

REPLICATE AERIAL PHOTOGRAPHIC CENSUSES
OF OREGON COMMON MURRE COLONIES, 1996-1997

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INTRODUCTION

The common murre (*Uria aalge*) is the most abundant seabird species breeding in Oregon, with an estimated mean breeding population of 722,559 birds in 1988 (U.S. Fish and Wildlife Service, unpub. data). Oregon's breeding population is of international importance and constitutes approximately 66% of all common murres breeding south of Alaska (Carter et al. in prep). Remote censusing from aerial photographs is currently the only effective technique to assess the population status of this species in Oregon. The extreme sensitivity of nesting murres and the inaccessibility of most murre breeding sites in Oregon prohibit working within breeding colonies.

In 1988, the U.S. Fish and Wildlife Service (USFWS) conducted an inventory of all seabird species nesting along the Oregon coast. During the inventory, 66 active common murre colonies were documented, and 59 of these were censused using aerial photos. Since 1988, the USFWS has conducted one annual aerial photographic survey of all Oregon common murre colonies each June. This survey is timed to coincide with the late-incubation and early hatching periods, when colony attendance is believed to be most stable. As time constraints prohibit a census of all murre colonies every year, coastwide population trends are determined each year by using aerial photographs to census a subset of 15 murre colonies distributed along the entire Oregon coast. Photographs of all Oregon murre colonies (censused and uncensused) are archived for future use.

Following the 1990 breeding season, common murre colony attendance in Oregon began to decline. It is believed this decline was associated with poor oceanic productivity due to the 1991/93 El Niño event, although elevated sea surface temperatures and corresponding low oceanic productivity have persisted in northern Oregon waters through 1997. Colony attendance for Oregon's common murre breeding population reached its nadir in 1993, when almost complete abandonment of colonies occurred during late incubation. A decline in colony attendance does not necessarily indicate a decline in the population, as adult breeders may have chosen to forego breeding in years of poor foraging conditions. This assumption is based, in part, on the results of beach mortality transects conducted near Newport, Oregon and the lack of known anthropogenically-induced mortality events such as oils spills and net entanglement in Oregon. Reduced colony attendance, however, is indicative of reduced productivity, and in years of poor colony attendance normal attrition rates may exceed production, resulting in a net population loss.

In 1994, colony attendance by common murres in Oregon began to recover. Census values for the 15 standard survey colony monitoring sites distributed along the Oregon coast increased to 94% of the 7-year (1988-1994) mean value. This recovery continued in 1995 when colony attendance at the 15 sites exceeded the 7-year mean by 2%, yielding a 1995 Oregon breeding population estimate of 742,492 birds, the third largest common murre breeding population estimate in Oregon since monitoring began in 1988 (USFWS, unpub. data). In 1996 and 1997, however, colony attendance declined. The 1996 total at our 15 statewide monitoring sites was only 82% of the 8 year (1988-1995) mean value, yielding a 1996 Oregon breeding population estimate of 571,145. The decline continued in 1997, when the total for the 15 statewide

monitoring sites was only 79% of the nine year (1988-1996) mean value, resulting in an Oregon breeding population estimate of 539,893 birds.

Beginning in 1995, a three-year study was undertaken to assess changes in colony attendance by murre through the breeding season and to determine whether a single annual survey is adequate for monitoring trends in Oregon's breeding population of common murre. During May and June of each year, three replicate aerial photographic censuses of common murre colonies were conducted along the Oregon north coast, and colony attendance was compared between surveys each year and between survey years. The study was conducted only on north coast colonies because of limited helicopter availability and funding constraints.

This study was a cooperative effort, with funding provided by the Western Oregon National Wildlife Refuge Complex (USFWS) and the Tenyo Maru Trustee Council in 1996 and 1997. The Tenyo Maru Trustee Council agreed to partially fund all three years of this study as a Pilot Project for oil spill restoration planning purposes. The common murre was documented as the most seriously damaged species as a result of the Tenyo Maru oil spill that occurred off the entrance of the Strait of Juan de Fuca in July 1991. A significant number of the 3,157 dead common murre recovered in the Tenyo Maru spill event may have originated from Oregon breeding colonies.¹ Since the Oregon common murre population was likely injured as a result of this spill, it is appropriate that seabird monitoring and restoration actions occur in Oregon as well as Washington.

