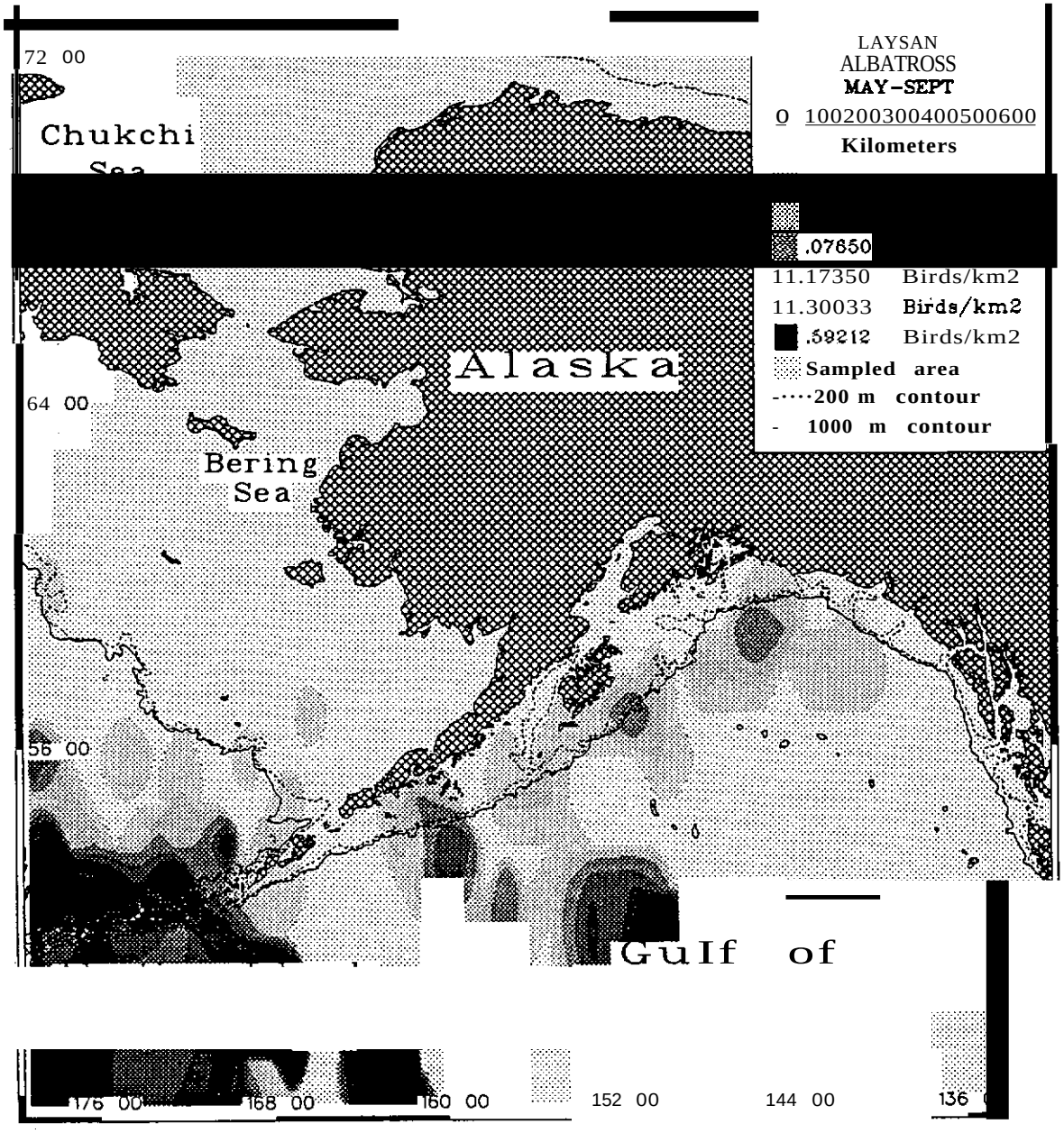

Figure 7. Distribution and abundance of Laysan Albatross in Alaska during summer. Note arithmetic scaling of density.

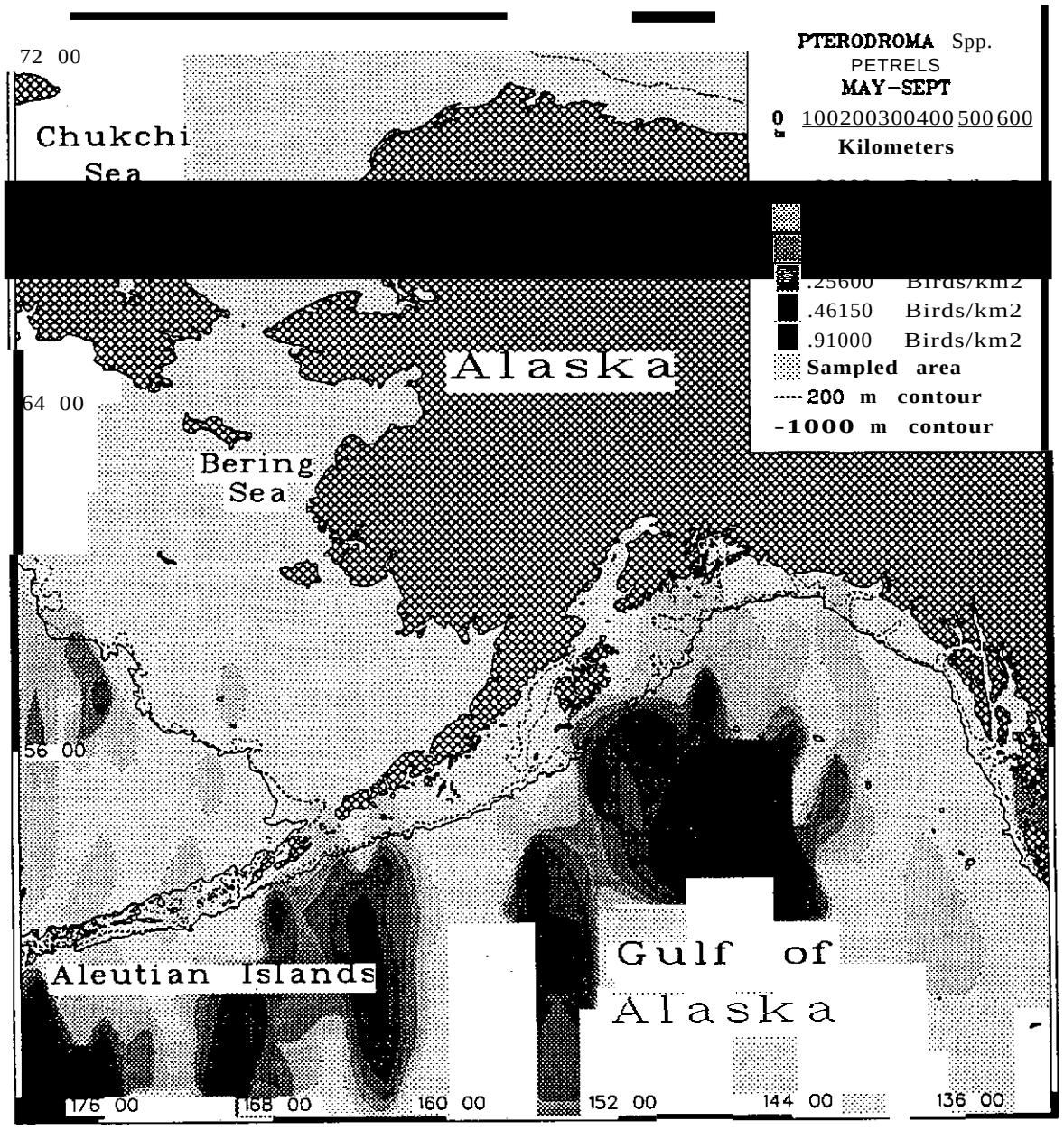

Figure 8. Distribution and abundance of Pterodroma petrels (primarily Mottled Petrel) in Alaska during summer. Note arithmetic scaling of density.

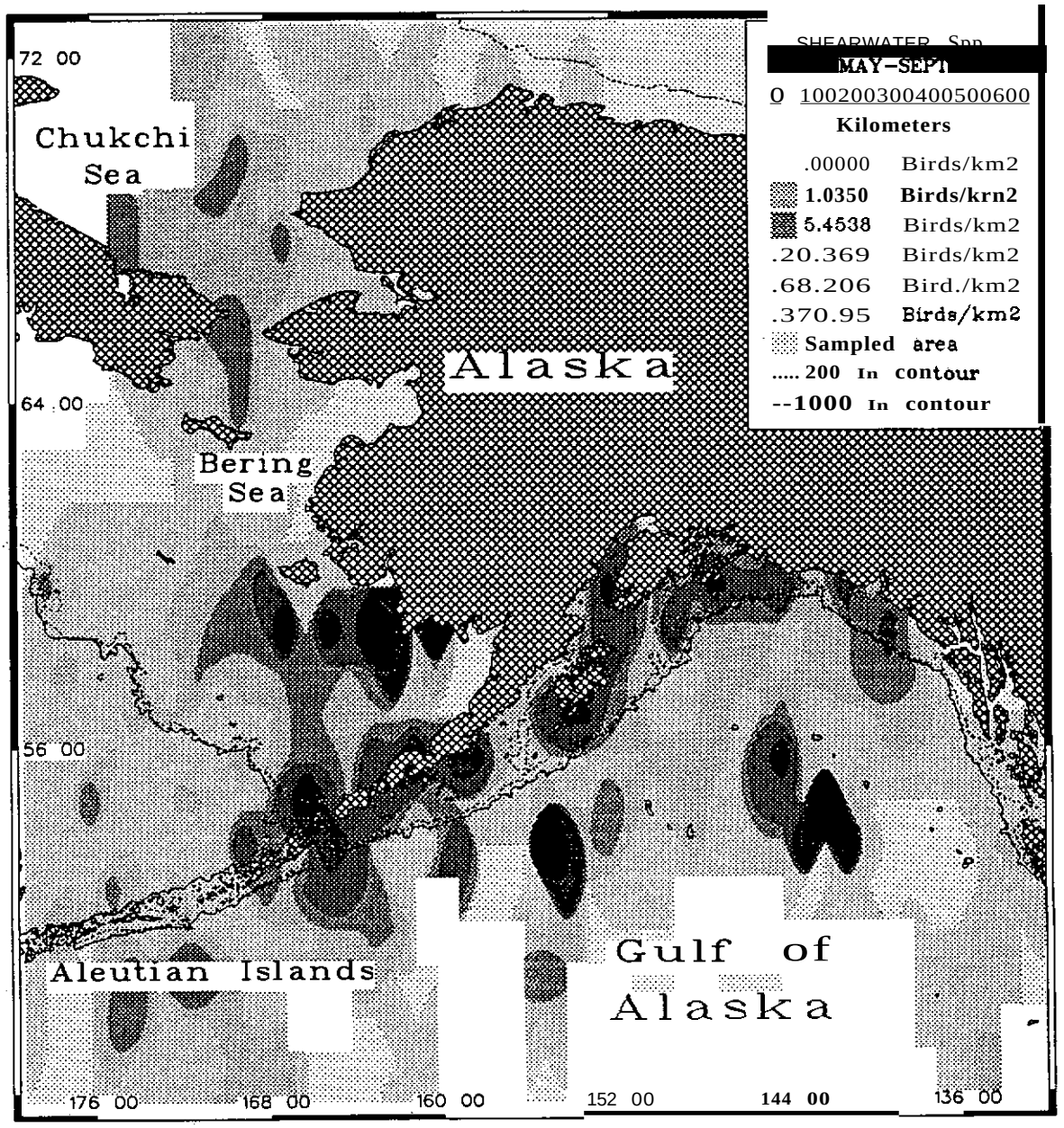

Figure 9. Distribution and abundance of shearwaters (principally Short-tailed and Sooty) in Alaska during' summer. Note geometric scaling of density.

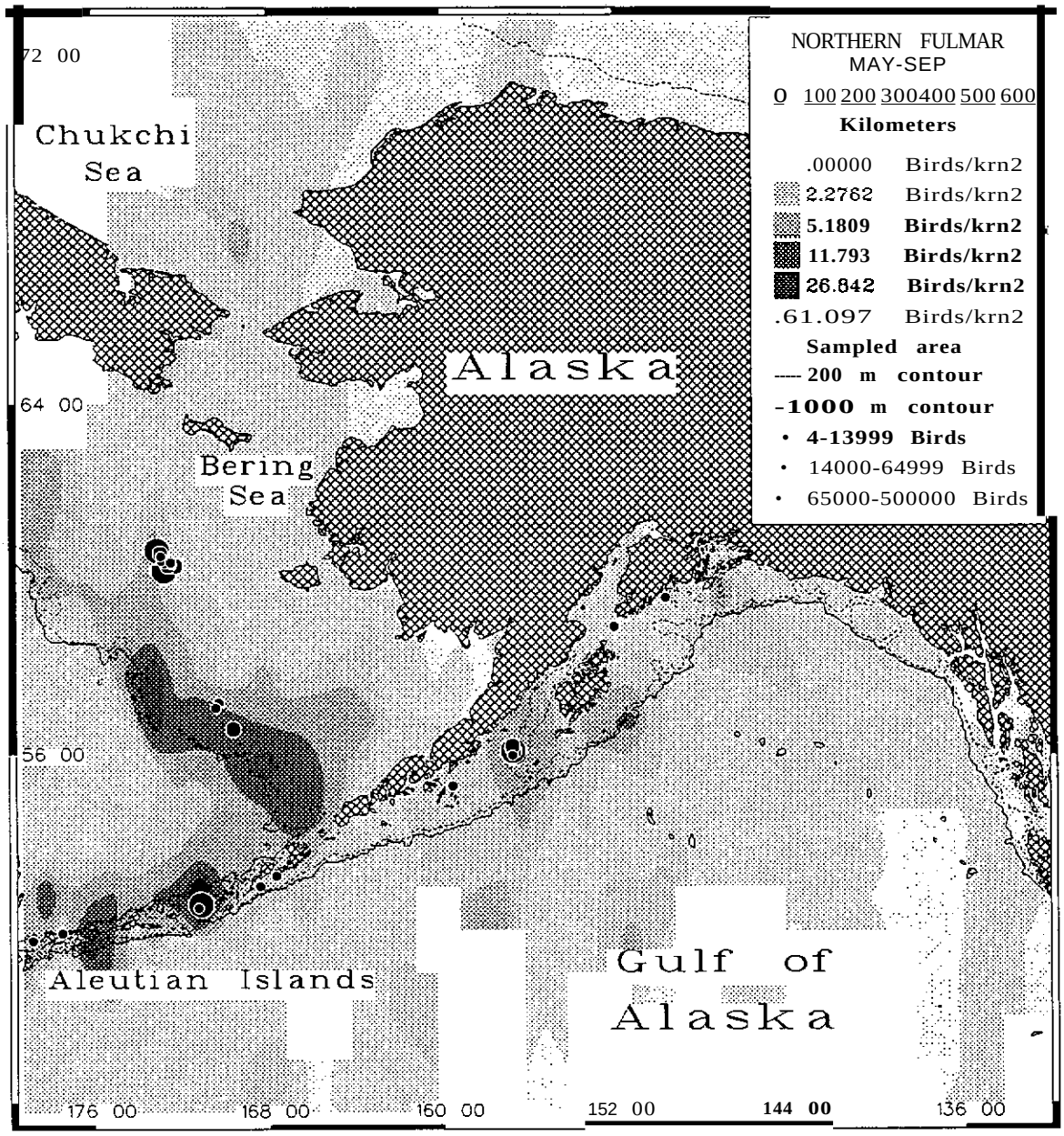

Figure 10. Distribution and abundance of Northern Fulmar in Alaska during summer. Note geometric scaling of density.

