

# PACIFIC SEABIRDS



A Publication of the Pacific Seabird Group

Volume 25 Number 2

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## Dedicated to the Study and Conservation of Pacific Seabirds and Their Environment

The Pacific Seabird Group (PSG) was formed in 1972 out of a need for better communication among Pacific seabird researchers. The Group coordinates and stimulates the field activities of members involved in research and informs its members and the general public of conservation issues relating to Pacific Ocean seabirds and the marine environment. Group meetings are held annually and the PSG publication, *Pacific Seabirds* (formerly the *PSG Bulletin*), is issued biannually. Current activities include involvement in seabird sanctuaries, seabird restoration after oil spills, seabird/fisheries interactions, and endangered species. Policy statements are issued on conservation issues of critical importance. Although PSG's primary area of interest is the west coast of North America and adjacent areas of the Pacific Ocean, it is hoped that seabird enthusiasts in other parts of the world will join and participate in PSG. PSG is a member of the U.S. Section of the International Council for Bird Preservation and the International Union for Conservation of Nature (IUCN). Annual dues for membership are \$20 (individual and family); \$13 (student, undergraduate and graduate); and \$600 (Life Membership, payable in five \$120 installments). Dues are payable to the Treasurer (see Membership page for details and application). PSG is a member of the American Bird Conservancy.

### *Pacific Seabirds*

*Pacific Seabirds* (ISSN 1089-6317) is published twice a year, in the spring and fall, and contains news of interest to PSG members, including regional seabird research, conservation news, and abstracts of papers presented at the annual meeting. *Pacific Seabirds* is an outlet for the results of scientific research, as well as articles and shorter items on seabird conservation, seabird research activities, and other topics related to the objectives of PSG. All materials should be submitted to the Editor, except that technical manuscripts should be submitted to the Associate Editor for Technical Manuscripts and conservation-related material should be submitted to the Associated Editor for Conservation. Back issues of the *Bulletin* or *Pacific Seabirds* may be ordered from the treasurer: please remit \$2.50 each for Vols.1-8 (1974-1981) and \$5.00 each for Vol. 9 and later (see Membership Application for details and order form).

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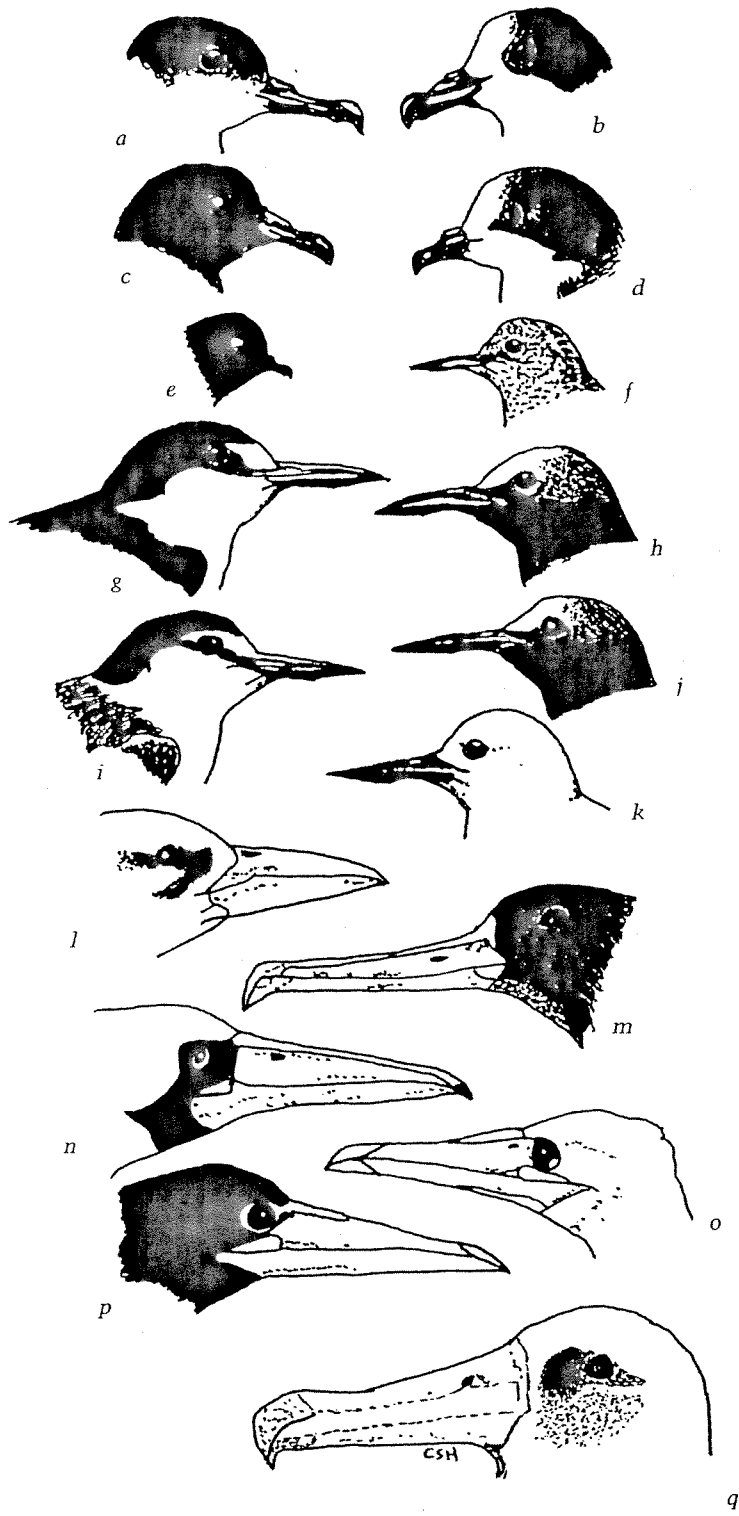
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Courtesy Craig S. Harrison