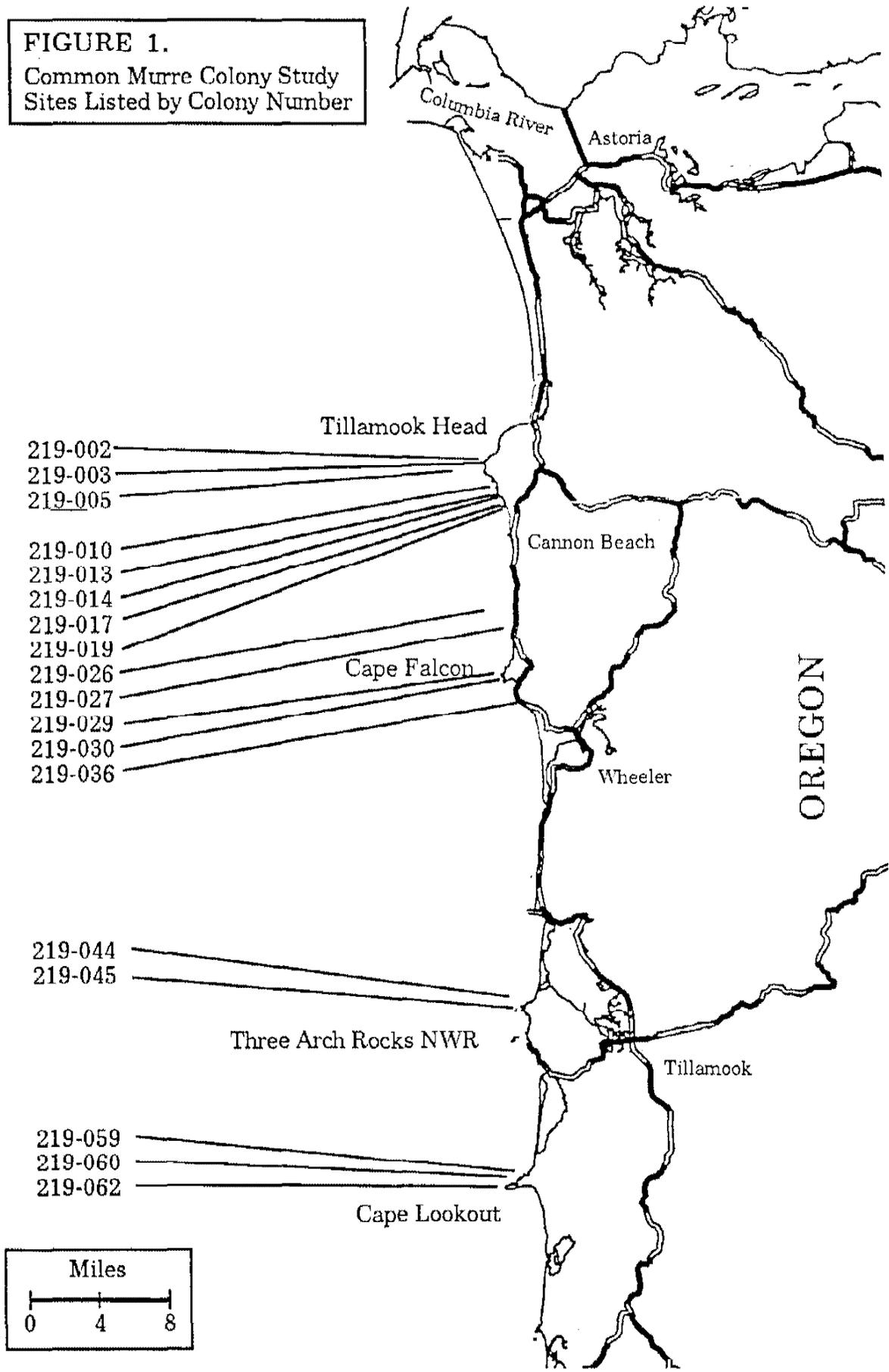
METHODS

Three replicate aerial photographic surveys of 15 (1995), 17 (1996) and 18 (1997) common murre colonies were conducted along the Oregon north coast. Results from 1995 have been reported previously (Lowe and Pitkin 1996). Surveys in 1996 were conducted on May 25, June 4 and June 18; surveys in 1997 on May 22, June 9, and June 19. The colonies surveyed are located between Tillamook Head (45°56'45"N) and Cape Lookout (45°20'12"N) and include the seven northernmost colonies in Oregon (Figure 1). Nine of the colonies selected normally support more than 2,000 birds, typical of large Oregon colonies. The remaining colonies each normally support fewer than 400 birds, and are similar in size to some Washington colonies.

This replicate study included three aerial censuses each survey year. Each year, the second (middle) census was conducted as part of the annual USFWS coastwide survey of Oregon murre colonies, hereafter referred to as our standard survey. The standard survey, timed to coincide with late incubation and early hatching of Oregon murre, requires two days to complete and usually occurs the first week in June. In 1996 and 1997, the first replicate census was conducted two weeks prior to the standard survey, the third census two weeks after the standard survey. In 1996, the three census surveys were conducted on May 25, June 4, and June 18; in 1997, they occurred on May 22, June 9, and June 19. Survey flights always originated at the Astoria airport, and were timed to commence within an hour of noon to reduce variability in colony attendance

¹Tenyo Maru Natural Resources Damage Assessment Meeting Transcripts, Neah Bay, Washington, February 7-8, 1995

FIGURE 1.
Common Murre Colony Study
Sites Listed by Colony Number



and to maintain consistent sun angles for photography. In 1996, the May 25 flight commenced at 1328 after a 1.5 hr. mechanical delay, the June 4 flight began at 1124 and the June 18 flight at 1114. In 1997, the May 22 flight departed at 1149, the June 9 flight at 1240, and the June 19 flight at 1203.

The survey platform used for the 1996 study was a Hughes 500D helicopter equipped with pop-out floats. In 1997, the survey platform was a Hughes 500D helicopter equipped with fixed floats and an auxiliary fuel tank. In accordance with Oregon survey methods, two photographers participated on each survey flight. The photographers were positioned in the right front and right rear seats with the doors removed. Photographs were taken as the helicopter slowly circled the colonies at altitudes of 800-1000 ft. above sea level. The front seat photographer used a Canon EOS A2E 35 mm camera with a Tamron 200-400 mm f/5.6 autofocus lens to obtain close-up overlapping colony photographs. The rear seat photographer used a Nikon N-90s 35 mm camera with a Nikon 80-200 mm f/2.8 autofocus lens for larger colony overviews and to assist with positioning overlapping close-up slides during counting. Film used was Fujichrome Sensia 200 ASA pushed one stop to 400 ASA, or Sensia 100 ASA pushed one stop to 200 ASA, depending upon lighting conditions. Shutter speeds of 1/500 or faster were used.

After processing, sorting, and labeling, overlapping colony slides were projected onto large sheets of paper using three or four projectors simultaneously. Individual birds were then circled by hand and tallied on hand-held counters. After counting, images of all slides used for counting were archived on CD-ROM discs using the Kodak Photo CD process. Each image was recorded on the CD in five different resolutions ranging from 128 x 192 pixels to 2048 x 3072 pixels. A list of the images by colony and date are included in Appendix I and II. One complete set of CDs was archived at the Oregon Coast National Wildlife Refuge Complex Office in Newport, Oregon and a second set was submitted to the Tenyo Maru Trustee Council, Olympia, Washington. The original color slides were placed in polyethylene sheets and storage boxes and archived at the Oregon Coast National Wildlife Refuge Complex Office in Newport.

RESULTS AND DISCUSSION

Replicate aerial photographic censuses were conducted at 17 (1996) and 18 (1997) Oregon north coast colonies on 25 May, 4 June and 18 June 1996, and 22 May, 9 June and 19 June 1997. The total number of murres counted at the colony sites during the study ranged from 33,382 to 35,656 with a mean of 34,789 in 1996, and from 20,780 to 34,980 with a mean of 28,743 in 1997 (Tables 1. and 2.). The number of common murres breeding at the study sites represents about 9% of Oregon's breeding population. (As a means of illustrating trends or contrasting data, some results from the 1995 survey year will also be discussed in this section.)

The variability among census totals during the 1996 and 1997 survey seasons was greater than during the 1995 season. In 1996, the 25 May census total recorded 2.5% more birds than the mean of the three censuses, the 4 June census total (part of the statewide standard survey) was 1.5% above the mean, and the 18 June census total recorded 4.0% fewer birds than the mean. In

1997, however, the variability among census totals was much greater. The 22 May census total was 21.7% above the mean of the three censuses.

Table 1. Results of 1996 Replicate Aerial Surveys of 17 Oregon North Coast Common Murre Colonies.

Large Colonies

Colony Name	Colony No.	Mean	25 May	% Variation From Mean	04 June	% Variation From Mean	18 June	% Variation From Mean
Tillamook Rock	219-005	6292	6767	7.5	6356	1.0	5752	-8.6
Sea Lion Rock	219-013	2366	2519	6.5	2329	-1.6	2249	-5.2
Bird Rocks (N.)	219-017	2197	2764	25.8	1946	-11.4	1880	-11.7
Bird Rocks (S.)	219-019	6212	7646	23.1	5559	-11.2	5432	-11.4
Castle Rock	219-026	5126	5238	2.2	5431	6.0	4710	-8.1
Gull Rock	219-027	2573	2513	-2.3	2666	3.6	2540	-1.3
Pyramid Rock	219-044	3142	2573	-18.1	3382	7.6	3470	10.4
Pillar Rock	219-045	5530	4945	-10.6	5606	1.4	6039	9.2
Brown Rock	219-060	262	0	-100	787	200.4	0	-100
SUBTOTAL		33,700	34,965	3.8	34,062	1.1	32,072	-4.8

Small Colonies

Colony Name	Colony No.	Mean	25 May	% Variation From Mean	04 June	% Variation From Mean	18 June	% Variation From Mean
Tillamook Head Rk.	219-002	108	135	25.0	107	-0.9	81	-25.0
Unnamed Rock	219-003	125	162	29.6	119	-4.8	95	-24.0
Unnamed Rock	219-010	417	274	-34.3	632	51.6	345	-17.3
Unnamed Rock	219-014	97	92	-5.2	113	16.5	85	-12.4
Cape Falcon Rock	219-030	28	6	-78.6	5	-82.1	73	161.0
Unnamed Rock	219-036	22	0	-100	56	154.5	9	-59.1
Unnamed Rock	219-059	175	18	-89.7	122	-30.3	385	120.0
Cape Lookout (W.)	219-062	118	4	-96.6	113	-4.2	237	100.8
SUBTOTAL		1090	691	-36.6	1267	16.2	1310	20.2
TOTAL		34,790	35,656	2.50	35,329	1.5	33,382	-4.0

Table 2. Results of 1997 Replicate Aerial Surveys of 18 Oregon North Coast Common Murre Colonies.