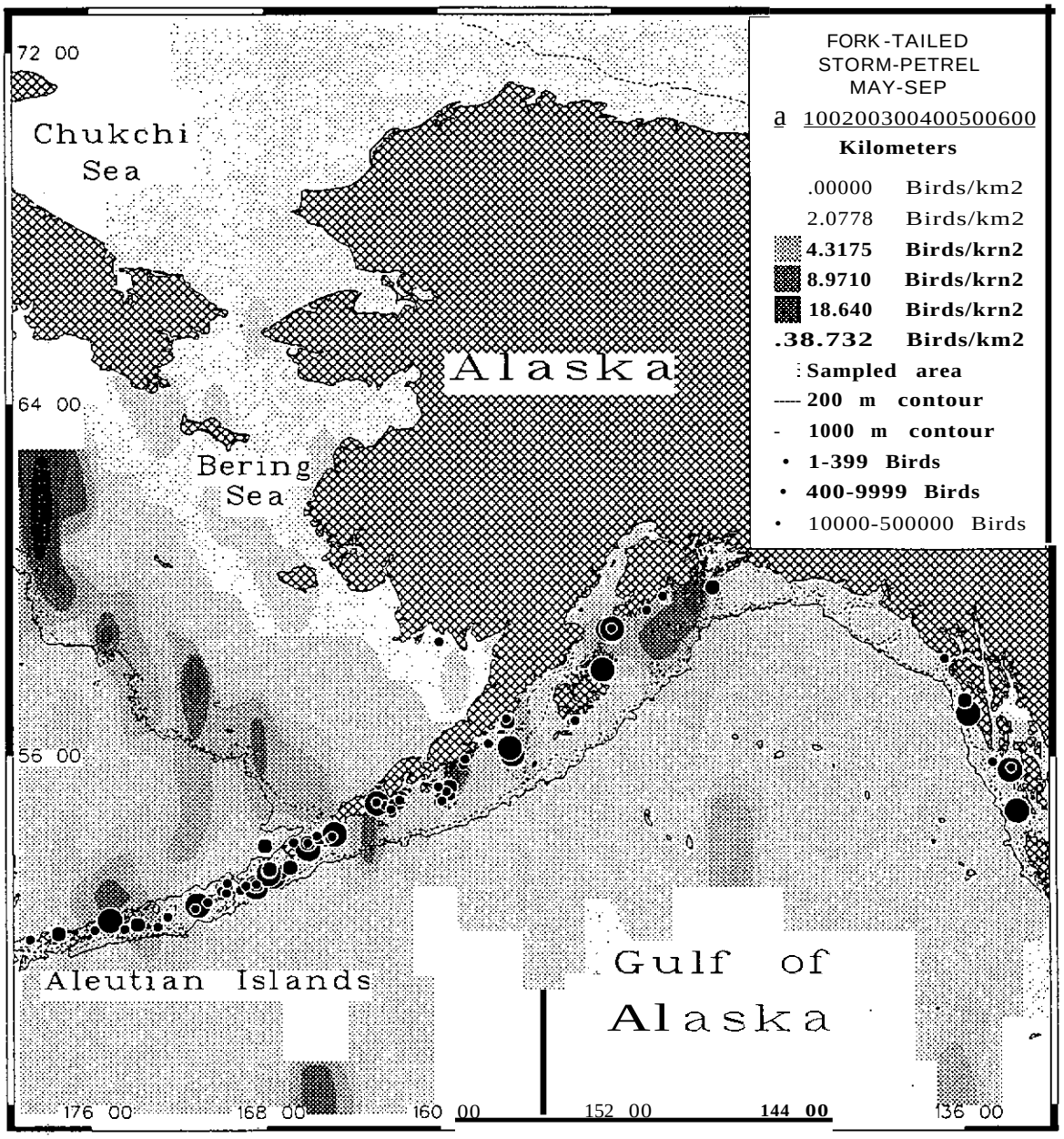

Figure 11. Distribution and abundance of Fork-tailed storm-petrel in Alaska during summer. Note geometric scaling of density,

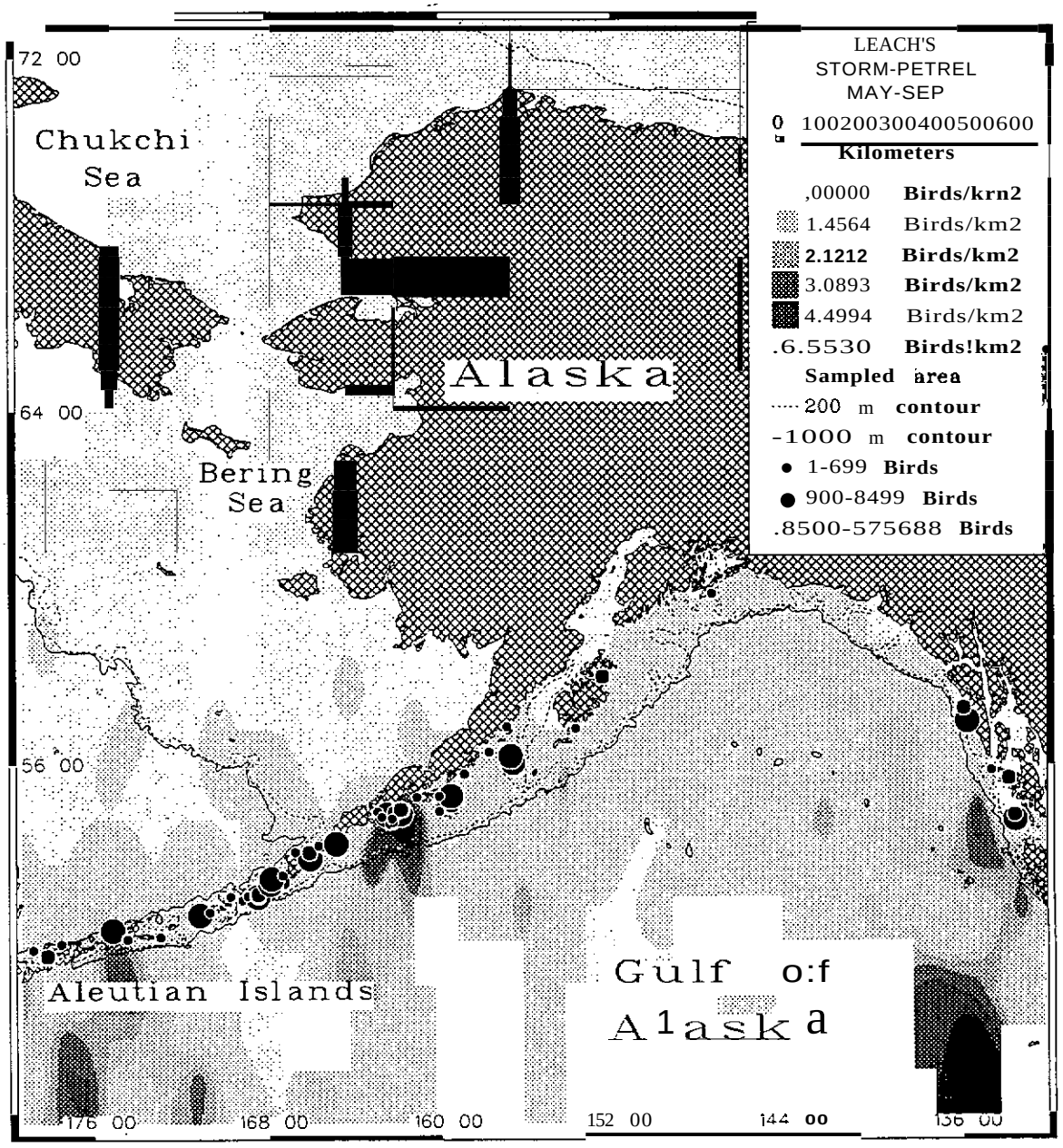

Figure 12. Distribution and abundance of Leach's storm-petrel in Alaska during summer. Note arithmetic scaling of density.

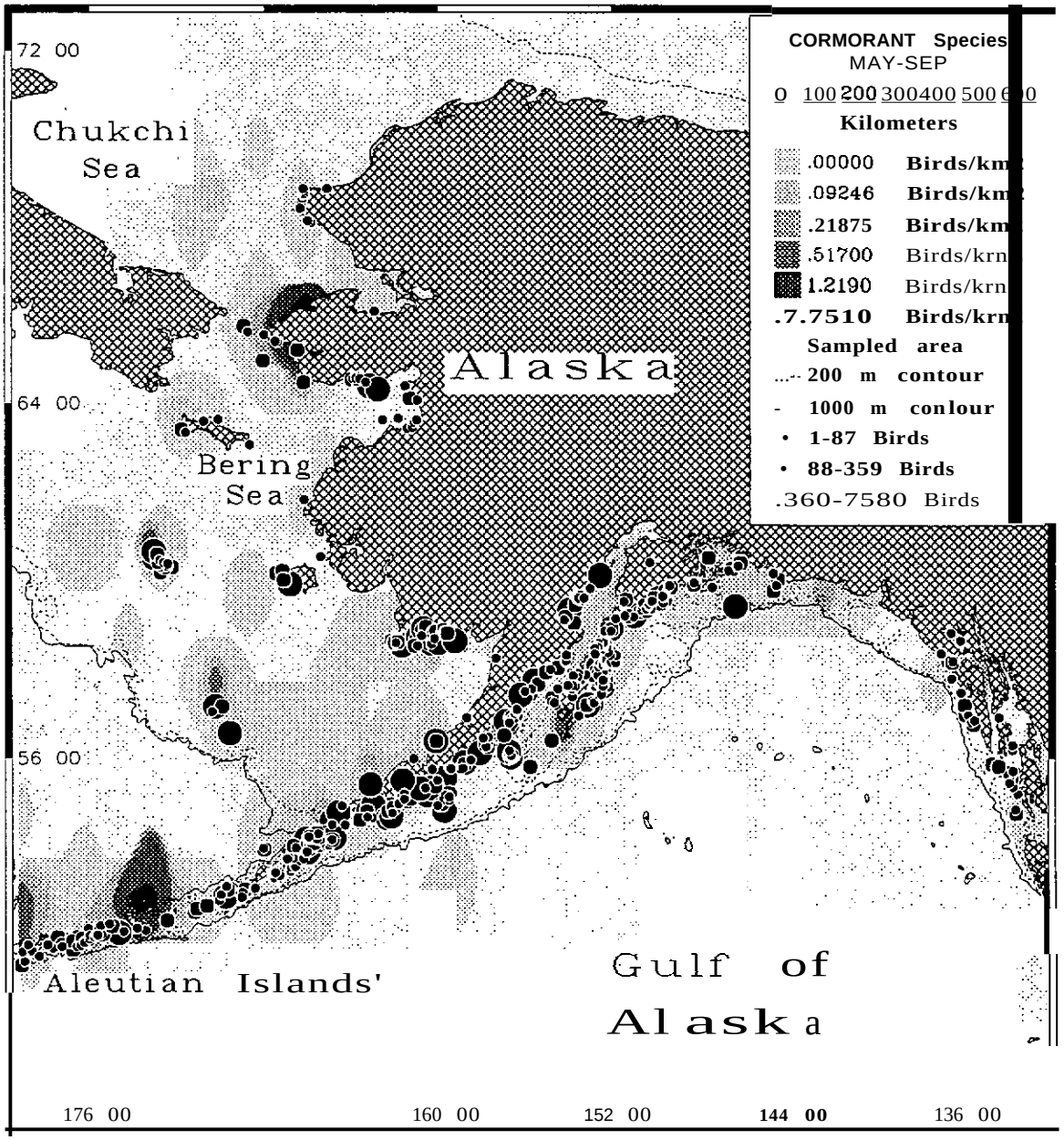

Figure 13. Distribution and abundance of Cormorants (principally Pelagic, Red-faced, and Double-crested) in Alaska during summer. Note arithmetic scaling of density.

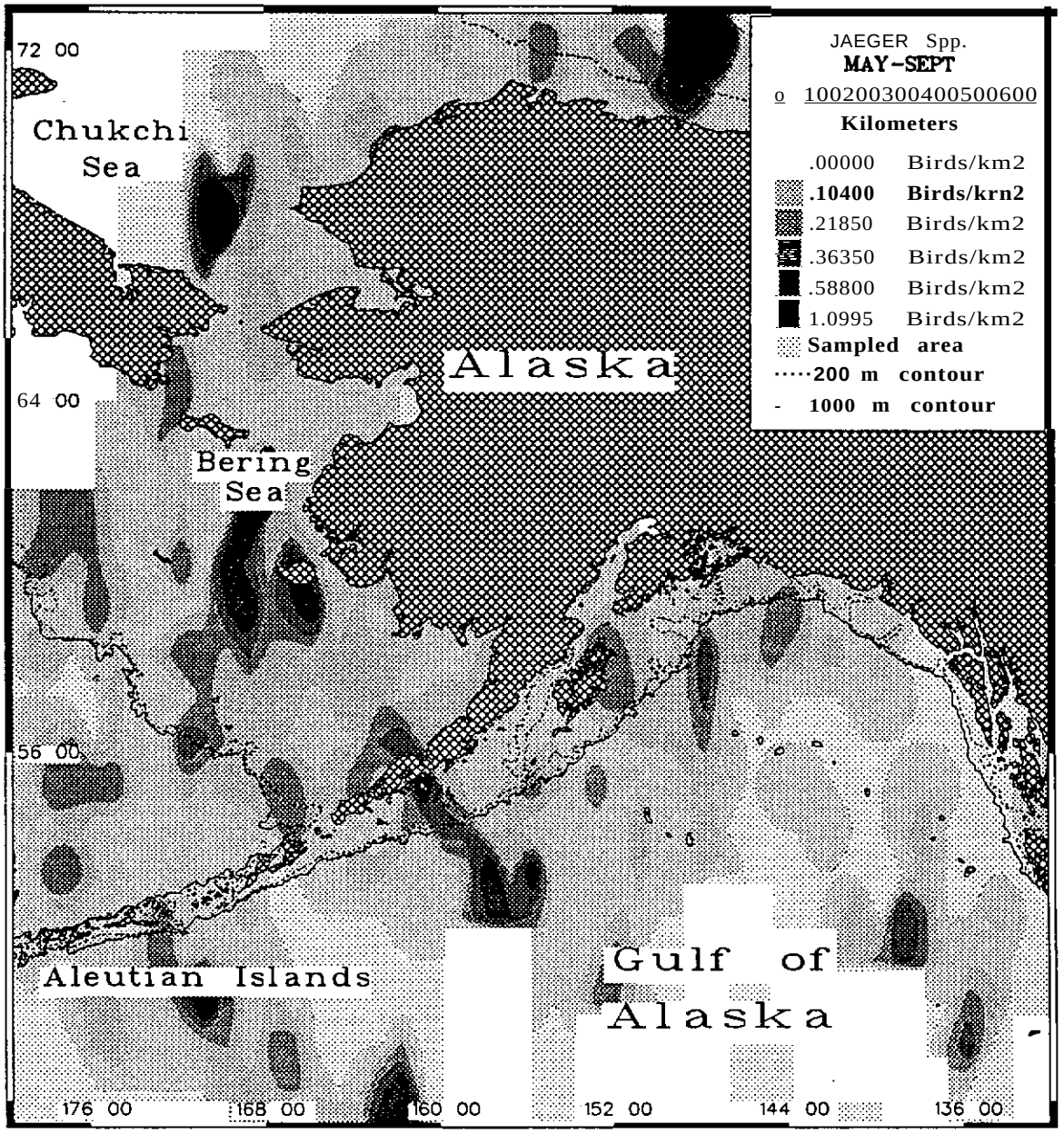

Figure 14. Distribution and abundance of Jaegers (Pomarine, Long-tailed and Parasitic) in Alaska during summer. Note geometric scaling of density.