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# FORUM

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## THOUGHTS ON AN ELECTRONIC JOURNAL OF MARINE ORNITHOLOGY

By *Alan E. Burger*  
Chair, Pacific Seabird Group

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As our working lives get increasingly entangled in the web, using the Internet as a vehicle for publishing scientific journals is likely to become the standard. It is cheaper and faster than hardcopy publishing and can be accessible to a wider audience if freely accessible. In his proposal for an electronic journal of marine ornithology, Steve Speich has some compelling arguments to support the idea. Over the past months, particularly when I was at the International Ornithology Congress in Durban, South Africa, I discussed the idea of an e-journal with many seabird people, including some leaders in our field like John Cooper, John Croxall, Bob Furness, Tony Gaston, George Hunt, Henri Weimerskirch and Sarah Wanless. There was considerable divergence of opinion in my limited, but influential sample, but most seabird biologists seem to be in favour of developing an e-journal. I offer the following points to consider as rough ideas, definitely half-baked.

**1. Access to e-mail is very varied across the globe.** Most scientists and managers who are likely to use a seabird journal already have access to e-mail, including those in less technologically developed countries. On the other hand, casual web-browsing and downloading of information from web-sites seems to be much less common outside than in North America. One unexpected reason is that many countries charge for local phone calls, which deters long hours of web browsing from home computers. All this will change with time, unless the web collapses under its own success.

**2. People like paper.** Most, myself included, like the idea of being able to browse at leisure through a favourite journal while sitting in the sun, on the bus, or wherever. Staring at a computer screen just doesn't create the same ambience. One can always print out the essential papers, but printing marginally interesting papers will be a hassle.

**3. No one wants another paper journal.** It's too expensive.

**4. Hard copies will be needed for archives.** Most people don't fully trust

electronic archiving and want to have something tangible in a safe place for posterity. Perhaps the introduction of papyrus raised the same concerns among the tablet carvers in ancient times. Of course the concerns were justified - no one is likely to find the paper version of the Rosetta Stone. I'm told that printing a few hard copies of a journal is almost as expensive as a full press run, so someone will have to pay for archiving costs.