Large Colonies

Colony Name	Colony No.	Mean	22 May	% Variation From Mean	09 June	% Variation From Mean	19 June	% Variation From Mean
Tillamook Rock	219-005	4445	5674	27.6	4565	2.7	3095	-30.4
Sea Lion Rock	219-013	2249	2763	22.9	2240	-0.4	1743	-22.5
Bird Rocks (N.)	219-017	1653	2404	45.4	1547	-6.4	1009	-39.0
Bird Rocks (S.)	219-019	4740	5030	6.1	5043	6.4	4147	-18.6
Castle Rock	219-026	3147	4863	54.5	3406	8.2	1171	-62.8
Gull Rock	219-027	3025	3989	31.9	3117	3.0	1969	-34.9
Pyramid Rock	219-044	2726	3386	24.2	3033	11.3	1758	-35.5
Pillar Rock	219-045	5024	4865	-3.2	5668	12.8	4538	-9.7
Brown Rock	219-060	1057	1376	30.2	1010	-4.4	784	-25.8
SUBTOTAL		28,066	34,350	22.4	29,629	5.6	20,214	-28.0

Table 2., Continued

Small Colonies

Colony Name	Colony No.	Mean	22 May	% Variation From Mean	09 June	% Variation From Mean	19 June	% Variation From Mean
Tillamook Head Rk.	219-002	4	0	-100	10	150.0	1	-75.0
Unnamed Rock	219-003	2	0	-100	4	100.0	3	75
Unnamed Rock	219-010	323	309	-4.3	429	32.8	230	-28.8
Unnamed Rock	219-014	65	69	6.2	90	38.5	36	44.6
Unnamed Rock	219-029	43	35	-18.6	76	76.7	19	-55.8
Cape Falcon Rock	219-030	0	0	0	0	0	0	0
Unnamed Rock	219-036	0	0	0	0	0	0	0
Unnamed Rock	219-059	104	74	-28.8	118	13.5	120	15.4
Cape Lookout (W.)	219-062	138	143	3.6	113	-18.1	157	13.8
SUBTOTAL		679	630	-7.2	840	23.7	566	-16.6
TOTAL		28,745	34,980	21.7	30,469	6.0	20,780	-27.7

the 9 June census total was 6.0% above the mean, and the 19 June census total was 27.7% below the mean. Brown Rock (219-060), which was unstable throughout the three year survey, was completely abandoned on the first and third surveys in 1996.

Variability in colony attendance among individual colonies ranged from moderate to extremely high. Large colonies showed lower variability than small colonies in all survey years, but even large colonies showed high variability in 1997. In 1996, variability in large colony censuses (excluding Brown Rock) ranged from 18.1% below the mean value to 25.8% above the mean value. Brown Rock, where all breeding attempts failed in 1996, ranged from 100% below the mean to 200% above the mean. In 1997, large colony variability ranged from 62.8% below the mean value to 54.5% above the mean value. These extreme values occurred at Castle Rock (219-026), where disturbances from bald eagles occurred.

Small colonies showed the greatest individual variability in colony attendance. In 1996, census results ranged from 100% below the mean value to 161% above the mean value. In 1997, variability ranged from 100% below the mean to 150% above the mean. The instances of extreme variability in 1996 occurred in colonies that supported fewer than 75 birds, and fewer than 10 birds in 1997.

The causes of the moderate to extreme variability seen in all colonies in 1996 and 1997 can be largely explained by poor environmental conditions. Abnormally high ocean temperatures and sub-normal upwelling indices in the eastern North Pacific ocean have occurred every year since 1992, though in varying degrees of severity. These changes are poorly understood, but don't seem to be completely attributable to El Niños, which occurred in 1991/93 and 1996/97. The unusually warm ocean conditions and reduced upwelling since 1991 have contributed to lower near-shore ocean productivity, including reduced kelp and plankton production (Bill Peterson, pers. comm.) and increased colony abandonment and low production among some nesting seabirds, including common murre (*Uria aalge*), Brandt's cormorants (*Phalacrocorax penicillatus*) and pelagic cormorants (*P. pelagicus*) (USFWS unpub. data).

In 1996 and 1997, unprecedented numbers of adult murres died along the Pacific coast from southern Washington to southern Oregon during June and early July. On a 7.3 km stretch of beach south of Newport, Oregon, 159 adult murres were recovered in June, 1996 during routine beached bird mortality transects conducted by USFWS personnel. In June, 1997, 74 adult murres were recovered along the same stretch of beach. Virtually all recovered murres appeared to be emaciated, a further indication of poor ocean productivity. During years of good upwelling and normal ocean temperatures, very few adult murres are recovered during routine mortality transects in June.

Poor physical condition among breeding adults led to what appeared to be very low production of murre chicks during the 1996 and 1997 seasons. No murre chicks were recovered between late June and late September in 1996, and only 9 chicks were recovered between late June and late September in 1997 along the 7.3 km transect beach. During years of good chick production, often hundreds of murre chicks can be recovered between late June and late September on the transect beach. During the 1995 survey year, for example, only 3 adult murres were recovered in June on the same 7.3 km beach, while 128 murre chicks were recovered between late June and late September on the 7.3 km transect beach. While we believe that production of murre chicks in 1995 was below normal, it was nonetheless much better than in 1996 or 1997. As a consequence, the results of replicate aerial surveys conducted in 1996 and 1997 are better indicators of murre breeding phenology for years of very low production than for years of normal production, while 1995 survey results are likely much more indicative of conditions during years of normal chick production.

Variability in overall colony attendance within a survey year was lowest in 1995 and highest in 1997. Most colonies showed increasingly variable colony attendance as the study progressed, and colony attendance declined overall during the course of the three year study. These observations are consistent with the pattern of ocean conditions and murre mortality described above. As would be suspected statistically, small colonies (<430 birds) showed greater variability in colony attendance every survey year. One interesting result is that in all survey years, grand totals for the first census were higher than the mean, grand totals for the last census were lower than the mean, and grand totals for the middle census (part of the annual standard survey) were closest to the mean. This same pattern held true for large colony totals throughout the study, but was reversed for small colony totals, where attendance peaked on the final census in 1995 and 1996, and on the middle census in 1997. This delayed build-up in colony attendance at small colonies could result, among a variety of factors, from lower desirability of small colonies among experienced breeding murres, from the use of small colonies by less experienced breeding murres, or from the general absence within small colonies of breeding Brandt's cormorants and the protection from avian predators they normally provide to breeding murres.