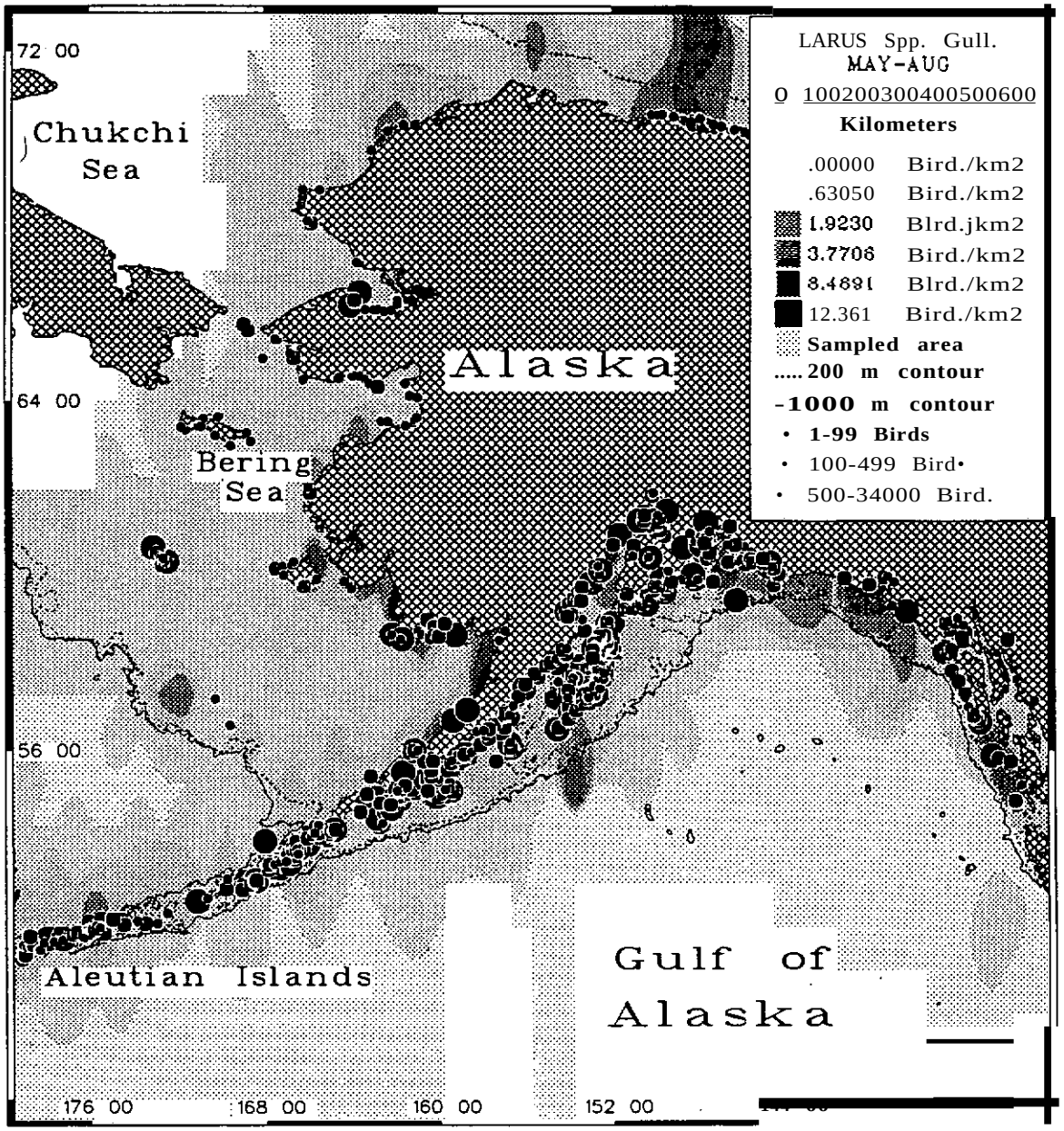

Figure 15. Distribution and abundance of Larus gulls (Herring, Glaucous-winged, Glaucous) in Alaska during summer. Note geometric scaling of density.

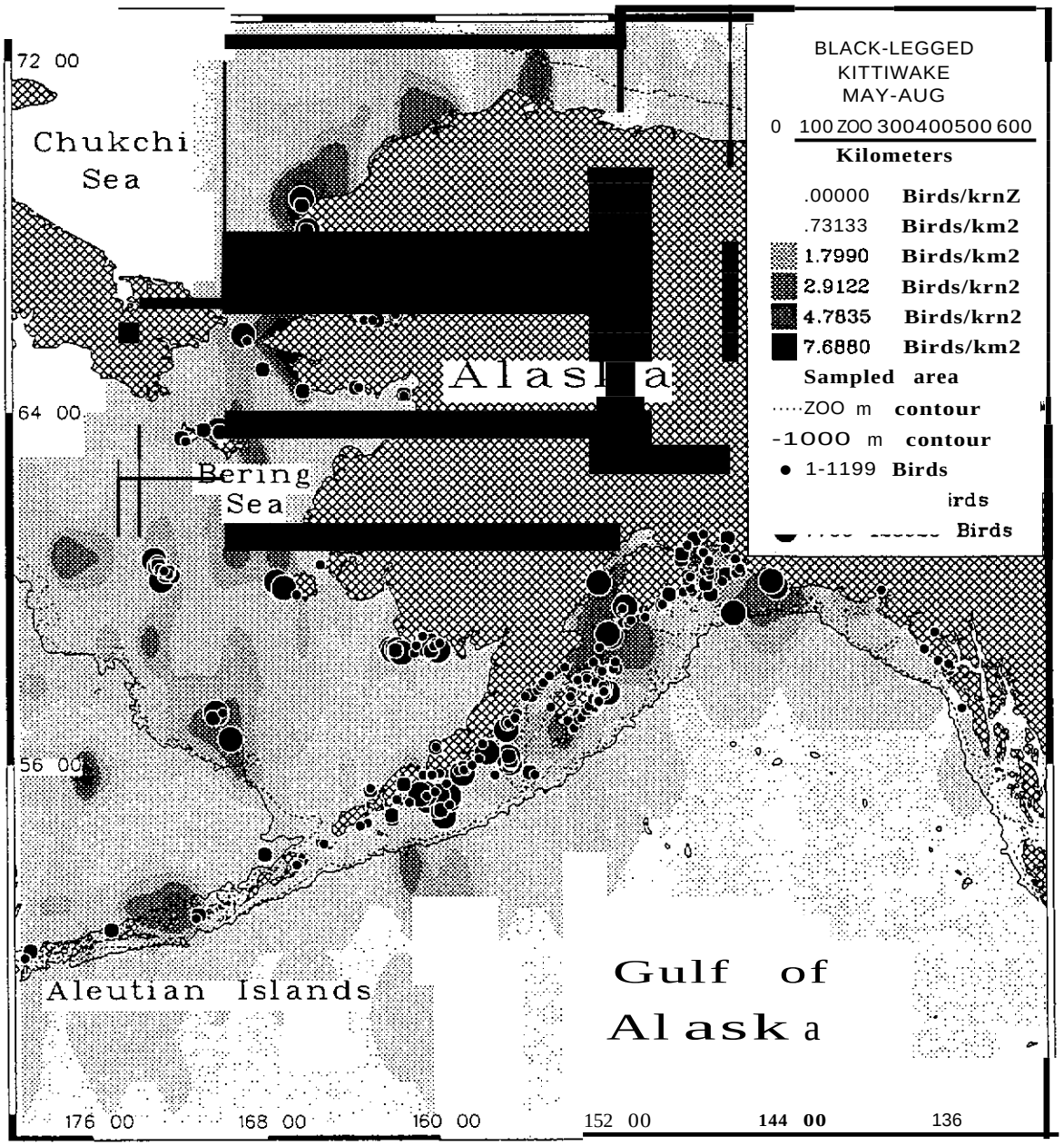

Figure 16. Distribution and abundance of Black-legged Kittiwakes in Alaska during summer. Note geometric scaling of density.

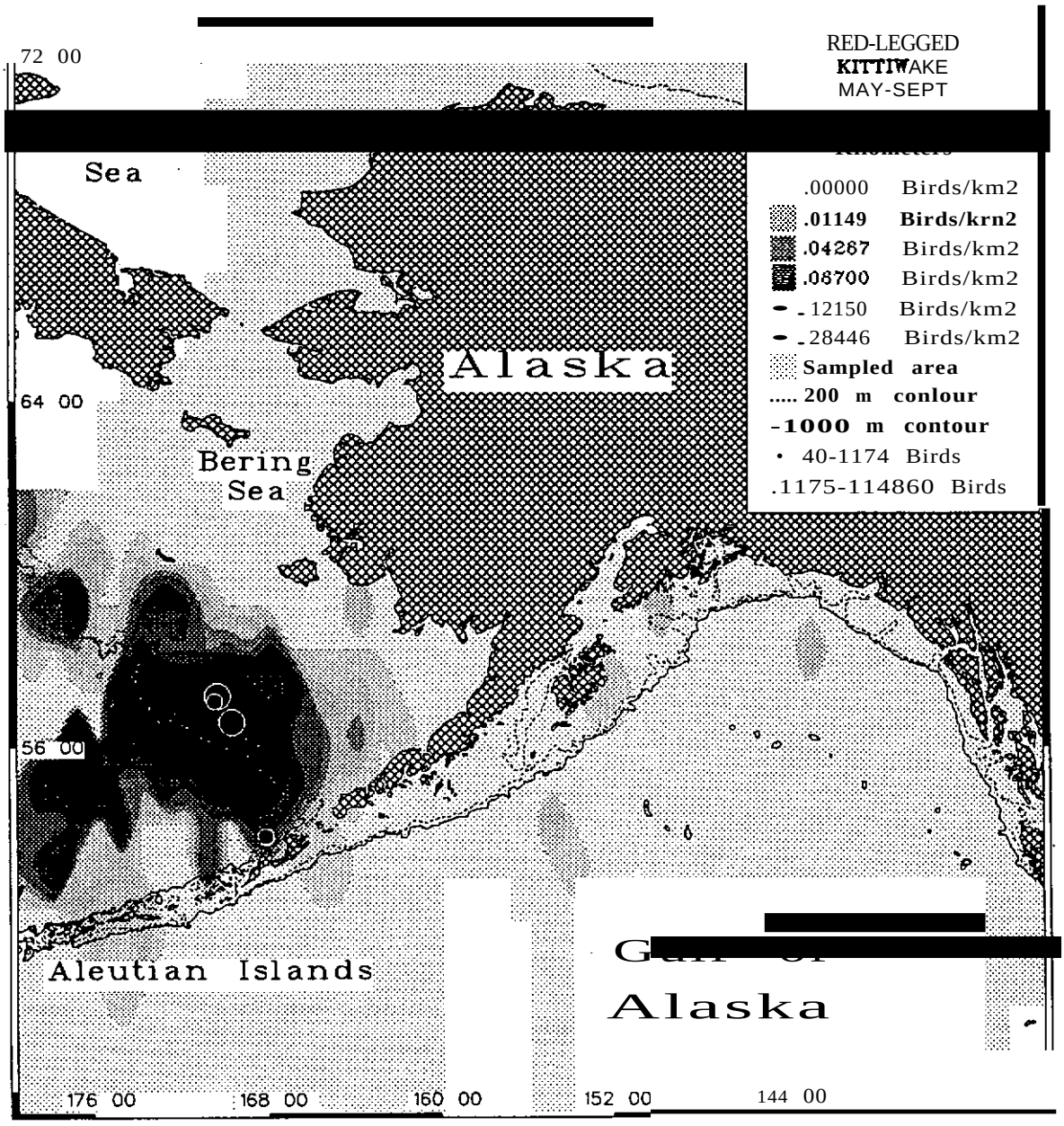

Figure 17. Distribution and abundance of Red-legged Kittiwakes in Alaska during summer. Note arithmetic scaling of density.

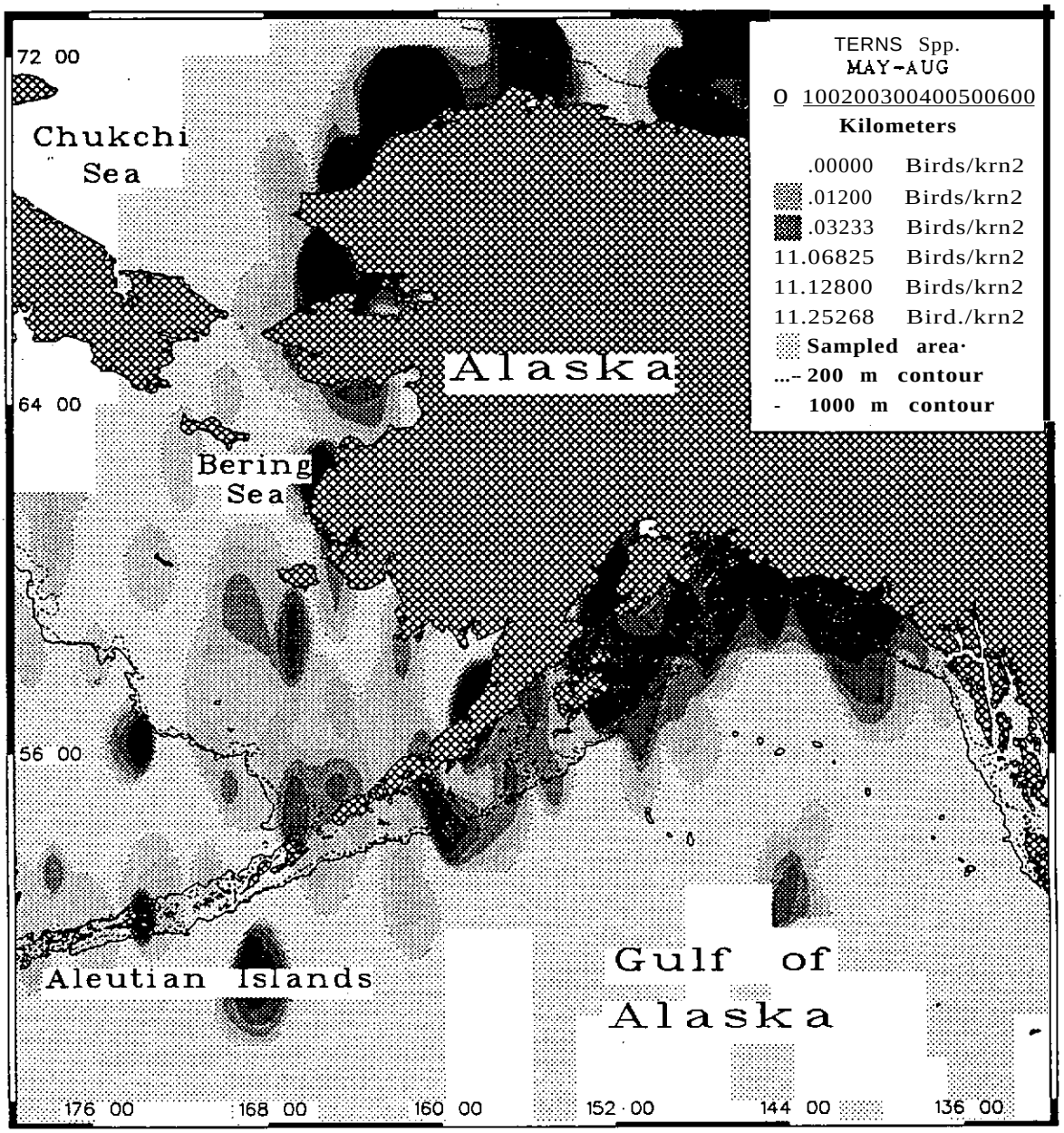

Figure 18.' Distribution and abundance of Terns (Arctic, Common, Aleutian) in Alaska during summer. Note arithmetic scaling of density.