**5. Distinguishing trash from treasure might be difficult.** Almost anyone can dump information on the web, so a fledgling e-journal that published high quality peer-reviewed papers would need to make those high qualities very obvious. I think this has been very successfully done by the Ecological Society of America in launching their e-journal Conservation Ecology ([www.consecol.org](http://www.consecol.org)). They have a highly respected editor and editorial board, elicited solid articles from recognised deities for their first few issues, and have a well-constructed web-site.

**6. The best papers will still go elsewhere.** Good seabird biology is good science and deserves a wide audience. Papers that are good enough for the top ecological, oceanographic or behavioural journals will still go there, to give authors maximum exposure and academic credit. Some argue that a seabird journal is an unnecessary ghetto-ization of our science. Others counter by saying a good seabird journal will bring together papers now scattered over many journals, often inaccessible to those outside wealthy universities. Both points of view have merit.

**7. This should be an international venture.** There is little value in setting up yet another seabird periodical with a regional or continental focus. Only a truly international venture will attract the high quality papers that will give the e-journal respect and readership. This could be achieved through having regional editors who can rapidly deal with submissions and twist local arms for good papers. A widely respected editor-in-chief would be a big asset. Equally important, a journal supported by several societies is more

likely to receive the financial and volunteer support it needs to get off the ground and keep flying.

**8. Regional outlets should not disappear.** Very few seabird biologists subscribe to an existing bulletin or journal from outside their geographic home range. A paper on the regional variation in nest habitat of an African cormorant is unlikely to interest the average North American ornithologist. But at the same time, such a paper might be a critical key to understanding or managing a local endangered species. The various seabird groups should thus continue to provide a vehicle for the low-intensity regional notes and papers that now appear in existing seabird periodicals. Pacific Seabirds could continue to publish news, reviews and papers with a Pacific focus.

**9. It would help to have it free on the web.** Some e-journals apparently charge an access or membership fee (e.g., pre-paid codes at restricted web sites). It would serve the global sea-birder and conservation community best if we could provide free access to an e-journal. Free access is critical to spread the benefits to less wealthy countries. Obviously this entails some financial support, particularly at the start-up phase, which again makes a multi-society effort a good option. Spread the load and it might be very little for each society.

**10. The Pacific Seabird Group will have to take the lead.** The Europeans are in the midst of reorganizing their seabird groups, and while likely to support us, are unlikely to take the lead. Other seabird groups have fewer resources than PSG.

Some of the points I made above seem superficially contradictory, but I think this reflects the current uncertainty over this topic. Most people simply haven't given it a lot of thought. There are probably many other points I did not consider. John Cooper suggested taking a poll among subscribers to the present seabird list server to gauge international support for an e-journal. John and I also discussed the possibility of turning the existing journal that he edits, "Marine Or-

nithology", into an electronic journal, supported jointly by several seabird groups. This journal is published by the African Seabird Group and evolved in 1990 from the more Afrocentric journal "Cormorant". It now has an international

editorial board and the papers tend to have a southern hemisphere accent.

Publishing an electronic "Marine Ornithology" with a major PSG role, and a PSG-appointed co-editor, seem to be an ideal worth discussing. There are other models worth considering too. I hope you

will contribute to this discussion, either by writing something for the Forum section of Pacific Seabirds, or by contacting me (aburger@uvvm.uvic.ca) or Steve Speich, the publications coordinator (sspeich@azstarnet.com).

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## THE PACIFIC SEABIRD GROUP PUBLICATION PROGRAM AND A MODEL FOR AN ELECTRONIC JOURNAL OF MARINE ORNITHOLOGY

By *Steven M. Speich*

Editor, Pacific Seabirds and Coordinator, Publications Committee

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Many members of the Pacific Seabird Group (PSG) have expressed interest in a high-profile international journal dedicated to marine ornithology. The PSG, over the past few years, has considered several options. These include, 1) developing *Pacific Seabirds* into a truly international journal, 2) combining with the Colonial Waterbird Society and supporting the publication of *Colonial Waterbirds* or a new derivative, 3) PSG going alone, or in association with other groups, in establishing a new hard copy international marine bird journal, 4) establishing an electronic journal with minimal review - in effect a news, data and pre-publication outlet, or 5) PSG going alone or in association with other groups, in establishing an international marine bird journal published on the internet.