As the study progressed, mean colony attendance generally decreased for all colonies, while the standard error of the mean and the count range generally increased for all colonies, especially in 1996 and 1997 (Table 3.). This result is also consistent with poor environmental conditions and high stress levels described above.

Table 3. Comparison of Replicate Aerial Survey Censuses for Oregon North Coast Common Murre Colonies, 1995 – 1997.

Large Colonies

Colony Name	Colony No.	1995			1996			1997		
		mean	SE	range	mean	SE	range	mean	SE	range
Tillamook Rock	219-005	7389	134	7199-7488	6292	417	5752-6767	4445	1056	3095-5674
Sea Lion Rock	219-013	2608	77	2508-2694	2366	113	2249-2519	2249	416	1743-2763
Bird Rocks (N.)	219-017	2947	214	2649-3047	2197	402	1880-2764	1653	574	1009-2404
Bird Rocks (S.)	219-019	6907	257	6549-7143	6212	1015	5432-7646	4740	419	4147-5043
Castle Rock	219-026	7030	656	6132-7679	5126	305	4710-5431	3147	1518	1171-4863
Gull Rock	219-027	5039	408	4462-5342	2573	67	2513-2666	3025	827	1969-3989
Pyramid Rock	219-044	4578	247	4381-4926	3142	404	2573-3470	2726	699	1758-3386
Pillar Rock	219-045	7216	123	7079-7377	5530	450	4945-6039	5024	475	4538-5668
Brown Rock	219-060	1663	691	718-2350	262	371	0-787	1057	244	784-1376

Small Colonies

Colony Name	Colony No.	1995			1996			1997		
		mean	SE	range	mean	SE	range	mean	SE	range
Tillamook Head Rk.	219-002	69	8	60-80	108	22	81-135	4	4	0-10
Unnamed Rock	219-003	148	52	106-221	125	28	95-162	2	2	0-4
Unnamed Rock	219-010	124	100	0-244	417	155	274-632	323	82	230-429
Unnamed Rock	219-014	129	7	120-136	97	12	85-113	65	22	36-90
Unnamed Rock	219-029	NS	NS	NS	NS	NS	NS	43	24	19-76
Cape Falcon Rock	219-030	NS	NS	NS	28	32	5-73	0	0	0
Unnamed Rock	219-036	42	3	38-44	22	25	0-56	0	0	0
Unnamed Rock	219-059	NS	NS	NS	175	154	18-385	104	21	74-120
Cape Lookout (W.)	219-062	125	15	105-139	118	95	4-237	138	18	113-157

NS – No Survey Conducted

In addition to impacts associated with poor ocean conditions, predation and disturbance by bald eagles (*Haliaeetus leucocephalus*) very likely reduced colony attendance, increased the variability in attendance or delayed breeding phenology at several of the large study colonies. Common murre breeding phenology was delayed by bald eagle predation and disturbance at Three Arch Rocks, Oregon's largest murre colony, beginning in 1995 (Lowe and Pitkin 1996) and continuing through 1997. Sea Lion Rock (219-013), Bird Rocks (219-017, 019), Castle Rock (219-026), Pyramid Rock (219-044) and Brown Rock (219-060) may have suffered from delayed breeding phenology resulting from bald eagle disturbances in 1996 and 1997. The timing of nest initiation appears to be critical to the breeding success of Oregon murre, and delayed phenology very likely resulted in reduced chick production at the affected colonies.

CONCLUSION

This three year study, a similar ongoing study begun in Washington in 1994, and surveys starting in California in 1996 were the first replicate aerial photographic censuses of common murre on the U.S. west coast. Given the very poor ocean productivity experienced in near-shore waters from southern California to as far north as British Columbia since 1992, the three-year Oregon

study occurred at perhaps the best time possible, in that the single year of relatively normal murre production (1995) since that time was included in the study. Likewise, much value was gained from replicate surveys conducted in years of little or no production, as causes and effects of failed breeding attempts became more apparent and were much better documented. Under the protection of the Endangered Species Act, bald eagles have increased in number and are beginning to reclaim their historic ecological niche along the U.S. west coast. The continuing predation and harassment of breeding murre by bald eagles, first witnessed in Oregon during the course of this study, allows researchers to observe a more natural predator/prey relationship between the two species which undoubtedly existed for millennia before bald eagle numbers plummeted.

Aerial photographic censusing of breeding common murre is currently the best available technique for monitoring populations over large geographic areas. Results of this study indicate that in years of relatively normal breeding production, a single survey within the first week in June may be adequate for population monitoring. In years of sub-normal production, however, a single survey may not be adequate to provide a realistic picture of population status or activity, as breeding attempts may be abandoned over the course of the season or foregone altogether, resulting in lower counts and higher variability among counts. The relatively small sample size of this study, both numerically and geographically, and the relatively short duration of the study also limit the conclusions we can reach with our data.

Oregon's breeding murre occur in essentially two distinct breeding systems: the northern system, ranging from Yaquina Head on the south to Tillamook Head on the north, and the southern system, ranging from Coquille Point on the north to Goat Island on the south. These two systems normally experience different environmental regimes during the breeding period, and murre within the two systems may exhibit slightly different breeding phonologies and success rates. For a number of financial and logistical reasons this study focused only on the northernmost murre colonies within the northern system. Unfortunately, we were unable to survey the colonies at Three Arch Rocks, which support the largest concentration of breeding murre south of Alaska, three times the total of all the colonies included in our study, and which dominate the northern system. Realistic attempts to monitor population levels within the northern system should include at least one large colony at Three Arch Rocks. Further, to establish correct survey timing on a state-wide level, rather than on the north coast alone, it would be appropriate to conduct a similar survey within Oregon's southern murre breeding system.

RECOMMENDATIONS

- Resume replicate aerial surveys on the Oregon north coast and continue until at least two years of normal murre production can be sampled, or resume surveys for a period of two to three years after murre again exhibit normal production on the north coast.
- Conduct a similar three-year replicate survey on the Oregon south coast.

ACKNOWLEDGMENTS

This study could not have been conducted without cooperative interagency effort. We would like to thank the Tenyo Maru Trustee Council for providing funding during all three years of this study. We also thank Tara Zimmerman and the USFWS Region 1 Migratory Bird Coordinators Office, Robin Brown and the Oregon Department of Fish and Wildlife for their continuing support in protecting Oregon's seabird populations and for providing nongame funding to support this project in 1995.

A special thanks to owner Jim Mott of Eagle Air Helicopters in Forks, Washington for the timely and costly alterations he made to his airship to meet our federal safety requirements, and to Fly Wright Helicopters in Federal Way, Washington. The piloting skills of Jimmy Schuler and Jim Hultgrien were extraordinary.

Annual aerial photographic surveys would not have been possible without the continued support of former Western Oregon Refuges Project Leader, Palmer C. Sekora. Palmer's commitment to protecting Oregon seabird populations insured that the expensive annual aerial survey of common murre occurred each year despite a declining operational budget. We also thank Project Leader James E. Houk for his support of the three year survey.