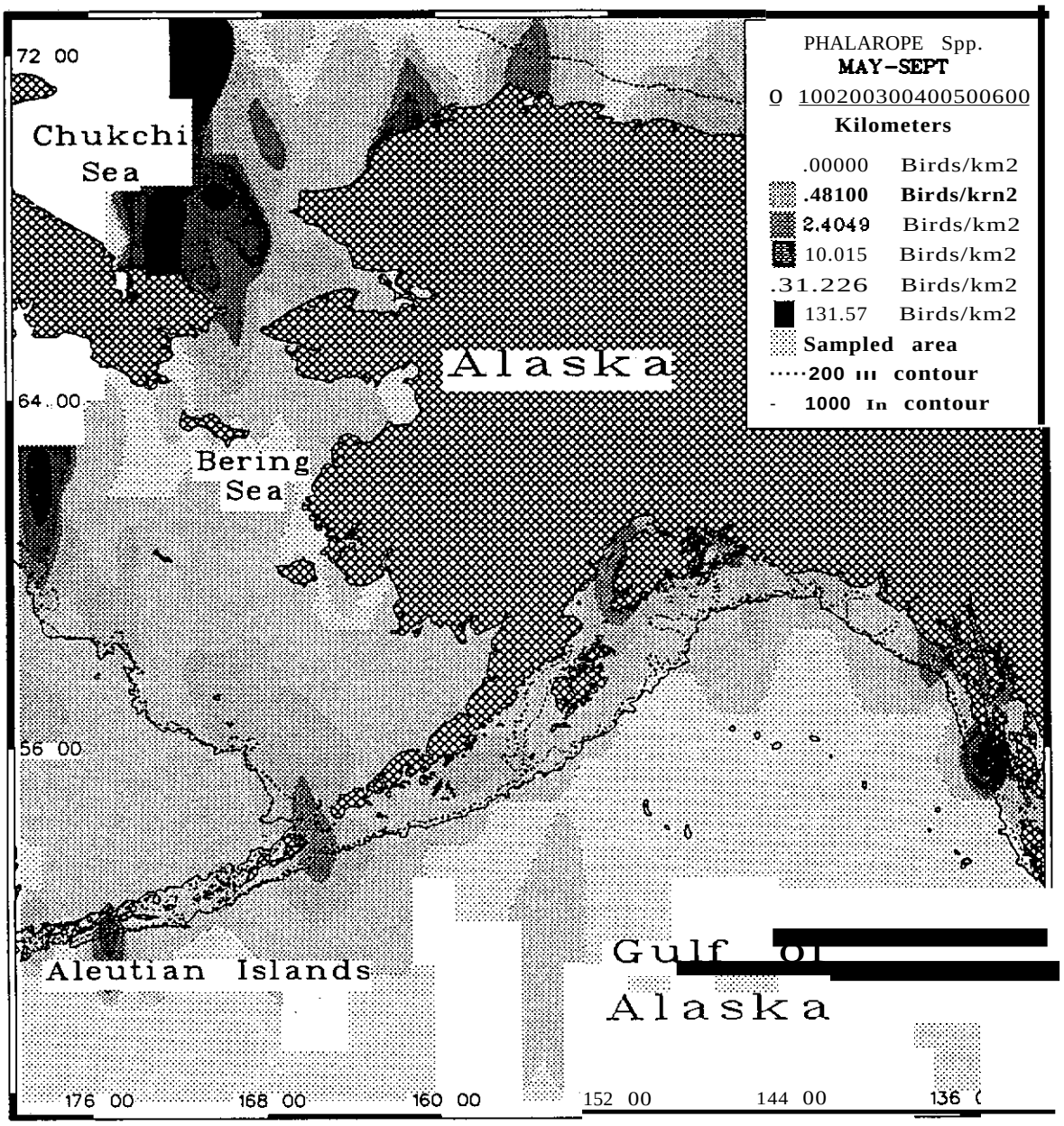

Figure 19. Distribution and abundance of Phalaropes (Red-necked and Red) in Alaska during summer. Note geometric scaling of density.

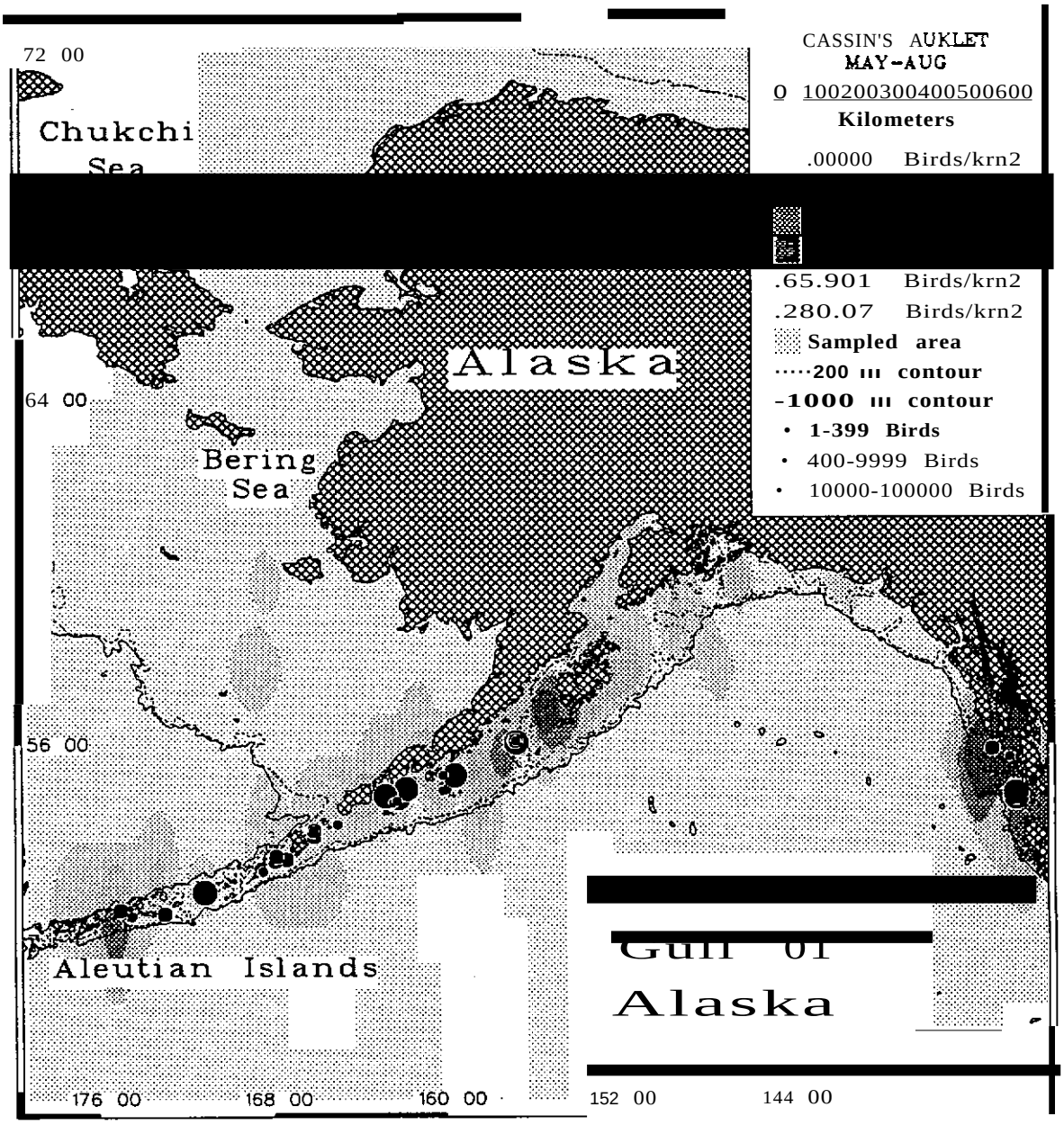

Figure 20. Distribution and .abundance of Cassin's Auklet in Alaska during summer. Note geometric scaling of density.

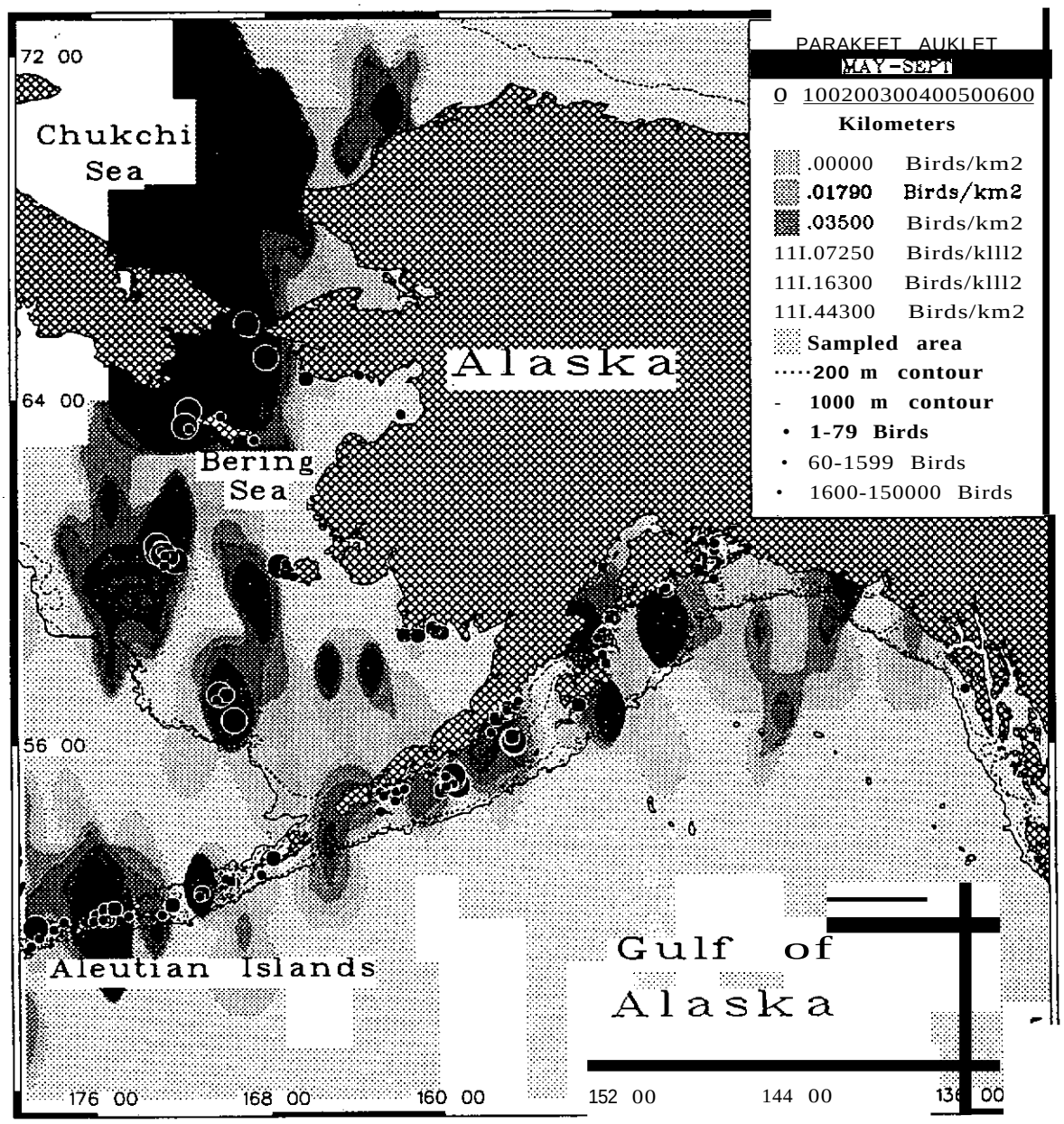

Figure 21. Distribution and abundance of Parakeet Auklet in Alaska during summer. Note arithmetic scaling of density.

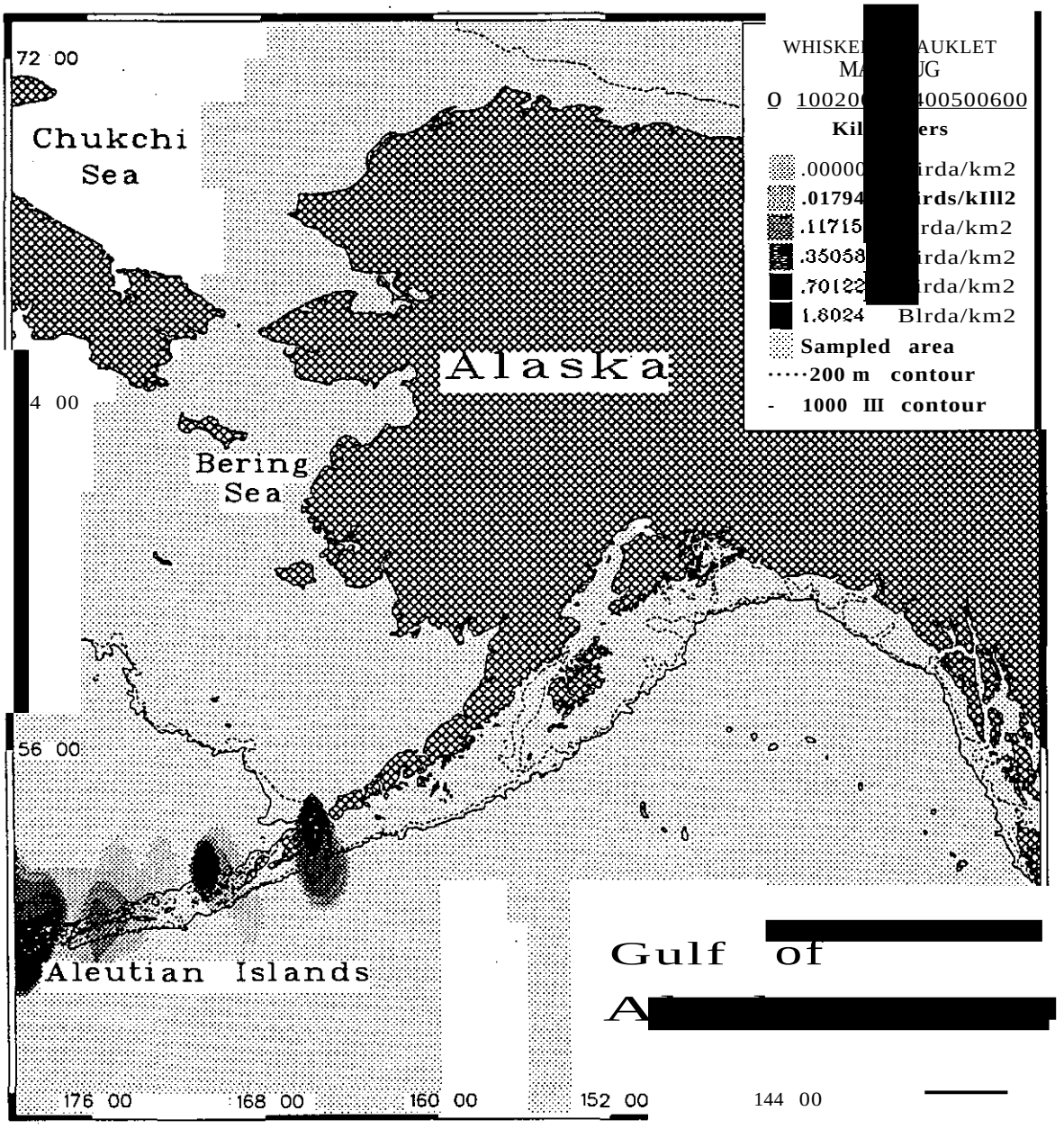

Figure 23. Distribution and abundance of Whiskered Auklet in Alaska during summer. Note geometric scaling of density.