The concept of creating an international "*Journal of Marine Ornithology*" has recently been discussed within the PSG Publications Committee and in the development of PSG Vision proposals (see *Pacific Seabirds* 1997, 24(1): 3-6). The issue of PSG publishing a "formal" journal is not new and was debated several times and then abandoned. The publication goals of the PSG, as set forth at the annual meeting in Sacramento, California are centered on three outlets. These are: 1) the continued holding of symposia at annual meetings with subsequent publication (see Publications, this issue, for list of published PSG symposia); 2) development of a technical publications series (see Publications, this issue, for announcement of availability of PSG Technical Publication Number 1, *Exxon Valdez Oil Spill Seabird Restoration Workshop*); and 3) changing the *Pacific Seabird Group Bulletin* to *Pacific Seabirds*. *Pacific Seabirds* is loosely modeled after *Science* magazine, and includes the

elements of a newsletter, bulletin, and journal (i.e., technical articles, review articles, and book reviews). The decision to "let" *Pacific Seabirds* develop spared PSG the burden of the significant costs of supporting a traditional journal.

Recently PSG started utilizing a web site on the internet (see inside front cover for address) where electronic versions of articles that appeared in past issues of *Pacific Seabirds* and *PSG Technical Publications* are available in an electronic format for unrestricted use. The internet provides for the efficient publication of an electronic "*Journal of Marine Ornithology*," cost effectively and universally available to all potential users.

### Models

The advantages and challenges associated with publishing a fully peer-reviewed journal on the internet are perhaps best appreciated when compared and contrasted with different publication models. Four models are considered and briefly described.

**Model I - Peer Review, Hard Copy Only Publishing.** This is the mode of publication commonly used by scientific societies. Society members pay a subscription fee, as part of or in addition to membership fees and receive a paper copy of the publication. Libraries pay a subscription fee. Authors may or may not have to pay page charges. Reprints are usually available to authors for a fee. Editorial staff range from single unpaid individuals to professional editorial staffs such as support *Science*. There is usually a "society" that supports and governs the journal and editorial/publishing policies. Papers are fully peer-reviewed in the traditional sense. Costs include maintaining the organization, editorial staff, related review process, printing and postage.

**Model II. Peer Review, Internet Web Site Publishing With Hard Copies Sent To Libraries.** Identical to Model I except that hard copies of the journal are only sent to libraries, to maintain the archiving and long term availability of the journal. Society members and contributors do not receive printed copies of articles. The journal is viewable on a web site. Articles can be downloaded, and printed, by individuals for personal use. The web site, and access to the journal articles, can be freely open to all potential users, or access can be restricted (password necessary) to "society" members or by individual paid subscriptions. All aspects of review, editing and publishing are the same as for a traditional journal. Costs as in Model I, except that fewer issues are printed and a web site is maintained.

**Model III. Peer Review, Internet Publishing Only.** All aspects are the same as Model I, except that hard copies are not published. Essentially a traditional peer-reviewed journal published entirely on the internet. The site is freely open to all users and users are free to download any item. Authors do not receive printed reprints. Internet publishing allows individual articles to be posted to the web site as soon as they successfully complete the review process and are revised.

**Model IV. No Peer Review, Internet Publishing Only.** In this model there is no peer review, and hard copies are not published, and users are free to download any item. Editing is limited. This is a means for rapidly communicating ideas and data to all interested users, essentially an internet site for the "publishing" of "unpublished" manuscripts, manuscripts submitted for publication, data sets, new information and ideas, challenges to con-

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ventional thinking, dogma, status quo, etc. Costs are associated with the maintenance of the web site and "editorial" functions. The site is freely open to all contributors and users.

**Options.** It is not necessary that the "journal" be supported by a society in the traditional sense. Existing societies can continue to function as they do now. That means no annual meeting and its associated costs. Individuals join an existing "society" such as PSG, Japan Alcidi Society, etc. The supporting societies appoint an international editorial board and set editorial standards. The member societies collectively support costs of publishing (editorial staff, web site, postage, archive copies for libraries). Thus, existing societies can maintain their present meetings, newsletters, and bulletins as they choose.