LITERATURE CITED

- Carter, H. R., U. W. Wilson, R. W. Lowe, M. S. Rodway, D. A. Manuwal, J. E. Takekawa, and J. L. Yee. In Prep. Population trends of the Common Murre (*Uria aalge californica*). Pages xx-xx. In D. A. Manuwal, H. R. Carter, and T. Zimmerman, editors. Biology and conservation of the Common Murre in California, Oregon, Washington, and British Columbia. Chapters 1 and 2: Natural history and population trends. U.S. Geological Survey, Information and Technology Report No. xx, Washington, D.C.
- Lowe, R. W. and D. S. Pitkin. 1996. Replicate aerial photographic censuses of Oregon Common Murre colonies 1995. Unpublished report to the Tenyo Maru Trustee Council, U. S. Fish and Wildlife Service, Oregon Coastal Refuges, Newport, Oregon.

APPENDIX I

Digital Image List of Aerial Photographs from 5/25/96 Census on CD-ROM #1

Colony Number	Date	Slide Number	Disk Image Number	Colony Number	Date	Slide Number	Disk Image Number
219-002	5/25/96	26	001	219-019	5/25/96	9	051
"	5/25/96	12	002	219-026	5/25/96	52	052
"	5/25/96	16	003	"	5/25/96	1	053
"	5/25/96	21	004	"	5/25/96	11	054
219-003	5/25/96	22	005	"	5/25/96	16	055
"	5/25/96	14	006	"	5/25/96	10	056
219-005	5/25/96	30	007	"	5/25/96	8	057
"	5/25/96	35	008	"	5/25/96	5	058
"	5/25/96	4	009	"	5/25/96	6	059
"	5/25/96	9	010	"	5/25/96	31	060
"	5/25/96	27	011	219-027	5/25/96	24	061
"	5/25/96	15	012	"	5/25/96	27	062
"	5/25/96	23	013	"	5/25/96	1	063
"	5/25/96	7	014	"	5/25/96	4	064
"	5/25/96	11	015	"	5/25/96	33	065
"	5/25/96	3	016	"	5/25/96	6	066
"	5/25/96	14	017	219-030	5/25/96	33	067
"	5/25/96	13	018	"	5/25/96	19	068
"	5/25/96	30	019	"	5/25/96	16	069
"	5/25/96	20	020	"	5/25/96	15	070
"	5/25/96	24	021	"	5/25/96	34	071
"	5/25/96	29	022	219-036	5/25/96	1	072
"	5/25/96	18	023	219-044	5/25/96	25	073
"	5/25/96	6	024	"	5/25/96	16	074
219-010	5/25/96	23	025	"	5/25/96	30	075
"	5/25/96	17	026	"	5/25/96	24	076
219-013	5/25/96	13	027	"	5/25/96	15	077
"	5/25/96	5	028	"	5/25/96	17	078
"	5/25/96	26	029	"	5/25/96	18	079
"	5/25/96	9	030	"	5/25/96	23	080
"	5/25/96	24	031	"	5/25/96	22	081
"	5/25/96	32	032	"	5/25/96	21	082
"	5/25/96	3	033	219-045	5/25/96	2	083
"	5/25/96	22	034	"	5/25/96	23	084
"	5/25/96	33	035	"	5/25/96	24	085
219-014	5/25/96	19	036	"	5/25/96	13	086
"	5/25/96	9	037	"	5/25/96	11	087
219-017	5/25/96	3	038	"	5/25/96	9	088
"	5/25/96	2	039	"	5/25/96	25	089
"	5/25/96	5	040	"	5/25/96	19	090
"	5/25/96	32	041	"	5/25/96	10	091
"	5/25/96	29	042	"	5/25/96	12	092
219-019	5/25/96	20	043	219-060	5/25/96	20	093
"	5/25/96	4	044	"	5/25/96	1	094
"	5/25/96	8	045	"	5/25/96	2	095
"	5/25/96	32	046	"	5/25/96	3	096
"	5/25/96	7	047	"	5/25/96	12	097
"	5/25/96	6	048	219-062	5/25/96	8	098
"	5/25/96	4	049	"	5/25/96	32	099
"	5/25/96	27	050	"	5/25/96	35	100

Appendix I

Digital Image List of Aerial Photographs from 6/4/96 Census on CD-ROM #2

Colony Number	Date	Slide Number	Disk Image Number	Colony Number	Date	Slide Number	Disk Image Number
219-002	6/4/96	26	001	219-026	6/4/96	31	051
"	6/4/96	31	002	"	6/4/96	32	052
"	6/4/96	32	003	"	6/4/96	27	053
219-003	6/4/96	31	004	219-027	6/4/96	5	054
"	6/4/96	29	005	"	6/4/96	26	055
219-005	6/4/96	7	006	"	6/4/96	27	056
"	6/4/96	2	007	"	6/4/96	29	057
"	6/4/96	5	008	"	6/4/96	19	058
"	6/4/96	16	009	219-030	6/4/96	14	059
"	6/4/96	5	010	"	6/4/96	4	060
"	6/4/96	34	011	219-036	6/4/96	32	061
"	6/4/96	22	012	"	6/4/96	35	062
"	6/4/96	23	013	219-044	6/4/96	1	063
"	6/4/96	9	014	"	6/4/96	3	064
"	6/4/96	8	015	"	6/4/96	2	065
"	6/4/96	32	016	"	6/4/96	15	066
"	6/4/96	13	017	"	6/4/96	4	067
"	6/4/96	12	018	"	6/4/96	5	068
"	6/4/96	11	019	"	6/4/96	28	069
"	6/4/96	36	020	"	6/4/96	30	070
"	6/4/96	8	021	"	6/4/96	33	071
219-010	6/4/96	31	022	"	6/4/96	32	072
219-013	6/4/96	13	023	"	6/4/96	34	073
"	6/4/96	2	024	"	6/4/96	18	074
"	6/4/96	2	025	219-045	6/4/96	6	075
"	6/4/96	8	026	"	6/4/96	15	076
"	6/4/96	35	027	"	6/4/96	17	077
"	6/4/96	15	028	"	6/4/96	16	078
"	6/4/96	20	029	"	6/4/96	18	079
"	6/4/96	27	030	"	6/4/96	20	080
"	6/4/96	10	031	"	6/4/96	21	081
219-014	6/4/96	35	032	"	6/4/96	19	082
219-017	6/4/96	33	033	"	6/4/96	10	083
"	6/4/96	2	034	"	6/4/96	11	084
"	6/4/96	1	035	"	6/4/96	12	085
"	6/4/96	25	036	219-060	6/4/96	32	086
219-019	6/4/96	24	037	"	6/4/96	2	087
"	6/4/96	9	038	"	6/4/96	31	088
"	6/4/96	11	039	"	6/4/96	25	089
"	6/4/96	12	040	"	6/4/96	35	090
"	6/4/96	25	041	"	6/4/96	9	091
"	6/4/96	26	042	"	6/4/96	4	092
"	6/4/96	27	043	"	6/4/96	9	093
219-026	6/4/96	28	044	"	6/4/96	24	094
"	6/4/96	12	045	"	6/4/96	34	095
"	6/4/96	11	046	"	6/4/96	1	096
"	6/4/96	6	047	"	6/4/96	11	097
"	6/4/96	25	048	219-062	6/4/96	14	098
"	6/4/96	28	049	"	6/4/96	16	099
"	6/4/96	24	050	"	6/4/96	21	100