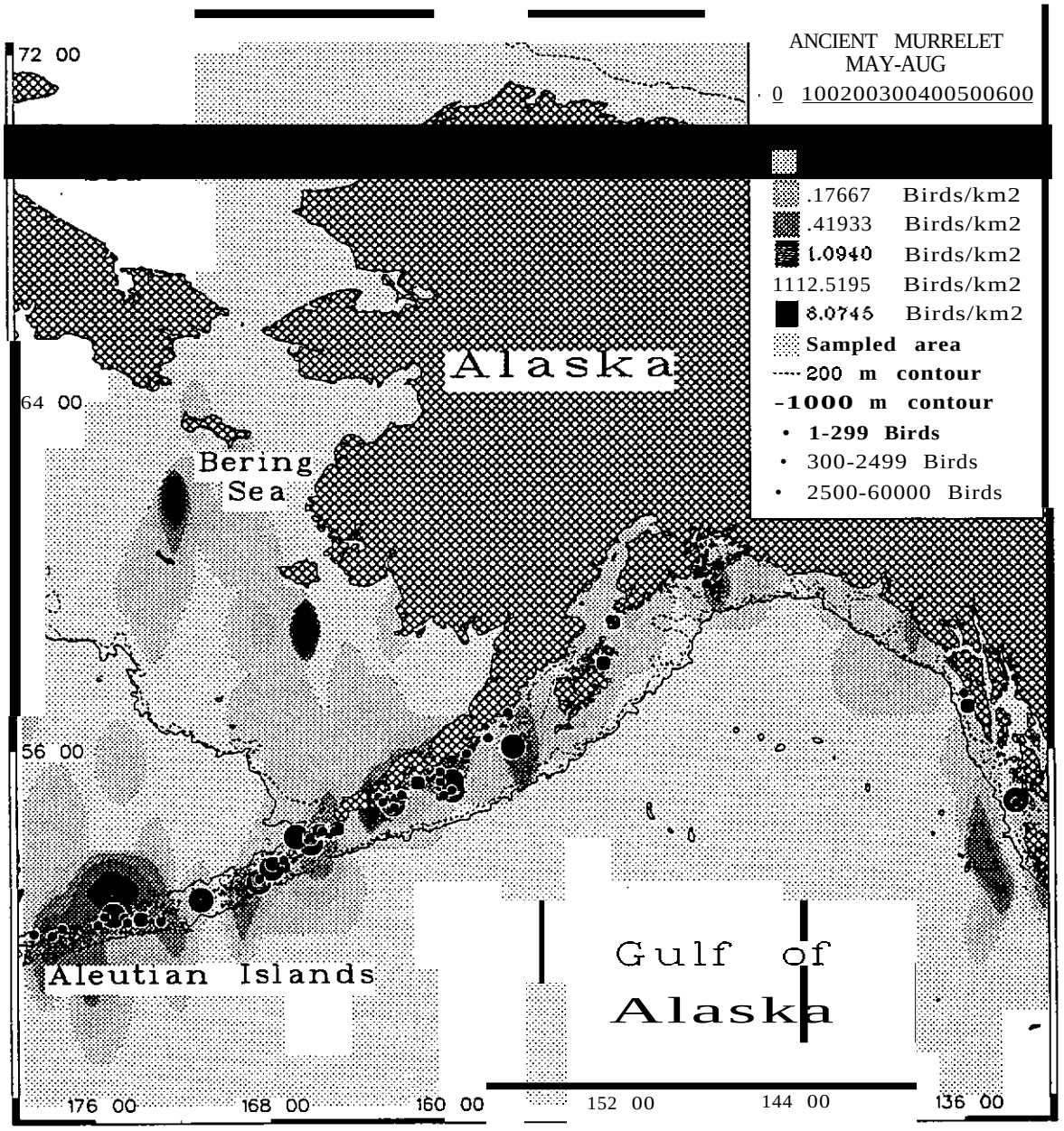

Figure 24. Distribution and abundance of Ancient Murrelet in Alaska during summer. Note geometric scaling of density.

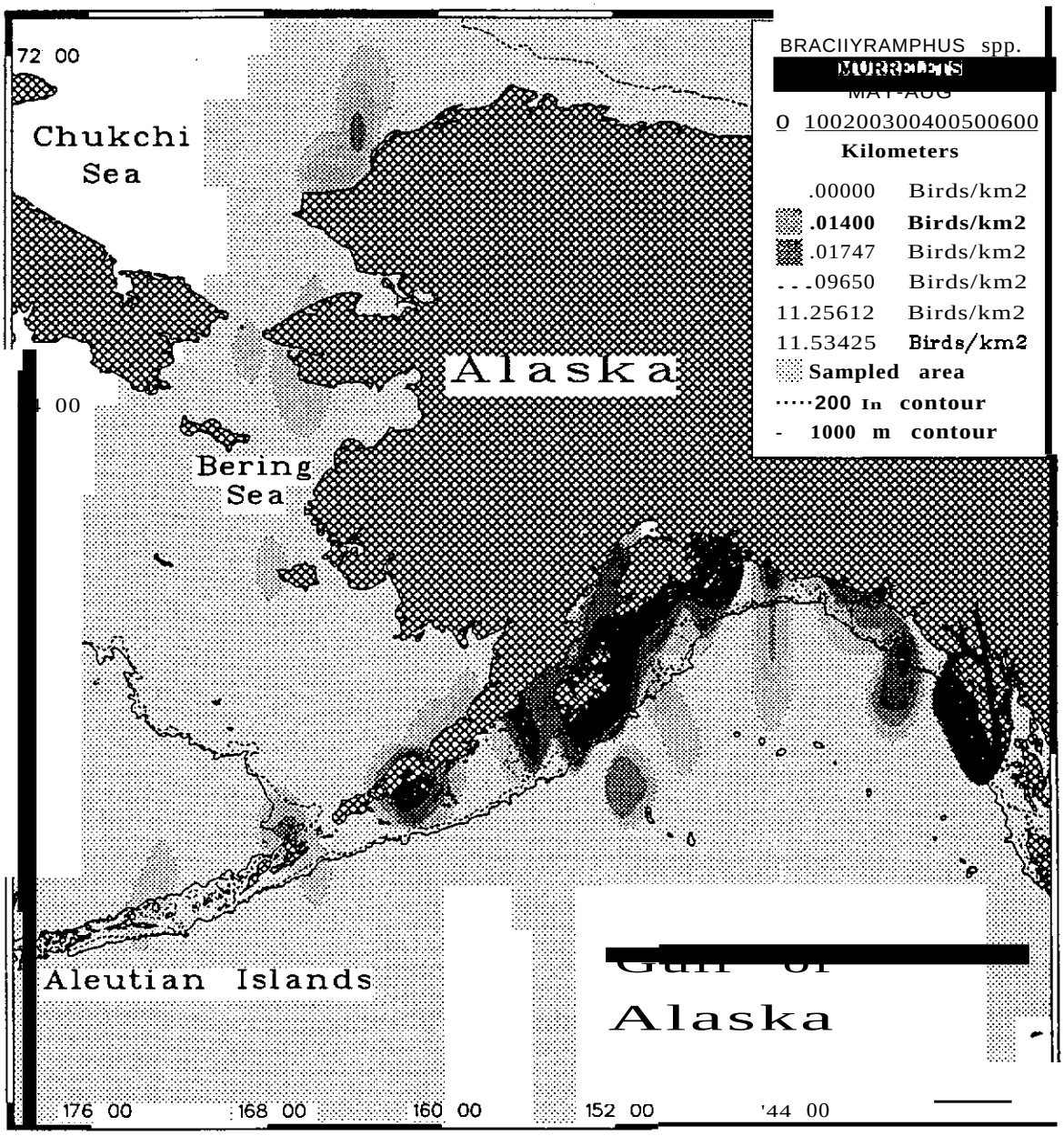

Figure 25. Distribution and abundance of BrachyramphuS murrelets (Marbled and Kittlitz's) in Alaska during summer. Note arithmetic scaling of density.

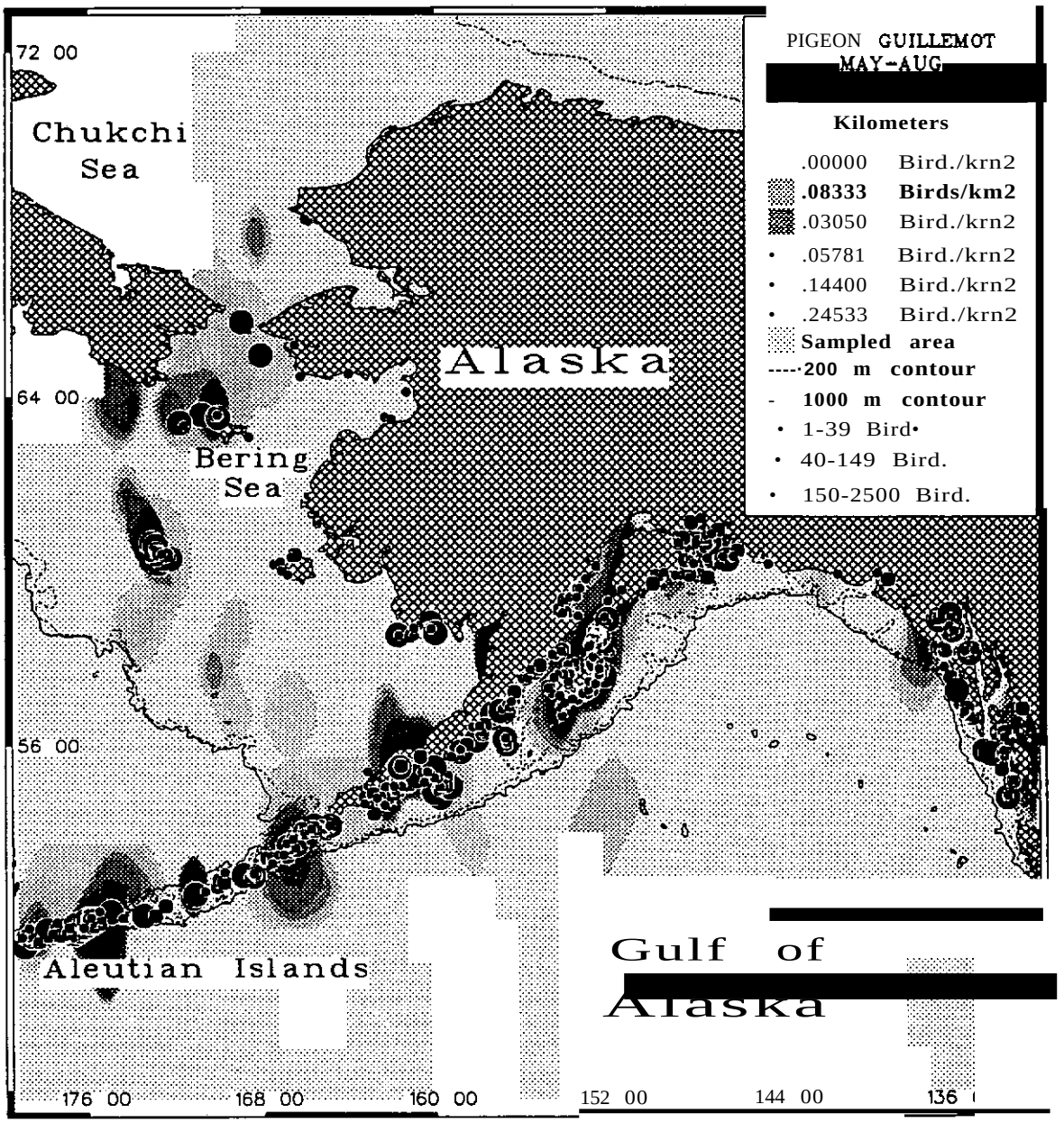

Figure 26. Distribution and abundance of Pigeon Guillemot in Alaska during summer. Note arithmetic scaling of density.

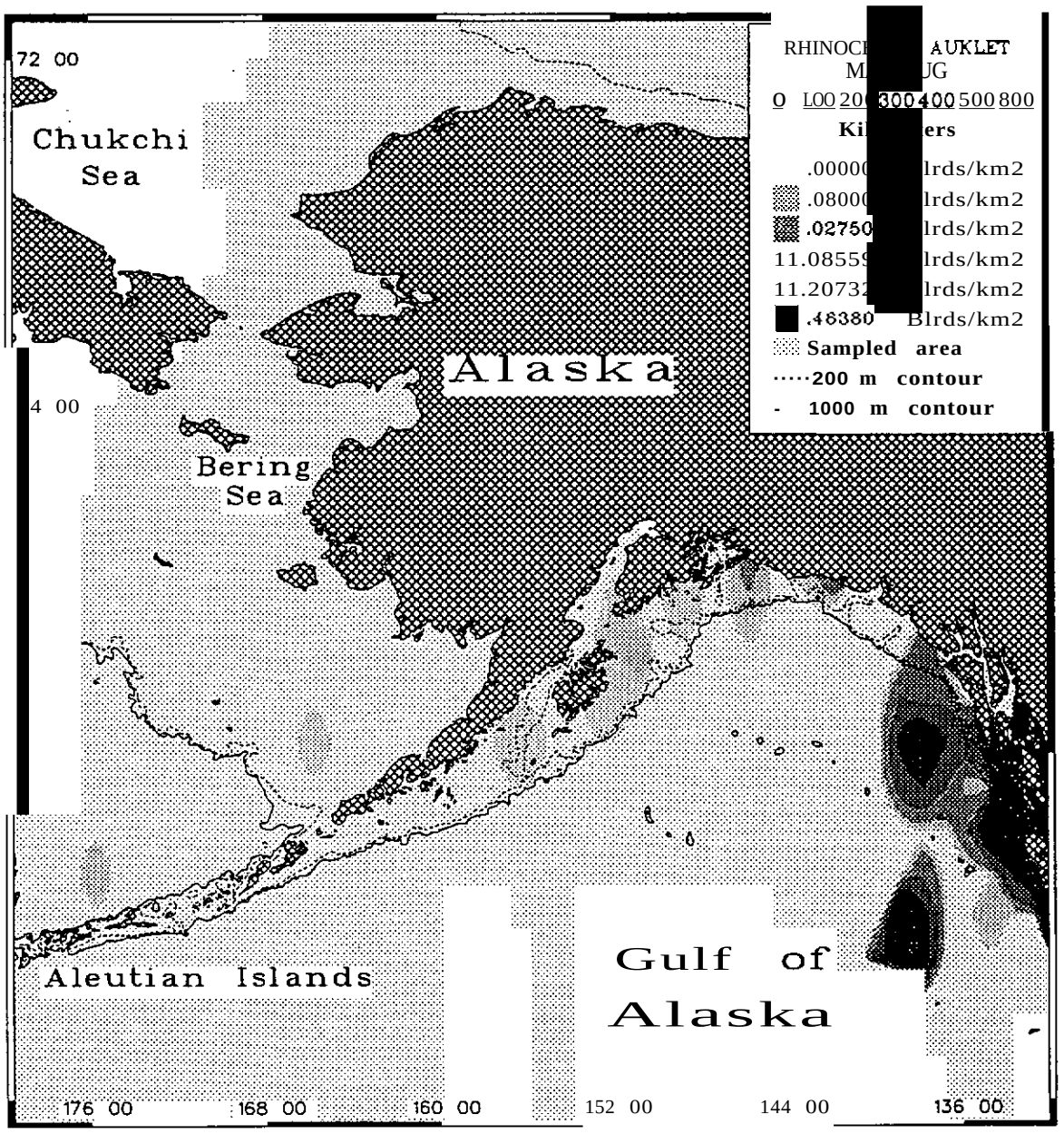

Figure 27. Distribution and abundance of Rhinoceros Auklet in Alaska during summer. Note arithmetic scaling of density.