Note: Past issues of journals can be placed on a web site, universally open to all users or restricted to "society" members or by individual paid subscriptions. The Ecological Society of America now offers such a service ([www.jstor.org](http://www.jstor.org)). A somewhat different service has been established by the American Association for the Advancement of Science ([www.science.org](http://www.science.org)).

### Preferred Model - Model III

The option, the establishment of an international marine ornithology journal, peer reviewed, published entirely on the internet in cooperation with other groups, is the option that seems most efficient, cost effective, and that will allow free access to the widest possible international audience in a timely manner.

To fulfill the need for an international journal of marine ornithology of the highest standards, the PSG Publication Committee proposes the creation of a *Journal Of Marine Ornithology*, to be published entirely on the internet. The goal is to consolidate papers now appearing in a variety of avian, ecology, marine, and local publications into one international journal, with the lowest cost possible to the supporting societies, authors and users, while maximizing the potential user audience.

The elements of Model III are presented for consideration and further refinement.

**Scope.** An international journal dedicated to publishing scientific works of all aspects of the biology and conservation of marine birds and their environ-

**Standards.** All submitted papers would have to meet the high peer review standards expected of any professional journal to be published.

**Supporting Societies.** The Journal of Marine Ornithology would be supported by member societies. As envisioned there would not be a Society of Marine Ornithology. Instead individuals would maintain membership in their regional society, e.g., the PSG. In this way regional societies do not lose members, and individuals do not have yet another annual membership to pay.

**Editor and Editorial Board.** The editor and editorial board would control the daily operation of the journal. The editor and members of the editorial board (in effect associate editors) would be appointed by the supporting member societies. The supporting member societies set the overall goals and objectives.

**Potential Authors.** Any individual member of one of the supporting member societies would be encouraged to submit manuscripts for potential publication

**Page Charges.** The lower costs of internet publishing may allow reducing or eliminating page charges?

**Reprints.** Reprints would not be provided to authors. Authors, like any user, could download individual articles from the internet web site for electronic storage and later viewing, or to print, as they choose.

**Institution Subscriptions.** Libraries, commercial firms and other institutions can be charged annual subscriptions and receive the journal on CDs.

**Publication Schedule.** Electronic publishing allows for the posting of articles as soon as the editor considers them final. This would reduce the time from submission to publication.

**Access.** The internet web site for the *Journal of Marine Ornithology* would be open without restriction or fee to anyone. Any article on the site could be viewed and downloaded by anyone. In this manner, articles have a potentially unlimited number of users. After all, the goal is to make all information available to the widest possible audience without obstruction.

**Archiving And Permanency Of Publications.** The internet is not suitable for archiving of material and permanence of records. Digital archives are now under development. The foreseeable future suggests that "hard copies" in digital format on CDs be distributed to selected libraries as a means of archiving the journal. CDs are easy and cost affective to

produce and distribute. Concerns related to digital archiving are now being widely discussed and solution are being developed.

**Internet Web Site.** The *Journal of Marine Ornithology* would reside on a web site. An appropriate site must be found. A "web Master" would be needed to maintain and post articles, issues, etc. to the site as received from the Editor. Unless a site is donated, a fee for the site is likely. A table of contents for each volume and a searchable index of titles, key words, and authors would be maintained, linked to the individual articles maintained in a database. Articles would be available as Adobe Acrobat PDF files, a universal and widely used standard accessible through the easily available and free Adobe Acrobat Reader.

**Annual Meetings.** Since a supporting society is not required, annual meetings are not necessary. Members of the supporting member societies would continue to attend their regional society annual meetings. In this way member societies maintain their integrity and unity with their annual meeting located and timed to serve their membership - inconvenient travel to meetings outside of a societies' natural geographical area is eliminated. This does not prevent the supporting member societies from occasionally holding a collective international meeting for their members.