Appendix I

Digital Image List of Aerial Photographs from 6/18/96 Census on CD-ROM #3.1

Colony Number	Date	Slide Number	Disk Image Number	Colony Number	Date	Slide Number	Disk Image Number
219-002	6/18/96	7	001	219-026	6/18/96	18	051
"	6/18/96	32	002	"	6/18/96	14	052
219-003	6/18/96	3	003	"	6/18/96	16	053
"	6/18/96	22	004	"	6/18/96	13	054
219-005	6/18/96	16	005	"	6/18/96	28	055
"	6/18/96	32	006	"	6/18/96	12	056
"	6/18/96	15	007	219-027	6/18/96	1	057
"	6/18/96	34	008	"	6/18/96	2	058
"	6/18/96	9	009	"	6/18/96	23	059
"	6/18/96	13	010	"	6/18/96	21	060
"	6/18/96	30	011	"	6/18/96	17	061
"	6/18/96	10	012	"	6/18/96	19	062
"	6/18/96	6	013	"	6/18/96	20	063
"	6/18/96	11	014	219-030	6/18/96	17	064
"	6/18/96	26	015	"	6/18/96	7	065
"	6/18/96	32	016	"	6/18/96	25	066
"	6/18/96	18	017	"	6/18/96	31	067
"	6/18/96	15	018	"	6/18/96	30	068
"	6/18/96	19	019	"	6/18/96	17	069
"	6/18/96	20	020	"	6/18/96	18	070
"	6/18/96	4	021	"	6/18/96	4	071
"	6/18/96	25	022	"	6/18/96	5	072
219-010	6/18/96	23	023	"	6/18/96	16	073
"	6/18/96	32	024	"	6/18/96	14	074
219-013	6/18/96	28	025	219-036	6/18/96	3	075
"	6/18/96	32	026	"	6/18/96	23	076
"	6/18/96	30	027	219-044	6/18/96	12	077
"	6/18/96	6	028	"	6/18/96	11	078
"	6/18/96	30	029	"	6/18/96	7	079
"	6/18/96	34	030	"	6/18/96	34	080
"	6/18/96	10	031	"	6/18/96	10	081
"	6/18/96	27	032	"	6/18/96	9	082
219-014	6/18/96	26	033	"	6/18/96	17	083
219-017	6/18/96	35	034	"	6/18/96	13	084
"	6/18/96	25	035	"	6/18/96	15	085
"	6/18/96	27	036	"	6/18/96	16	086
"	6/18/96	28	037	"	6/18/96	14	087
"	6/18/96	29	038	"	6/18/96	8	088
"	6/18/96	26	039	"	6/18/96	24	089
219-019	6/18/96	9	040	"	6/18/96	18	090
"	6/18/96	31	041	"	6/18/96	11	091
"	6/18/96	7	042	219-045	6/18/96	3	092
"	6/18/96	6	043	"	6/18/96	22	093
"	6/18/96	5	044	"	6/18/96	23	094
"	6/18/96	36	045	"	6/18/96	16	095
"	6/18/96	1	046	"	6/18/96	20	096
"	6/18/96	2	047	"	6/18/96	18	097
219-026	6/18/96	19	048	"	6/18/96	1	098
"	6/18/96	22	049	"	6/18/96	36	099
"	6/18/96	20	050	"	6/18/96	10	100

Appendix I

Digital Image List of Aerial Photographs from 6/18/96 Census and Other Material on CD-ROM #3.2

Colony Number	Date	Slide Number	Disk Image Number
219-045	6/18/96	32	001
"	6/18/96	33	002
"	6/18/96	30	003
"	6/18/96	27	004
"	6/18/96	36	005
"	6/18/96	28	006
"	6/18/96	29	007
219-060	6/18/96	8	008
"	6/18/96	30	009
"	6/18/96	31	010
"	6/18/96	5	011
"	6/18/96	2	012
"	6/18/96	1	013
"	6/18/96	32	014
"	6/18/96	16	015
219-062	6/18/96	17	016
"	6/18/96	18	017
"	6/18/96	13	018
"	6/18/96	18	019
"	6/18/96	30	020
219-059	5/25/96	21	021
"	5/25/96	22	022
219-059	6/4/96	10	023
"	6/4/96	14	024
"	6/4/96	11	025
"	6/4/96	16	026
219-059	6/18/96	7	027
"	6/18/96	11	028
"	6/18/96	16	029
"	6/18/96	26	030
"	6/18/96	28	031
"	6/18/96	4	032
Murre Jumpling	7/11/89		033
Murre with Chick	6/23/88		034

APPENDIX II

Digital Image List of Aerial Photographs from 5/22/97 Census on CD-ROM #1.1

Colony Number	Date	Slide Number	Disk Image Number	Colony Number	Date	Slide Number	Disk Image Number
219-002	5/22/97	13	001	219-019	5/22/97	9	051
"	5/22/97	16	002	"	5/22/97	1	052
"	5/22/97	14	003	"	5/22/97	3	053
"	5/22/97	30	004	"	5/22/97	3	054
219-005	5/22/97	7	005	219-026	5/22/97	1	055
"	5/22/97	15	006	"	5/22/97	12	056
"	5/22/97	9	007	"	5/22/97	7	057
"	5/22/97	23	008	"	5/22/97	13	058
"	5/22/97	8	009	"	5/22/97	28	059
"	5/22/97	23	010	"	5/22/97	10	060
"	5/22/97	20	011	"	5/22/97	27	061
"	5/22/97	2	012	"	5/22/97	1	062
"	5/22/97	1	013	"	5/22/97	18	063
"	5/22/97	30	014	"	5/22/97	17	064
"	5/22/97	24	015	"	5/22/97	15	065
"	5/22/97	14	016	"	5/22/97	21	066
"	5/22/97	12	017	219-027	5/22/97	12	067
"	5/22/97	20	018	"	5/22/97	18	068
"	5/22/97	18	019	"	5/22/97	21	069
"	5/22/97	6	020	"	5/22/97	22	070
"	5/22/97	21	021	"	5/22/97	23	071
"	5/22/97	9	022	"	5/22/97	24	072
"	5/22/97	32	023	"	5/22/97	32	073
219-010	5/22/97	10	024	"	5/22/97	38	074
"	5/22/97	21	025	219-029	5/22/97	32	075
219-013	5/22/97	20	026	"	5/22/97	34	076
"	5/22/97	35	027	"	5/22/97	8	077
"	5/22/97	25	028	"	5/22/97	31	078
"	5/22/97	21	029	"	5/22/97	15	079
"	5/22/97	1	030	"	5/22/97	16	080
"	5/22/97	22	031	"	5/22/97	22	081
"	5/22/97	20	032	"	5/22/97	9	082
"	5/22/97	33	033	"	5/22/97	10	083
"	5/22/97	6	034	"	5/22/97	13	084
"	5/22/97	31	035	"	5/22/97	10	085
"	5/22/97	16	036	219-030	5/22/97	27	086
"	5/22/97	3	037	"	5/22/97	4	087
"	5/22/97	15	038	219-036	5/22/97	17	088
219-014	5/22/97	13	039	219-044	5/22/97	35	089
"	5/22/97	24	040	"	5/22/97	1	090
219-017	5/22/97	27	041	"	5/22/97	1	091
"	5/22/97	1	042	"	5/22/97	3	092
"	5/22/97	16	043	"	5/22/97	4	093
"	5/22/97	19	044	"	5/22/97	5	094
"	5/22/97	36	045	"	5/22/97	3	095
219-019	5/22/97	18	046	"	5/22/97	21	096
"	5/22/97	26	047	"	5/22/97	36	097
"	5/22/97	23	048	"	5/22/97	15	098
"	5/22/97	4	049	"	5/22/97	35	099
"	5/22/97	10	050	"	5/22/97	19	100