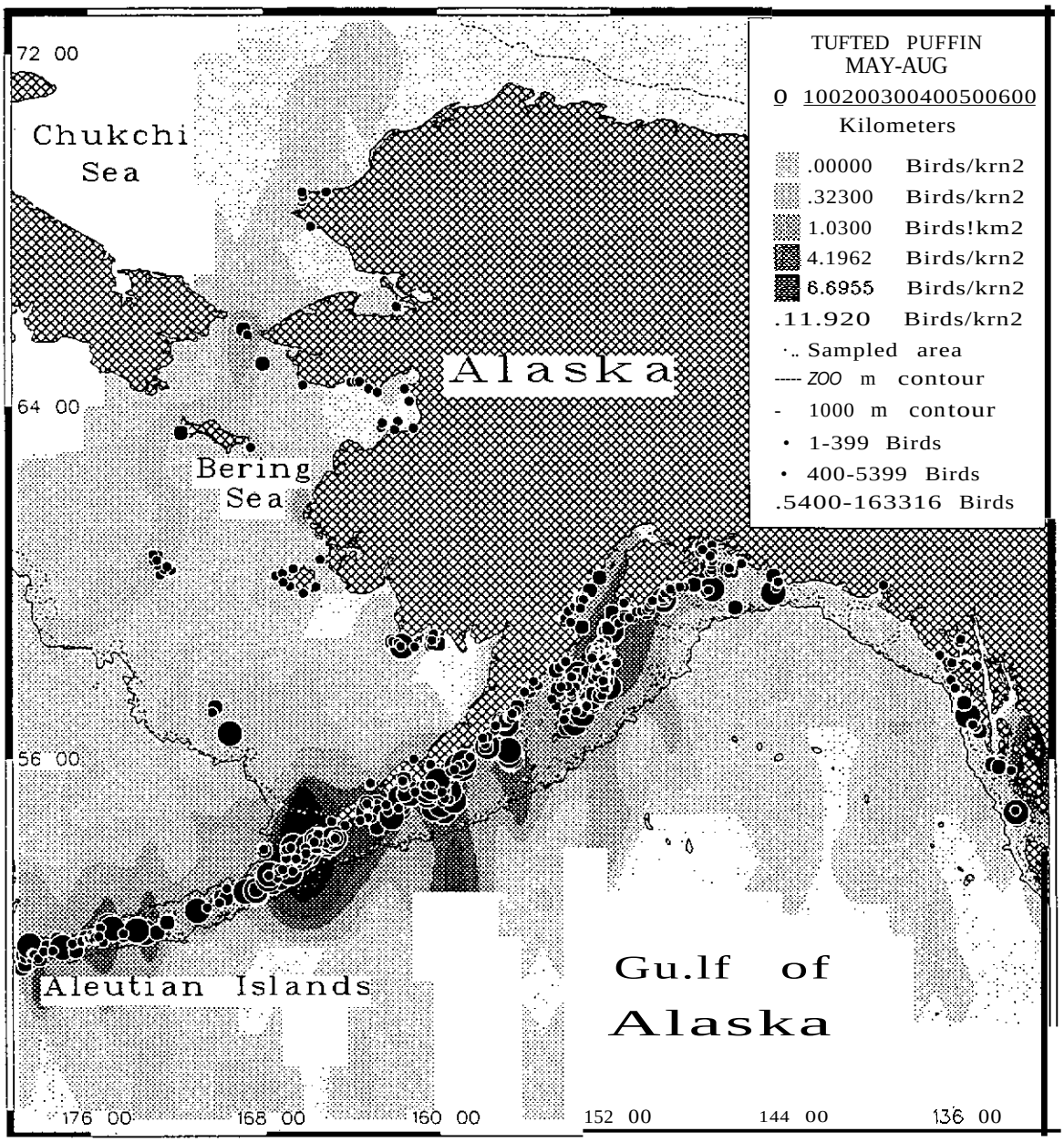

Figure 28. Distribution and abundance of Tufted Puffin in Alaska during summer. Note geometric scaling of density.

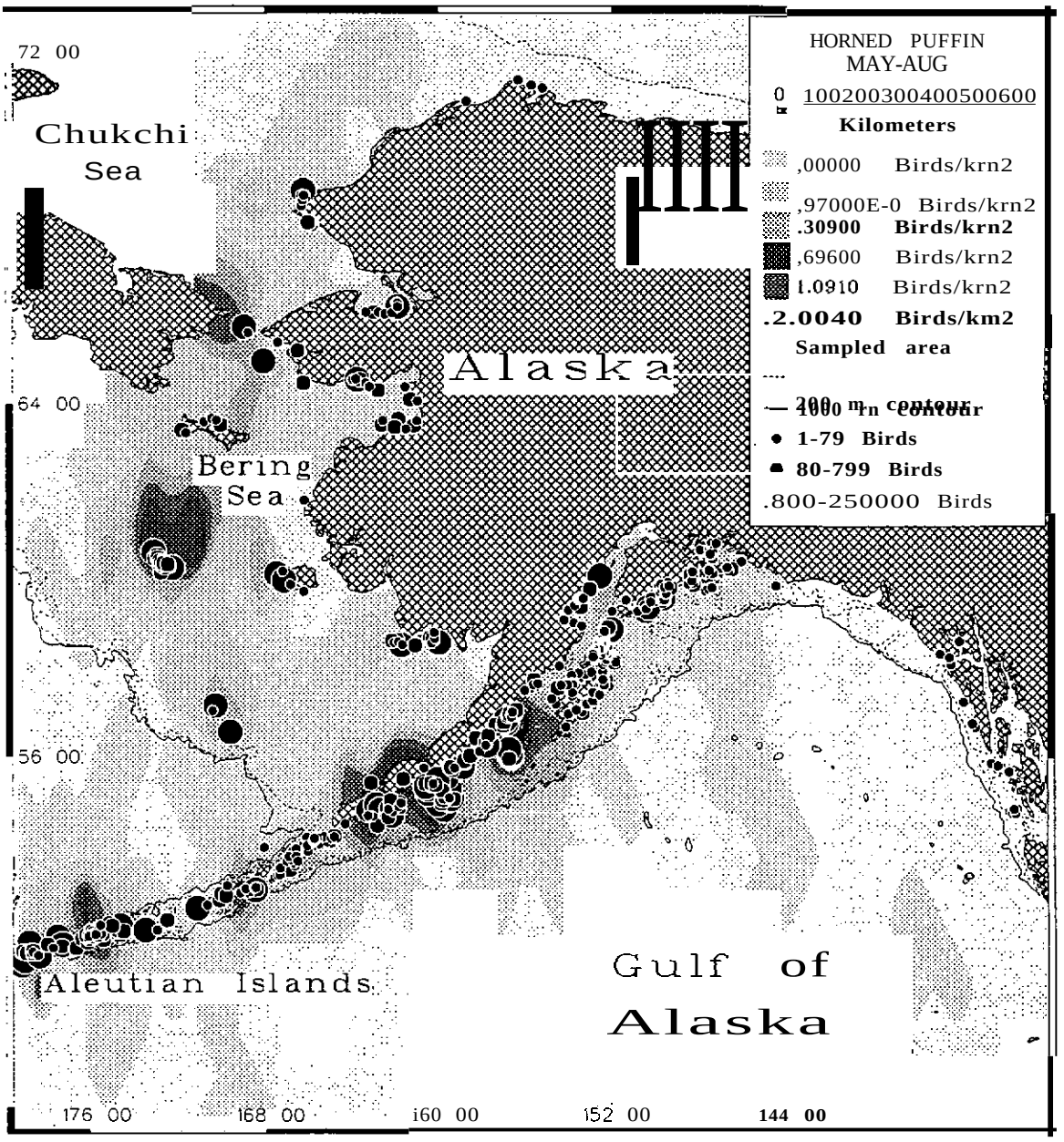

Figure 29. Distribution and abundance of Horned Puffin in Alaska during summer. Note geometric scaling of density.

Appendix 1. Catalog (incomplete) of aerial and ship-based seabird surveys conducted (primarily OCSEAP) in Alaska,.

1	A	B	C	D	E	F	G	H	I
1		ALPHA	CRUISEN	SURVTYPE	SHIPNAME	REGION	STRTDATE	ENDDATE	NOTRANS
2		MF	1	Shinboard	RN Georne Kelez	G.OA+ Aleutians	5/01170	17/14170	01
3		MF	1001	Shipboard	RN George Kelez	?	1971		01
4		FW	1018	Aerial	?	?	1981		01
5		MM	4001	?	?	?	18/13174	9/9174	01
6			4001	Shinboard	RN Thomnson	G.OA	9/16174	9129174	1991
7			50011	Aerial	Grumman Goose	G.OA	16/01172		1841
8			5001	Aerial	Grumman Goose	G.OA	4/16173	1	0
9			5001	Aerial	Grumman Goose	G.O.A.	14126173	1	0
10			5002	Shipboard	OCeanonranher	G.OA	1127175	3/04175	132
11			50031	Aerial	P2V	G.OA	13/06175	13/09175	1 47
12			50041	Shinboard	Surveyor	G.OA	14121175	16/14175	392
13			5005	Shipboard	**Discoverer**	G.OA + Bering Sea	15/09175	6121175	8261
14			5006	Aerial	P2V	G.O.A.	16/11176	6/17176	1851
15			5008	Aerial	P2V	Bering Sea/Arctic	106/18175	06121175	1021
16			50091	Aerial	P2V	G.OA	16126175	6127175	72
17			50101	Aerial	P2V	Arctic Seas	7/02175	7/04175	2531
18			5011	Aerial	Surveyor	G.OA + Berinn Sea	7/11175	8/01175	95
19			50121	Aerial	P2V	G.OA + Berino Sea	6/15175	6/16175	1681
20			5013	Shipboard	Glacier	G.O.A. + Berinn Sea	7/16175	17129175	1741
21			50141	Aerial	P2V	G.OA + Berino Sea	7/31175	17102175	277
22			5015	Shinboard	**Discoverer**	G.OA + Berinn Sea	18/06175	9/12175	226
23			50161	Shipboard	**Survevor**	G.OA + Berino Sea	18/07175	9/12175	91
24		1	50181	Shinboard	Miller Freeman	G.OA+Berinn Sea	8/12175	9/04175	149
25			5020	Shipboard	Silas Bent	G.OA + Berino Sea	9/01175	9128175	1091
26			50211	Shinboard	Glacier+Burton Is	G.OA + Berinn Sea	9/01175	9130175	124
27			50221	Shipboard	Miller Freeman	G.OA + Berino Sea	9/06175	8129175	150
28		1	50231	Shlnboard	Discoverer	G.OA + Berinn Sea	19/13175	10/02175	90
29			50241	Shipboard	**Survevor**	G.OA	9/16175	9122175	411
30			50251	Shinboard	Survevnr	GOA	110/01175	10124175	112
31			50261	Shipboard	**Survevor**	G.OA+Bering Sea	110/02175	110124175	110
32			50271	Aerial	P2V	G.OA	10/07175	110/08175	106
33			50281	Shipboard	Discoverer	G.OA	110/08175	10/16175	1 27
34			50291	Aerial	P2V	GOA	110/17175		74
35			50301	Shipboard	**Discoverer**	G.O.A.	10123175	11/09175	64
36			50311	Shioboard	Surveyor	G.O.A.	110128175	11/06175	38
37			5032	Shipboard	Surveyor	G.OA + Bering Sea	111/09175	11/17175	60
38		1	50341	Shioboard	Discoverer	G.OA	111/17175	12/02175	31
39		1	5034	Smallboat	Discoverer	G.OA	112/02175	112/06175	28
40		1	50351	Aerial	P2V	Berino Sea	12/09175		13
41			5036	Shinboard	USCGC Midnet	Berinn Sea	10/05175	110/13175	9
42			50371	Shipboard	RNAmatuli	Berino Sea	17/30175	10/24175	9
43			50381	Shioboard	Aleutian Tem	?	summer 75		403
44			5083	Shlnboard	Miller Freeman	Bering Sea	111/10175	12/03175	106
45		1	6001	Aerial	P2V	G.O.A.	11/08176		97
46		1	6002	Shinboard	MoanaWave	G.O.A.	12/15176	2120176	72
47			6004	Shipboard	MoanaWave	G.OA	12122176	3/04176	56
48			60051	Shinboard	**Discoverer**	G.OA	10124176	10127176	119
49			6006	Aerial	P2V	G.OA + Berinn Sea	12128176	3/08176	386
50			60071	Shipboard	Discoverer	G.O.A.	3/01176	3/11176	110
51			60081	Shioboard	Surveyor	G.OA	3/08176	3/12176	47
52			60091	Shinboard	MoanaWave	G.OA + Berinn Sea	3/08176	3125176	81
53			6010	Shipboard	Miller Freeman	G.O.A	3/15176	3121176	149
54			60111	Shinboard	**Discoverer**	G.OA	3/16176	3/29176	85
55			6012	Shipboard	Miller Freeman	G.OA + Bering Sea	3/24176	14121176	98
56			6013	Shlnboard	MoanaWave	G.OA	3/30176	14/15176	113
57			60141	Aerial	P2V	G.O.A.	3/29176	13/30176	1771
58			60151	Aerial	P2V	G.OA	4/04176		311
59			6016	Shipboard	Discoverer	G.OA	4/06176	4/13176	911

A	B	C	0	E	F	G	H	I
1	ALPHA	CRUISENO	SURVTYPE	SHIPNAME	REGION	ISTRTDATE	ENDDATE	NOTRANS
60		60171	?	?	?	1976		0
61		60181	Shipboard	?	G,OA	14/14176	*4130176*	57
62		6019	Shipboard	Moana Wave	G.OA	15/07176	5121176	78
63		6019	Shipboard	Moana Wave	G,OA	4121176	*5/05176*	63
64		6021	Shipboard	Miller Freeman	G.OA + Berina Sea	14125176	5/13176	100
65	1	6025	Shipboard	Nordic Prince	GOA	'5/01176	5/11176	141
66		6026	Shipboard	**Nordic Prince**	G,OA	5/18176	5120176	251
67		6027	Shipboard	Nordic Prince	G,OA	5/22/76	*6/08176*	1311
68		6028	Shipboard	**Nordic Prince**	G,OA	6/17176		31
69		6029	Shipboard	Nordic Prince	G,OA	16/18176	6126176	171
70		6030	?	?	?	?	?	01
71	FW	6031	Shipboard	Nordic Prince	?	517176	7127176	0
72		6050	Shipboard	**Discoverer**	G.OA	15/04176	5/05176	42
73		6051	Shipboard	?	?	11976		0
74		6052	Shipboard	?	G.OA	1976		0
75		6055	?	?	?	'?		0
76		6057	Shipboard	Miller Freeman	G.OA + Berina Sea	15/18176	*6104176*	128
77		60641	Shipboard	Surveyor	G.OA	15125176	6/03176	351
78		6066	Shipboard	Moana Wave	G.OA + Berina Sea	'5126176	6/05176	48
79		60671	Shipboard	Moana Wave	G.O.A. + Berina Sea	6/06176	6120176	103
80		6068	Shipboard	Lindblad Explorer	G.OA + Berina Sea	15/30176	6/16176	38
81		6069	?	?	?	1976		0
82	FW	1 6087	Shipboard	Miller Freeman	Seattle to Kodiak	1976		0
83		70271	Shipboard	Discoverer	G.OA	*'2115m*	*2120m*	109
84		7028	Aerial	Grumman Goose	G.OA	13/07m	*3/09m*	0
85		7029	Aerial	Grumman Goose	G,OA + Berina Sea	'4/20m	4/26/77	1 508
86		7031	Aerial	Grumman Goose	G.OA	15/19m	*5120m*	1751
87		70321	Shipboard	Yankee Clipper	Kodiak	*'5122171*	*6/06m*	3151
88		1 7033	Shipboard	Yankee Clipper	?	16/18m	*6128m*	2381
89		70341	?	?	?	*, 7/06177*	*7129m*	300
90		70351	Shipboard	Yankee Clipper	?	18/11m	*8123m/*	240
91		70361	Shipboard	Yankee Clipper	?	19/07m	*9119m*	211
92	r	70421	Shipboard	Surveyor	Kodiak-St.Matlhew	16123m	*6126m*	62
93		1 70431	Shipboard	Lindblad Explorer	S.E. Alaska	1977		01
94		70451	Aerial	Grumman Goose	'Kpdiak - Cook Inlet	16/17177	*6/18m*	1691
95		70461	Shipboard	?	:?	19/05177	*9/15m*	1631
96		7047	Shipboard	Miller Freeman	Kodiak	*10130177*	111/14177	151
97		70481	?	?	?	'?		0
98	FW	70491	Shipboard	USCGCMaliow	Central Pacific	Oel 1977	Nov 1977	0
99		70501	Shipboard	Aleutian Tern	Aleutian Islands	*15/12/77*	*5/16m*	0
100		70511	Shioboard	Aleutian Tern	Aleutian Islands	'6/22177		0
101	1	70521	Shipboard	Aleutian Tem	Aleutian Islands	17/02/77	712Bm	0
102		70531	Shipboard	Aleutian Tern	'Aleutian Islands	*'8/1m*	8122177	0
103		7054	Shipboard	Aleutian Tern	Aleutian Islands	17/20m	*7127m*	0
104		8006	Shipboard	Commando	Kodiak	14/03178	4/08178	20
105		8007	Shipboard	Commando	,Kodiak	14120178	4/30178	491
106		8008	Shipboard	Commando	Kodiak	12 May 78	3 May 78	291
107	FW	8012	Shipboard	Oshpro Maru	Japan-Alaska	1978		445
108		1 8014	Shipboard	Commando	Kodiak	15123178	*6/10178*	58
109		8015	Shipboard	Commando	Kodiak	16/13178	6/30178	68
110		80161	Shipboard	Miller Freeman	Kodiak	*16/19178*	7/09178	0
111	FW	80171	Shipboard	Commando	Kodiak	17/12178	7/28178	46
112	FW	80181	Shipboard	**Commando**	Kodiak	:8/01178	8/14178	01
113	FW	80191	Shipboard	Commando	**Kodiak**	:8/15178	8/30178	46
114	FW	80231	Smallboal	Demersal	; Cook Inlet	*8/04178*		151
115	FW	80241	Shipboard	Surveyor	?	8128178	9/09178	01
116	FW	80251	Shipboard	Hokusei Maru	Japan - 39'OON	1978		300
117	FW	8026	Smallboal	Demersal	Cook Inlet	5/16178		4