**Member Society Publications.** Each supporting member society would be free to publish newsletters, bulletins, annual reports, symposia, technical publications, etc. For example, PSG could continue to publish *PSG Symposia*, *PSG Technical Publications*, and *Pacific Seabirds*, and continue to place items on its web site. This would help in maintaining the integrity of member societies.

**Further Reading.** The Florida Entomological Society (*Florida Entomologist*) converted to publishing on the internet. See T.J. Walker (American Scientist 1998, Volume 86:463-471) for discussion and cost analysis. See [www.amsci.org/amsci/articles/98articles/walker.html](http://www.amsci.org/amsci/articles/98articles/walker.html) and [www.fcla.edu/FlaEnt/bioscivcp/htm](http://www.fcla.edu/FlaEnt/bioscivcp/htm) for additional information.

# ARTICLES

## INFLUX OF BROWN PELICANS OFF SOUTHWESTERN VANCOUVER ISLAND DURING THE 1997 EL NIÑO

By Alan E. Burger, Jerry K. Etkorn, Brian Gisborne, and Rod Palm

Brown Pelicans (*Pelecanus occidentalis*) are rare transient visitors to the coastal waters of British Columbia (Campbell et al. 1990), and their presence in the province is generally associated with periods when inshore sea temperatures are well above normal and prey is generally less available to seabirds along the Pacific Northwest coast. Mean sea surface temperatures in the 1990s have been consistently above average, and in 1997-1998 the southern B.C. coast experienced prolonged and severe El Niño-like conditions (H. Freeland, Institute of Ocean Sciences). This coincided with sightings of Brown Pelicans in several locations on the southern coast of Vancouver Island. In this paper we document sightings of pelicans made in systematic counts from land at and near Carmanah Point, and boat surveys made along the nearshore coast of southwest Vancouver Island in 1997 (Figure 1). These observa-

tions offered a rare opportunity to monitor the duration of the influx, the numbers and age-ratio of the pelicans, and the foraging behavior of the pelicans in British Columbia

Counts of pelicans were made by BG as he piloted a water taxi between Port Renfrew and Bamfield on most days from May through September. The boat travelled 100-400 m from the shoreline, just offshore of the kelp beds. Most pelicans were seen in the morning and the numbers reported here were from the Port Renfrew to Bamfield run between 0800 and 1300. All pelicans seen from the boat were recorded, including those seen flying, on the water, and roosting on rocks or beaches.

Carmanah Point (48° 37' N, 124° 46' W) lies within this stretch of coast, and faces the entrance to the Strait of Juan de Fuca. Seabirds routinely seen here include both pelagic species (e.g., Sooty Shearwaters *Puffinus griseus*) and those

of sheltered coastal waters (e.g., loons, grebes, sea ducks). It is a likely area to locate Brown Pelicans as they move north from the United States coast. Observations were made with 8x30 binoculars and a 20x spotting scope. The ocean around Carmanah Point was scanned for birds by JKE one or more times per day from the light station and the spotting scope was used to determine the age-class of the pelicans. Additional observations were made at locations along the coast within 2 km on either side of Carmanah Point.

Brown Pelicans were first seen on 31 August 1997 and then almost every day until 14 October (Table 1, Figure 2). None was seen after that date. The highest counts at Carmanah Point were between 12 September and 3 October, with the maximum count of 76 on 15 September. The nearshore boat counts showed a similar peak between 12 and 20 September with a maximum count of 129 on 15