APPENDIX II

Digital Image List of Aerial Photographs from 5/22/97 Census on CD-ROM #1.2

Colony Number	Date	Slide Number	Disk Image Number
219-044	5/22/97	31	001
"	5/22/97	32	002
"	5/22/97	11	003
"	5/22/97	13	004
219-045	5/22/97	29	005
"	5/22/97	1	006
"	5/22/97	3	007
"	5/22/97	6	008
"	5/22/97	7	009
"	5/22/97	9	010
"	5/22/97	14	011
"	5/22/97	15	012
"	5/22/97	17	013
"	5/22/97	18	014
"	5/22/97	24	015
"	5/22/97	22	016
219-059	5/22/97	15	017
"	5/22/97	21	018
"	5/22/97	22	019
219-060	5/22/97	36	020
"	5/22/97	9	021
"	5/22/97	4	022
"	5/22/97	6	023
"	5/22/97	17	024
"	5/22/97	19	025
"	5/22/97	21	026
"	5/22/97	23	027
"	5/22/97	26	028
"	5/22/97	27	029
"	5/22/97	28	030
"	5/22/97	29	031
"	5/22/97	32	032
"	5/22/97	33	033
"	5/22/97	35	034
219-062	5/22/97	16	035
"	5/22/97	12	036
"	5/22/97	14	037

Appendix II

Digital Image List of Aerial Photographs from 6/9/97 Census on CD-ROM #2.1

Colony Number	Date	Slide Number	Disk Image Number	Colony Number	Date	Slide Number	Disk Image Number
219-002	6/9/97	7	001	219-026	6/9/97	28	051
"	6/9/97	14	002	"	6/9/97	13	052
"	6/9/97	12	003	"	6/9/97	12	053
"	6/9/97	9	004	"	6/9/97	4	054
219-003	6/9/97	4	005	"	6/9/97	24	055
"	6/9/97	10	006	"	6/9/97	22	056
"	6/9/97	22	007	219-027	6/9/97	27	057
"	6/9/97	5	008	"	6/9/97	28	058
219-005	6/9/97	34	009	"	6/9/97	24	059
"	6/9/97	30	010	"	6/9/97	19	060
"	6/9/97	4	011	"	6/9/97	16	061
"	6/9/97	5	012	"	6/9/97	18	062
"	6/9/97	6	013	219-029	6/9/97	20	063
"	6/9/97	7	014	"	6/9/97	3	064
"	6/9/97	9	015	"	6/9/97	6	065
"	6/9/97	10	016	"	6/9/97	29	066
"	6/9/97	1	017	"	6/9/97	28	067
"	6/9/97	10	018	"	6/9/97	27	068
"	6/9/97	13	019	"	6/9/97	30	069
"	6/9/97	19	020	"	6/9/97	25	070
"	6/9/97	23	021	"	6/9/97	22	071
"	6/9/97	25	022	219-030	6/9/97	4	072
"	6/9/97	26	023	219-036	6/9/97	33	073
"	6/9/97	31	024	219-044	6/9/97	19	074
"	6/9/97	35	025	"	6/9/97	4	075
219-010	6/9/97	24	026	"	6/9/97	18	076
"	6/9/97	21	027	"	6/9/97	20	077
"	6/9/97	30	028	"	6/9/97	33	078
219-013	6/9/97	19	029	"	6/9/97	28	079
"	6/9/97	29	030	"	6/9/97	7	080
"	6/9/97	18	031	"	6/9/97	32	081
"	6/9/97	9	032	"	6/9/97	34	082
"	6/9/97	20	033	"	6/9/97	36	083
"	6/9/97	5	034	"	6/9/97	36	084
"	6/9/97	17	035	"	6/9/97	34	085
"	6/9/97	4	036	"	6/9/97	12	086
"	6/9/97	24	037	"	6/9/97	13	087
219-014	6/9/97	1	038	219-045	6/9/97	26	088
219-017	6/9/97	31	039	"	6/9/97	17	089
"	6/9/97	8	040	"	6/9/97	20	090
"	6/9/97	18	041	"	6/9/97	3	091
"	6/9/97	18	042	"	6/9/97	12	092
219-019	6/9/97	17	043	"	6/9/97	25	093
"	6/9/97	31	044	"	6/9/97	26	094
"	6/9/97	6	045	"	6/9/97	6	095
"	6/9/97	28	046	"	6/9/97	1	096
"	6/9/97	8	047	"	6/9/97	23	097
"	6/9/97	10	048	"	6/9/97	11	098
219-026	6/9/97	1	049	219-059	6/9/97	15	099
"	6/9/97	2	050	"	6/9/97	13	100

Appendix II

Digital Image List of Aerial Photographs from 6/9/97 Census on CD-ROM #2.2

Colony Number	Date	Slide Number	Disk Image Number
219-059	6/9/97	8	001
219-060	6/9/97	23	002
▪	6/9/97	8	003
▪	6/9/97	1	004
▪	6/9/97	4	005
▪	6/9/97	5	006
▪	6/9/97	6	007
▪	6/9/97	7	008
▪	6/9/97	14	009
▪	6/9/97	15	010
▪	6/9/97	17	011
▪	6/9/97	19	012
▪	6/9/97	21	013
▪	6/9/97	16	014
▪	6/9/97	22	015
▪	6/9/97	23	016
▪	6/9/97	24	017
▪	6/9/97	34	018
▪	6/9/97	35	019
219-062	6/9/97	32	020
▪	6/9/97	35	021
▪	6/9/97	29	022