A	B	C	0	E	F	G	H	I	I
1	ALPHA	1CRUISEN(	SURVTYPEI	SHIPNAME	REGION	ISTRTDATE	ENDDATE		NOTRANS
118	FW	8027	Smallboat	Demersal	Cook Inlet	18/03178			91
119		8032	Shipboard	Miller Freeman	G.OA	3/22/78	3125f78		241
120	FW	8049	Shioboard	USGGC Buttonwood	I?	i0CI1978	Nov 1978		01
121		8100	Shipboard	?	Aleutian Islands	1978			0
122	MF	9001	Shioboard	IMiller Freeman	Berino Sea	*'7f7169*	7/27/69		01
123		9001	Shioboard	IMV Tustumena	Kodiak to Homer	11/16f78			3
124	IFW	9002	Shipboard	1Ursa Maior	Kodiak	I Nov '79	:Dec' **79**	1	01
125	IFW	9003	Shioboard	IOshoro Maru	Western Pacific	IJUN 1979	IAUG 1979		01
126	iF	80002	Shipboard	ursa Maier	?	IFeb 1980	I Mar 1980		01
127	IFW	800041	Shioboard	USCGC Cambell	Kodiak to Aleutians	1 1980			321
128	iF	80010	Shipboard	Alpha Helix	Aleutian Islands	1980			401
129	F	80011	Shioboard	KORW	Kodiak	11980			0
130	F	80040	Shipboard	?	?	15119/80			0
131	F	80045	Shioboard	RNLee	ChUkchi S. + Berino	IFall '80			0
132	F	80100	Shipboard	Aleutian Tern	Aleutian Islands	1980	1		0
133	IFW	80280	Smallboat	Demersal	Cook Inlet	*9/04f78*			10
134	F	81003!	Shipboard	Ursa Malor	Kodiak	,Fall 81			01
135	I	810101	Shioboard	Aloha Helix	Eastern Aleutians	I 1981			10
136	IF	81020	Smallboat	?	E. Aleutian Islands	11981			0
137	IF	810221?		?	Benno-ChukchiSea	I 1981			0
138	iF	810241	Shipboard	Oceanoaraoher	Berino Sea	Sep 1981	'Oct 1981		0
139	IF	810251	Shioboard	?	Berino Sea	0CI1981			0
140	iF	820011	Shipboard	ISurf Bird	SE. Alaska	1982			0
141	IF	820021	Shioboard	1Surveyor	G.OA + Berino Sea	I 1982			0
142		820051	Shipboard	I?	IKodiak	Iwinter 82			0,'
143	IF	820061	Shipboard	1Ursa Major	Kodiak	'fall 82			01
144	IF	820071?		I?	South East	Isummer 82			01
145	I	820081	Shioboard	I?	South east	i 3/19/82			0
146	iF	82010	Shipboard	IOshore Maru	SE.from Japan	1982			0
147	F	82011	Shioboard	Oshoro Maru	SEto Jaoan	1982			0
148	IF	82050	Smallboat	I?	Cook inlet	18/16/82			17
149	!	82100	Shioboard	I?	I?	.11982			0
150	IF	830011	Shipboard	IUrsa Major	1Kodiak	IFeb 1983	IFeb 1983		01
151	IF	830021	Shioboard	?	Polar + Berino Sea	I 1983			0
152	IF	830031	Shipboard	Miller Freeman	Kodiak- Berino Sea	I WinI.83			0
153	iF	830051?		?	Kodiak	IFall 83			0
154	iF	830121?		?	N Pacific	11983			0
155	iF	831001?		?	Aleut Is,-Sl. Mathew	11983			0
156	IF	83200 ?		?	Aoattu is,	1983			0
157	iF	833001	Shioboard	Western Pacific	Adak-St. Mat.-Homer	1983			0
158	IF	83501	Smallboat	?	Prince William Sound	iJan,1983			0
159	IF	83502	Smallboat	?	Prince William Sound	IFeb.1983			0
160	IF	83503	Smallboat	?	Prince William Sound	IMar, 1983			0
161	IF	83504	Smallboat	?	Prince William Sound	!Apr.1983			0
162	'F	83505	Smallboat	?	Prince William Sound	IMav.1983			0
163	'F	83506	Smallboat	?	Prince William Sound	'Jun.1983			0
164	IF	83507	Smallboat	?	Prince William Sound	Jul.1983			0
165	IF	83508	Smallboat	?	Prince William Sound	Aua,1983			0
166	IF	835091	Smallboat	?	Prince William Sound	ISep, 1983			0
167	F	83510	Smallboat	?	Prince William Sound	Oct, 1983			0
168	iF	83511	Smallboat	I?	Prince William Sound	Nov, 1983			0
169	IF	83512	Smallboat	?	IPrince William Sound	Dec. 1983	1		0
170	iF	83555	Smallboat	?	IPrince William Sound	Isummer 83			0
171	F	83560	Smallboat	?	Prince William Sound	iwinter 83			0
172	IF	835751	Smallboat	?	Prince William Sound	i 1983			0
173	iF	840021	Shipboard	Ursa Major	KodiakiSemidis	1summer 84			0
174	F	840031	Shioboard	IPolar Sea		iMarch 84			0
175	F	8400512		ISmolk	Kodiak	iwinter **84**			0

A	B	C	0	E	F	G	H	I
1	ALPHA	CRUISEN(	SURVTYPE	SHIPNAME	REGION	STRTDATE	ENDDATE	NOTRANS
176	F	84020	?	?	South East	1984		871
1n	F	84030	Shipboard	Akademik Korolev	Berine Sea	6/28/84	6/29/84	01
178	F	84040	Shipboard	Oshoro Maru	?	summer 84		270
179	F	84041	Shipboard	Oshoro Maru	?	**summer 84**		178
180	F	84042	Shipboard	Oshoro Maru	?	summer 84	1	204
181	F	84043	Shipboard	Oshoro Maru	?	summer84	1	2751
182	F	84044	Shipboard	Oshoro Maru	55'N Line	summer 84		1481
183	F	84060	Shipboard	Refuee Charter	Shemva-Sl. Matthew	1984		01
184	F	84060	Smallboat	?	Prince William Sound	June 84		0
185	F	84501	Smallboat	?	Prince William Sound	Jan.84		0
186	F	84501	Smallboat	?	Prince William Sound	Oct. 84		0
187	F	84502	Smallboat	?	Prince William Sound	Feb. 84		01
188	F	84503	Smallboat	?	Prince William Sound	March 84		0
189	F	84504	Smallboat	?	Prince William Sound	April 84		01
190	F	84505	Smallboat	?	Prince William Sound	Mav84		01
191	F	84507	Smallboat	?	Prince William Snd.	Julv 84		01
192	F	84508	Smallboat	?	Prince William Sound	Aug. 84		0
193	F	84509	Smallboat	?	Prince William Sound	Sept. 84		0
194	F	84511	Smallboat	?	Prince William Sound	Nov. 84		0
195	F	84512	Smallboat	?	Prince William Sound	Dec. 84		0
196	F	84555	Smallboat	?	Prince William Sound	1984		0
197	F	84560	Smallboat	?	Prince William Sound	winter 84		0
198	F	84575	Smallboat	?	Prince Wiiliam Sound	1984		0
199	F	85005	Shipboard	Ursa Maior	Kodiak	Feb.85		01
200	F	85040	Shipboard	Oshoro Maru	?	1985	1	01
201	F	85041	Shipboard	Oshoro Maru	?	1985		01
202	F	850421	Shipboard	Oshoro Maru	?	1985		0
203	F	850431	Shioboard	Oshoro Maru	?	1985		0
204	F	850441	Shipboard	Oshoro Maru	?	1985		0
205	F	850451	Shipboard	Oshoro Maru	?	1985		0
206	F	85046	Shipboard	Oshoro Maru	?	1985		0
207	F	850471	Shipboard	Oshoro Maru	?	1985		0
208	F	850481	Shipboard	Oshoro Maru	?	1985		0
209	F	85049	Shipboard	Oshoro Maru	?	1985		0
210	F	85051	Shipboard	Hokusei Maru	?	1985		0
211	F	85052	Shipboard	Hokusei Maru	?	1985		0
212	F	85053	Shipboard	Hokusei Maru	?	1985		0
213	F	85054	Shipboard	Hokusei Maru	?	1985		0
214	F	85055	Shioboard	Hokusei Maru	?	1985		0
215	F	85056	Shipboard	Hokusei Maru	?	1985		0
216	F	85057	Shipboard	**Hokusei Maru**	?	1985		0
217	F	850581	Shipboard	Hokusei Maru	?	1985		0
218	F	850591	Shipboard	Hokusei Maru	?	1985		0
219	F	85060	Shioboard	Hokusei Maru	?	1985		0
220	F	850611	Shipboard	Hokusei Maru	?	1985		0
221	F	85062	Shipboard	**Hokusei Maru**	?	1985		0
222	F	85063	Shipboard	Hokusei Maru	?	1985		0
223	F	85064	Shipboard	Hokusei Maru	?	1985		0
224	F	85065	Shipboard	Hokusei Maru	?	1985		0
225	F	85100	?	?	Aleutian Islands	1985		0
226	F	85501	Smallboat	?	Prince William Sound	Jan.1985		01
227	F	85502	Smallboat	?	Prince William Sound	Feb.1985		0
228	F	85503	Smallboat	?	Prince William Sound	Mar. 1985		0
229	F	855041	Smallboat	?	Prince William Sound	Aor.1985		0
230	F	855051	Smallboat	?	Prince William Sound	Mav.1985		01
231	F	855061	Smallboat	?	Prince William Sound	Jun.1985		01
232	F	855071	Smallboat	?	**Prince William Sound**	Jui.1985		01
233	F	855081	Smallboat	?	Prince William Sound	AuD.1985		01

A	B	C	D	E	F	G	H	I
1	ALPHA	CRUISENC	SURVTYPE	SHIPNAME	REGION	STRTDATE	ENDDATE	NOTRANS
234	F	855091	Smallboat	?	Prince William Sound	Seo.1985		0
235	F	85510	Smallboat	?	Prince William Sound	Ocl.1985		0
236	F	85511	Smallboat	?	Prince William Sound	Nov. 1985		0
237	F	85512	Smallboat	?	Prince William Sound	Dec.1985		0
238	F	855551	Shioboard	?	Prince William Sound	11985	1	0
239	F	85560	Shioboard	?	Prince William Sound	1985		0
240	F	855751	Shioboard	?	Prince William Sound	1985		0
241	F	860051	?	?	Kodiak	february 86		0
242	F	86040	Shipboard	Pusan 851	N. Pacific ocean	?		0
243	F	860421	Shioboard	Aloha Helix	Gulf AK Seamount Pro	1986		0
244	F	86100	?	?	Aleutian Islands	1986		0
245	F	87001	?	?	Kodiak	Feb.87		0
246	F	87040	Shipboard	Aloha Helix	G.O.A.- oceanic	5/87		0
247	F	870411	Shioboard	Oshoro Maru	Kediak to Seattle	1987		0
248	F	87042	Shipboard	Oshoro Maru	N. Pacific ocean	10/87	11/87	0
249	F	88001	?	?	Kodiak	Feb.88		0
250	F	88040	Shipboard	?	Pusan,Kerea-Dutch H.	7/88		0
251	F	88041	Shioboard	Akademik Korolev	Dutch H.-Honolulu	seotember 88		0
252	F	88100	Shioboard	Tialax	Aleutian Islands	summer88		0
253	F	88100	Shioboard	Miller Freeman	G.OA	5/88		0
254		89001	Shipboard	Miller Freeman	Kodiak-Hawaii	1012189	10/19/89	706
255		890021	Shioboard	Miller Freeman	Hawaii-5eattle	10/24/89	11/12/89	401
256	F	90010	Shipboard	Tialax	Alaska Peninsula	7/07/90	7/18/90	335
257	F	900111	Shioboard	Osharo Maru	Tokvo-Hawaii	6/30/90	8/18/90	360
258	F	900121	Shipboard	Oshoro Maru	Hawaii-Tokyo	8124190	9/16190	460
259	F	900131	Shioboard	?	N. Pacific ocean	5128190	8/23/90	171
260	F	90500	Shipboard	?	N. Pacific ocean	1990		385
281	F	90501	Shiaboard	?	Trans N.Pac.O.Jaoan	1990		286
262	F	915.00	Shipboard	?	,?	1991		140
263	F	915011	Shioboard	?	?	1991		307
264	F	915021	Shipboard	?	?	1991		103

A	J	K	I	M	N
1	STATCNTSIOBSERV1		OBSERV2	.OBSERV3	COMMENTS
2		OINMFS			ship-RN George B. Kelez MFOO01
3		01			APS, OAP
4		01 Krasnow			Braadlv Loh ??
5		OiSanaer	Pat	Sam	**marine mammal survey**
6		OIWohl-K			18 **gen.obs**
7		ai Haddock-L	Benson-J		raw data at OBS-CE 1
8		O Haddock-L	Benson-J		3 dates 01 5001-164 transectslraw data at FWS,OB
9		01 Haddock L	Benson-J		3 days 01 5001-164 transectslraw data atFWS,OB
10		a Isleib P.	Eberhardt		transects-15 minslraw data at OBS-CE
11		A' Hunt G.	Briaas-K		47 exc.nDAT.llstinas+summ.-kev c.lfinai tace-OB
12		61! Hatch, S.	Timson-B		Trans.-15 mlns+300 m. wideldat-k.c.IFINAL TAPE
13		81 WarneY-1	Guzman-J		trans=15 minslnot key C.-raw data atOBS-CE
14		a Hunt G.	Briggs -K	Bailey-E	(44 eXDerimental transects\ F.T at OBS-CE
15		a Blackshic-J	Johnson-N	Bailey-E	FINAL TAPE at OBS-CE
16		a Bartonek J.	Hatch-S	Timson-B	FINAL TAPE at OBS-CE
17		aI Bartonek-J	Hatch 5	Timson-B	FINAL TAPE at OBS-CE
18		29 Benson, J.	Timson-R.S		FINAL TAPE at OBS-CE
19		a Cline-D	Johnson-N	Wohl-K	FINAL TAPE at OBS-CE
20		a Rauzon-M	Hatch 5		final tace at OBS-CE
21		aI Bartonek-J	Cliye-D	Harrison, C.	linal tace at OBS-CE
22		64 i Rauzon-M	Rurhle-J		FINAL TAPE at OBS-CE
23		321 Henderson-K	Benson-J	Handel-C	FINAL TAPE at OBS-CE
24		531 Nvsewander			FINAL TAPE at OBS-CE
25		77 Warner			scecimens coilectedIF.R. at OBS-CE
26		1,Sowls			FINAL TAPE at OBS-CE
27		211 Harrison, C.			FINAL TAPE at OBS-CE
28		191 Nvsewander			A lew birds collected I FT. in OBS-CE
29		1 Handei-C			small boat survey-not transcribed? I F.T. at OBS-CI
30		301 Handel, C.	Benson-J		FINAL TAPE at OBS-CE
31		30 I Rauzon-M			FINAL TAPE at OBS-CE
32		OI Bartonek-J	Harrison-C		FINAL TAPE at OBS-CE
33		111 Henderson-K			FINAL TAPE at OBS-CE
34		aI Harrison-C	Hatch_5	Bailey-E	FINAL TAPE at OBS-CE
35		23 i Roehle-J			FINAL TAPE at OBS-CE
36		ai Henderson-K		1	FINAL TAPE at OBS-CE
37	1	5IHatch 5			FINAL TAPE at OBS-CE
38		19iHardv-D	1Nvsewander-D		!Trans-15 mins each I F.T. at OBS-CE
39		OIHardy-D	NYsewander-D	1	not key cunched I F.T.at OBS-CE
40		O Harrison, C.	Hatch-S	Ruehie-T	FINAL TAPE at OBS-CE
41	1	O Wickersham-E			F.Tat OBS-CE I date?
42	1	aIAilen-J			FINAL TAPE at OBS-CE
43		aI Holberg-E			Aleutian Is. NWR. staff I F.T. at OBS-CE
44		11 !Kirchoff-M	Rauzon-M		FINAL TAPE at OBS-CE
45		a Harrison-C	Hatch 5	'Bailey-E	FINAL TAPE at OBS-CE
46		OISanaer-G	Kirchol-M	iPhillics	FINAL TAPE at OBS-CE
47		571 Kirchoff-M			nos. include eXDerimental 01 some tricsIOBS-CE+bil
48		01 Hardv-D	Frazer-D		F.T.at OBS-CE I contains additional scecies sightil
49		aI Harrison-C	Hatch_5	Sowls-A	F.Tat OBS-CE I 5002?? 1
50		1181 Forsell-D			FINAL TAPE at OBS-CE
51		O,Handel C.			FINAL TAPE at OBS-CE
52		351 Phillics-M			FINAL TAPE at OBS-CE 1
53		a Sanaer-G	Handel-C	Bates 5	FINAL TAPE at OBS-CE
54		441 Kirchhoff			F.Tat OBS-CE Idate 76? 1
55		521 Rauzon-M	1		sDecimens collected I F.T. at OBS-CE
56		115' Frazer, D.			1no recort I F.Tat OBS-CE
57		a Harrison-C	Hatch-S	Handel-C	FINAL TAPE at OBS-CE
58		0 Harrison-C	Hatch-S	Phillips-M	FINAL TAPE at OBS-CE
59		a' Harrison, C		1	Specimens collected I F.T. at OBS-CE Idate?

A	J	K	L	M	N
1	STATCNTSIOBSERVI		OBSERV2	OBSERV3	COMMENTS
60		01 Hall, H.			Maine Mammal survey
61		4 I SChad-T			no reoort I F.T. at OBS-GE I date?
62		231 DeGanoe			
63		231 DeGanoe			*6019/6058* I F.T. at OBS-GE
64		141 Forsell, D.			FINAL TAPE at OBS-CE
65		01 Moe-A			no reoort I F.T. at OBS-GE
66		ai Harrison, C.			F.T.at OBS-GE I no report
67		al Bartonek J.	Sowls-A	**ISanaer-G**	no reoort I F.T. at OBS-GE
68		01 Handel-C			FINAL TAPE at OBS-CE
69		a! Handel, C.	Sanaer-G		no report I F.T. at OBS-GE I date?
70		a!			6030-6049 VOID-NO WORK
71		01			
72		OIGould-P	Rauzon-M		FINAL TAPE at OBS-GE
73	1	al Gould, P.J.	Rauzon-M		FINAL TAPE at OBS-CE
74	I	al GoUld, P.J.			FINAL TAPE at OBS-GE
75		01			VOID
76		al Forsell, D.	I		FINAL TAPE at OBS-GE
77		OIGould-P	Larson-G		FINAL TAPE at OBS-GE
78	1	a 1 Metznoy-K			FINAL TAPE at OBS-GE
79	I	151 Me1znov-K			no reoort I F.T. at OBS-GE I Date?
60		01 Rauzon-M		1	date-? I F.T. at OBS-GE
61	I	01		I	PELAGIC DATA
62		01 Baird	,	I	
83	I	0: Sanaer-G	IPetersen-M	!	FINAL TAPE at OBS-CE
84	I	O! **Harrison-C**	Handel-G	'Sowls-A	F.T. at OBS-GE.757rec.I165-1/165-21427-tvpe 5
85	!	a 1 Harrison-C	Handel-C	Sowls-A	FINAL TAPE at OBS-CE
86	!	a1 Harrison-C	!SowIs-A	GiII-B	FINAL TAPE at OBS-CE
87	I	2! Forsell-D	1Gould	.Sanoer	4 oen. obs.lship=Lea IIFin Tp.at OBS-CE
88	'	01 Forsell-D	1 Sanaer-G	Guzman	Yankee Clipper-Lea 213 aen.obs.1 F.R. at OBS-CE
89		01 Sanoer-G	Forsell	Guzman	5 oen.obs. IF.T. at OBS-GE
90		01 Forsell-D	Sanaer-G		Yankee Clipper 4 I F.R. at OBS-CE
91	I	11 Nelson	Forsell	DeGanoe	Yankee Clipper-leo 5 I F.R. at OBS-CE
92	I	01 DeGanae	Sowls		FINAL TAPE at OBS-CE
93	I	01 Bates-S	,Matthews		
94	I	a 1 Harrison, C.	Handel	Gill	FINAL TAPE at OBS-GE
95	!	OIGould-P			5 General Obs. I F.T. at OBS-GE I NEGOA
96	I	01 Nelson		i	I
97		01		I	NO DATA
98	'	01 Forsell-D			
99	I	01 Spindier-M		1	date-5/16180r9l 51'52 176'31 ICorrections made
100	I	al Spindler-M		!	52'45 175'15 I **correctins made**
101		a I Spindler-M		I	51'20 179' \ **Corrections made**
102		O'Spindler-M		'	51'21 179'00 I Corrections made
103		a I Spindler-M	Manuwal		Coastal Semi sopochnol ls. I Corrections made
104		41 Sanaer-G	Wiswar-D		4 General obs.
105	I	7! Sanoer-G	Forsell-D		
106		31 Forsell-D	Hironaka		
107		01 DeGange			Hakodate,Jaoan-Berino Sea-Westem **Gulf** of Alask
108		01 Sanaer-G	**Krasnow**		
109		al Forsell, D.	Wiswor	1	1 aeneral obs.
110		01 Guzman		I	
111		01 Krasnow	Wiswor	I	
112		41 1Forsell-D	Voss	I	
113		01 Krasnow	Wohl	I	
114		01 Jones	Petersen	I Sanaer	Small boats - small boat transect
115		OiHatch-5		I	
116		OiDeGanae	I	i	Hakodate Japan - Western N. Pacific - south to 39'1
117		01' **Jones**	IPeterson		I 4 small boat transects - 4.75 hours

A	J	K	I	M	N
1	STATCNTS	OBSERV1	OBSERV2	OBSERV3	COMMENTS
118		0 Jones	Peterson		9 small boat transects - 3.5 hours
119		0 Macletosh			
120		0 Forsell-D			
121		0			NWR
122		0 Sanaer			NMFS
123		0 Nvsewander	Forsell		1 (FERRY)
124		0 Forsell-D			1
125		0 DeGanae			Western Pacific 60A Berino Sea to Subarctic Conv
126		0 Forsell-D	Nvsewander-D	Zwiefelhofer	1
127		0 Forsell-D	Nvsewander-D		
128		0 Bartonek. J.			
129		0 Zwiefelhofer			
130		0 Gould P.J.	HorJars-P?		
131		0 Baird			
132		0 Earlv-T	Emerson		Summer Aleutian Data
133	1	0 Jones	Peterson		110 small boat transects - 4 hrs 10 mins
134		0 Zwiefelhofer, D.			
135		01 Dav, R.H.			
136		01 Forsell-D	Baird-P		Small boat and LAND SURVEYS
137		01 Nelson-J			
138		01 Earlv-T			
139		0 Garret-R			
140		01 Gould-P	Trapp	1	
141		01 Sowls-A		1	
142		a1 Zwiefelhofer			
143		a Zwieflehofer, D.			
144		0 Nelson	Ilenhausen-B		
145	1	0 Krasnow			1
146		a Bartonek, J.			continued on F82011 \ to slalion 717,
147	1	0 Day, R.H			continuation of F82011\ Sl. 1718 -1241
146		0			
149		0 Forsell, D.	1		Aleutian Islands Nat'l ??
150		a1 Zwiefelhofer			
151		0 Ward-M	1		
152		a Mackintosh			1
153	1	a Zwieflehofer. D.	1		1
154		1081 DeGanoe			1 Gillnet Fishery
155		a Forsell-D			
156		a Forsell, D.		1	Radial Transects
157		a Gould, P.J.	Forsell		
158		01 Hunt. G.			Replicated transects in study areas (no.- month
159		01 Hunt, G.	1		Replicated transects in studY areas (no.- month)
160		a Hunt G.			Replicated transects in study areas Ino.= month}
161		01 Hunt, G.			Replicated transects in study areas Ino.- month
162		01 Hunt. G.			Replicated transects in study areas (no.= month
163		0 Hunt. G.			Replicated transects in study areas Ino.= month
164		a Hunt, G.			Replicated transects in studY areas no.= month)
165	1	a Hunt, G.			Replicated transects in studY areas no.= month)
166		a Hunt, G.			Replicated transects in study areas no.= month)
167	1	a Hunt, G.			Replicated transects in study areas (no.- month)
168		a Hunt, G.			'Replicated transects in studY areas (no.= month)
169		01 Hunt. G.			Replicated transects in studY areas (no.- month)
170		0 Irons-D			Shoreline transects
171		0 Irons-D			**shoreline transects**
172	1	a Hunt, G.			Pelacic transects
173		0 Forsell-D			St1-34
174		**0 Sowls**			Polar Sea Cruise
175		01 Forsell-D	Zwiefelhofer		Uvak Ucanak Bays only

A	J	K	L	M	N
1	STATCNTSIOBSERV1		OBSERV2	OBSERV3	COMMENTS
234	Ollrons-D				Replicated transects in study area
235	Ollrons-D				RePlicated transects in studY area
236	O Irons-D				Replicated transects in studY area
237	O Irons-D				Reolicated transects in study area
238	O Irons-D				Shoreline transects
239	Ollrons-D				Shoreline transects
240	Ollrons-D				Pelaoic Transects
241	OlZwiefelhofer				
242	12101 Dav. R. H.				1040 Pusan-Honolulu=560 sI 041 Honolulu-Tokvo=I
243	OlDav. R.H.				1
244	01				Aleutian Islands NWR 100=Kiska
245	01 Zwiefelhofer				
246	275! Bartonek. J.				not keYPunched 11/88
247	2451 Bartonek. J.				not keypunched 11/88
248	9691 Dav. R.H.				Seattle to flvino souid fisherv + returnl969+ St.lnot
249	OlZwiefelhofer				
250	161Dav, R.H.				observations onlv in Jaoan Sea I not kevpunched-
251	127 Bartonek, J.				not kevpunched-11/88
252	01 Piatt-J				
253	0 Piatt-J				
254	Ol Gould P.J.	Piatt-J			
255	OjGould-P	1			
256	0J Gould P.J.	Piatt-J			Semidis to Shumaoins
257	01 Neweomer-M				Tokvo to Vancouver and Vancouver to Hawaii. (for
258	Ol Gould. P.J.				
259	0 Ringal				N.Pacific Ocean out of Jaoan I For Pat Gould
260	01 Kellv-J				110 min. transects I scientific observational hiah se
261	01 Kellv-J				110 min. transects I diving scientific observer progra
262	01 Kellv-J				Scientific observer orooram hiah seas driflnets
263	01 Kellv-J				Scientific observer Proaram -High seas driflnet
264	01 Gerwin-JA				10 min transects I research cruise

A	J ! K	L	M	N
1	STATCNTS OBSERV1	OBSERV2	OBSERV3	COMMENTS
176	01 Sanner-G	Cobb-J		87=Transects + Stations
1n	01 Goaleh			FWSIUSSR Berino Sea Exoedrtion -Russian Reser
176	01 Bartonek, J.			
179	01 Bartonek, J.			
160	01 Bartonek J.			
161	01 Bartonek, J.			
182	0; Bartonek, J.			
183	161 Sowls-A			1st: 1-16
184	Ollrons-D			Renlicated transects in studv area - no. indicates m
185	**Ollrons-D**			ReDllcated transects In studvarea-no. indicates m
166	Ollrohs-D			Renllcatsd transects In studv area-no. indicates mo
187	Ollrons-D			Reallcated transects In studY area-no. indicates md
168	Ollrons-D			Renlicated transects In studv area - no. indicates m
169	0 Irons, D.			Replicated transects In study area-no. Indicates mo
190	Ollrons-O			Renlicated transects in studv area- no. indicates m
191	01 Hunt, G.			Replicated transects in studv area-no. Indicates md
192	Ollrons-D			Renlicated transects in studv area - no. Indicates m
193	Oilrons-D			Reolicated transects in studvarea-no. Indicates md
194	0: Irons-D			Renlicated transects in studv area-no. Indicates md
195	Ollrons-D			ReDllcated transects in study area-no. Indicates me
196	Ollrons-D			Shoreline transects 1
197	Ollrons-D			shoreline transects
196	01 Hunt, G.			Pelaole Transects 1
199	O1 Nvsewander	Zwiefelhofer, D.		Uvak-Uaanik
200	O! Bartonek, J.			
201	01 Bartonek J.			
202	O! Bartonek, J.			1
203	01 Bartonek, J.			
204	01 Bartonek, J.			
205	Oi Bartonek, J.			
206	Oi Bartonek, J.			
207	Oi Bartonek, J.			
208	01 Bartonek, J.			
209	01 Bartonek, J.			1
210	01 Newcomer-M			worklnn under Bob Dav-11/86,data not entered
211	01 Newcomer-M			worklna under Bob *Dav-11/86,data* not entered
212	0; Newcomer-M			workina under Bob Dav-11/86,data not entered
213	01 Newcomer-M			workina under Bob Dav-11/86,data not entered
214	a **Newcomer-M**			worklnn under Bob Dav-11/86 data not entered
215	a **Newcomer-M**			workino under Bob *Dav-11/86,data* not entered
216	O Newcomer-M			workina under Bob Dav-11/86,data not entered
217	O **Neweomer-M**			workino under Bob *Dav-11/86* data not entered
218	01 Newcomer-M			workina under Bob *Dav-11/86,data* not entered
219	OJ Newcomer-M			worklnn under Bob Dav-11/86,data not entered
220	0, Newcomer-M			workino under Bob *Dav-11/86* data not entered
221	01 Newcomer-M			workina under Bob *Dav-11/86,data* not entered
222	OI Newcomer-M			workinn under Bob Dav-11/86,data not entered
223	O Newcomer-M			workino under Bob *Dav-11/86* data not entered
224	O Newcomer-M			worklna under Bob Dav-11/86,data not entered
225	0			Aleutian Islands NWR
226	O Irons-D			Reolicated transects In studY area
227	O Irons-D			Renllcated transects In studY area
228	0 Irons-D			Replicated transects in studY area
229	0 Irons-D			Realicated transects in studvarea
230	Ollrons-D			Reolicated transects in studY area
231	Ollrons-D			Realicated transects In studY area
232	0 **Irons-D**			Replicated transects In studv area
233	**Ollrons-D**			1ReDlicated transects In study area