Appendix II

Digital Image List of Aerial Photographs from 6/19/97 Census on CD-ROM #3.1

Colony Number	Date	Slide Number	Disk Image Number	Colony Number	Date	Slide Number	Disk Image Number
219-002	6/19/97	10	001	219-026	6/19/97	12	051
"	6/19/97	25	002	"	6/19/97	33	052
219-003	6/19/97	3	003	219-027	6/19/97	13	053
"	6/19/97	2	004	"	6/19/97	14	054
"	6/19/97	4	005	"	6/19/97	10	055
"	6/19/97	13	006	"	6/19/97	12	056
"	6/19/97	11	007	"	6/19/97	6	057
219-005	6/19/97	11	008	219-029	6/19/97	34	058
"	6/19/97	1	009	"	6/19/97	18	059
"	6/19/97	3	010	"	6/19/97	19	060
"	6/19/97	4	011	"	6/19/97	20	061
"	6/19/97	8	012	"	6/19/97	23	062
"	6/19/97	10	013	"	6/19/97	24	063
"	6/19/97	12	014	"	6/19/97	25	064
"	6/19/97	11	015	"	6/19/97	28	065
"	6/19/97	19	016	"	6/19/97	32	066
"	6/19/97	22	017	219-030	6/19/97	36	067
"	6/19/97	24	018	219-044	6/19/97	16	068
"	6/19/97	26	019	"	6/19/97	1	069
"	6/19/97	27	020	"	6/19/97	2	070
"	6/19/97	31	021	"	6/19/97	3	071
"	6/19/97	36	022	"	6/19/97	6	072
219-010	6/19/97	6	023	"	6/19/97	8	073
"	6/19/97	7	024	"	6/19/97	9	074
219-013	6/19/97	7	025	"	6/19/97	10	075
"	6/19/97	11	026	"	6/19/97	13	076
"	6/19/97	12	027	"	6/19/97	15	077
"	6/19/97	11	028	"	6/19/97	18	078
"	6/19/97	26	029	"	6/19/97	20	079
"	6/19/97	29	030	"	6/19/97	23	080
"	6/19/97	30	031	"	6/19/97	24	081
"	6/19/97	32	032	"	6/19/97	25	082
"	6/19/97	33	033	219-045	6/19/97	15	083
219-014	6/19/97	32	034	"	6/19/97	2	084
219-017	6/19/97	29	035	"	6/19/97	3	085
"	6/19/97	14	036	"	6/19/97	4	086
"	6/19/97	15	037	"	6/19/97	36	087
"	6/19/97	16	038	"	6/19/97	18	088
"	6/19/97	18	039	"	6/19/97	21	089
"	6/19/97	12	040	"	6/19/97	30	090
"	6/19/97	33	041	"	6/19/97	32	091
219-019	6/19/97	1	042	"	6/19/97	33	092
"	6/19/97	3	043	219-059	6/19/97	4	093
"	6/19/97	5	044	"	6/19/97	34	094
"	6/19/97	9	045	"	6/19/97	36	095
"	6/19/97	11	046	219-060	6/19/97	1	096
"	6/19/97	18	047	"	6/19/97	2	097
219-026	6/19/97	26	048	"	6/19/97	4	098
"	6/19/97	7	049	"	6/19/97	14	099
"	6/19/97	11	050	"	6/19/97	15	100

Appendix II

Digital Image List of Aerial Photographs from 6/19/97 Census on CD-ROM #3.2

Colony Number	Date	Slide Number	Disk Image Number
219-060	6/19/97	15	001
▪	6/19/97	17	002
▪	6/19/97	18	003
▪	6/19/97	19	004
▪	6/19/97	19	005
▪	6/19/97	20	006
▪	6/19/97	21	007
▪	6/19/97	21	008
▪	6/19/97	24	009
▪	6/19/97	25	010
▪	6/19/97	33	011
▪	6/19/97	34	012
219-062	6/19/97	11	013
▪	6/19/97	17	014
▪	6/19/97	3	015

FY97 TENYO MARU TRUSTEE COMMITTEE FUNDING - 9812-0019 & 9821-0019

**BUDGET REQUEST FOR AERIAL PHOTOGRAPHIC CENSUSES BY ROY LOWE
OREGON COMMON MURRE COLONIES**

FY OTR	DCN OR PP#	SALARY		FILM & PROCESS	PHOTO CD'S	HELICOPTER FLIGHTS (2)		OVERHEAD @ 15%	TOTAL	BALANCE	
	Budgeted Amount	EXP #	\$9,647.00	\$600.00	\$495.00	\$7,490.00	HRS.	\$2,735.00	BUDGET	\$20,967.00	
1997	98188-7-0345	14555								\$17,670.29	
1997	98188-7-0385	15523								\$14,434.07	
1997	13590-7-9709	16524						\$2,319.76		\$12,114.31	
1997	29408-7-0627	15530			\$834.90					\$11,279.41	
1997	29408-7-0730	16289		\$127.10						\$11,152.31	
1997	29408-7-0730	16290		\$381.75						\$10,770.56	
1997	13590-7-9712*	15216	\$412.15	Roy						\$10,358.41	
1997	13590-7-9712*	15215	\$293.73	Dave						\$10,064.58	
1997	13590-7-9714	16213	\$1,236.35	Roy						\$8,828.33	
1997	13590-7-9714	16214	\$886.21	Dave						\$7,942.12	
1998	13590-8-9811	13679	\$559.58	Roy						\$7,382.54	
1998	13590-8-9811	13789	\$366.08	Dave						\$7,016.46	
1998	13590-8-9812	13854	\$839.36	Roy						\$6,177.10	
1998	13590-8-9812	13866	\$549.08	Dave						\$5,628.02	
1998	29408-1-805X	13484		\$161.45						\$5,466.57	
1998	13590-8-M801	14167	\$3,800.00							\$1,666.57	
2000	13590-0-2003	12088	\$592.32	Roy						\$1,074.25	
2000	13590-0-2003	12087	\$1,135.39	Dave						-\$61.14	
	FUNDS REMAINING		-\$1,023.25		-\$70.30		-\$339.90		\$957.07	\$415.24	-\$61.14

*NOTE: Backup for this pay period is attached to Pilot Report for FY96 - 71 hrs of PP9712 were charged against FY96 funding.

FY96 TENYO MARU TRUSTEE COMMITTEE FUNDING - 9812-0019 & 9821-0019

**BUDGET REQUEST FOR AERIAL PHOTOGRAPHIC CENSUSES BY ROY LOWE
OREGON COMMON MURRE COLONIES**

FY OTR	DCN OR PP#	SALARY		FILM & PROCESS	PHOTO CD'S	HELICOPTER FLIGHTS (2)	HRS.	TOTAL BUDGET	BALANCE
	Budgeted Amount	EXP #	\$8,634.00	\$1,035.00		\$5,886.00			\$15,555.00
1996	13590-6-0056	12005		\$45.76					\$15,509.24
1996	13590-6-9609	12604	\$552.48	Roy					\$14,956.76
1996	11880-6-0413	12633		\$391.20					\$14,565.56
1996	11880-6-0613	13235		\$101.70					\$14,463.86
1996	98188-6-0307	13234				\$2,681.40			\$11,782.46
1996	98188-6-0345	13469				\$2,681.40			\$9,101.06
1996	11880-6-0713	15031		\$130.80					\$8,970.26
1996	13590-6-0171	15119		\$91.53					\$8,878.73
1997	13590-7-9626	11838	\$555.23	Dave					\$8,323.50
1997	13590-7-9626	11839	\$1,014.40	Roy					\$7,309.10
1997	13590-7-9712	15215	\$1,365.57	Dave					\$5,943.53
1997	13590-7-9712	15216	\$2,058.76	Roy					\$3,884.77
1998	29408-1-8042	12637		\$590.32					\$3,294.45
1998	13590-8-9810	13338	\$788.27	Dave					\$2,506.18
1998	13590-8-9810	13339	\$1,367.85	Roy					\$1,138.33
2000					\$705.02				\$433.31
2000	13590-0-2004	12287	\$382.37	Dave					\$50.94
	FUNDS REMAINING		\$549.07		-\$316.31	-\$705.02	\$523.20	\$0.00	\$50.94