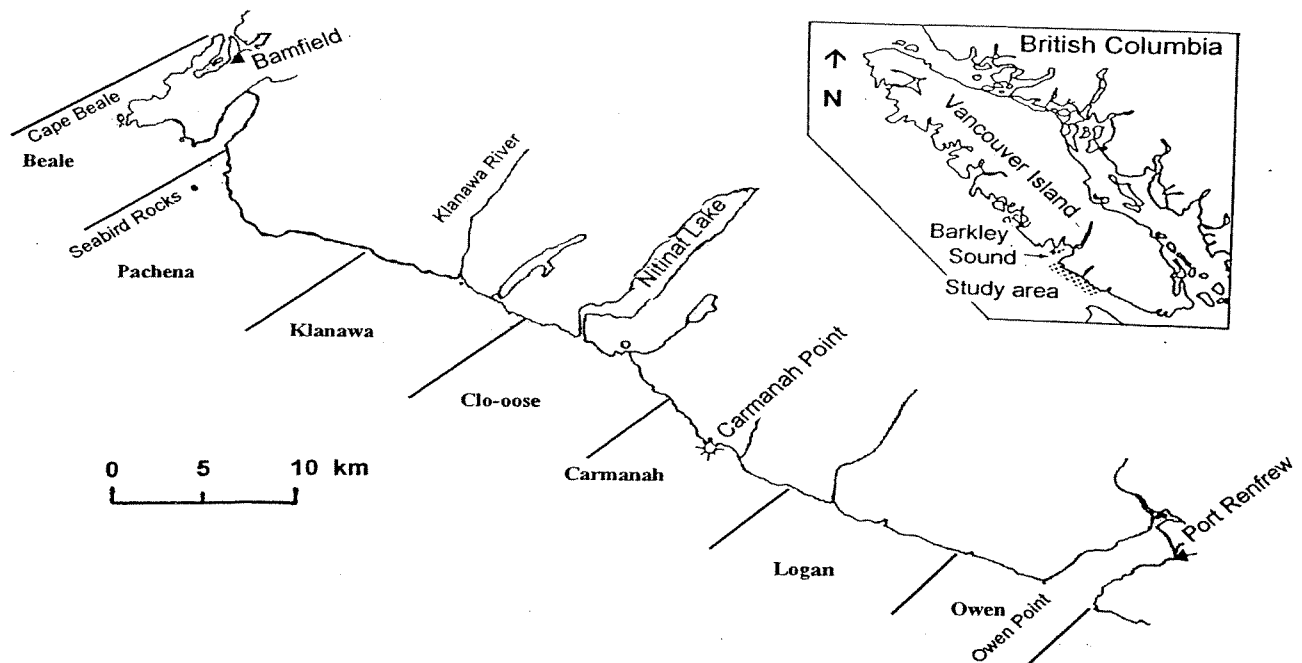


Figure 1. Map of southwestern Vancouver Island, showing the divisions of the coast surveyed by boat between Port Renfrew and Bamfield, the location of Carmanah Point where systematic observations were done, and some other features mentioned in the text.

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Table 1. Counts of Brown pelicans seen from or near Carmanah Point in 1997. On days in which more than one count was made the maximum count is given.

Date	Plumage type			Total	Behavior notes
	Adult	Immature	Not aged		
5 September			1	1	Flying
12 September	7	27		34	Roosting on nearshore rock
13 September			10	10	Flying by
14 September			10	10	Roosting on Bonilla Point and on beach
15 September	20	56		76	Roosting on nearshore rock
17 September	7	6		13	Roosting on sandy beach
19 September			61	61	Roosting on rocks (41) and feeding nearby (20)
21 September	0	6		6	Roosting on nearshore rock
22 September	1	4		5	Roosting on rocky point and nearshore rock
23 September			12	12	Flying near shore
24 September			11	11	Flying near shore
25 September	1	16		17	Flying near shore
27 September	17	5		22	Roosting on rocks (20) and flying near shore (2)
28 September	8	2		10	Roosting on rock (2) and flying near shore (8)
30 September			14	14	Roosting on rocks and flying near shore
2 October	8	2		10	Feeding and sitting on water
3 October	19	19		38	Roosting on rock (10) and feeding in Carmanah Bay (28)
4 October	2	1		3	Feeding in mixed-species flock (see text)
7 October			5	5	Roosting on nearshore rock
8 October	4	8		12	Roosting on rocks, feeding and flying near shore
11 October	5	3		8	Flying and resting on sea in Carmanah Bay
12 October			6	6	Flying and resting on sea in Carmanah Bay
14 October			1	1	Flying 200 m offshore
Total sightings	99	155	131	385	

September. There were few boat counts made during late September when 10-30 pelicans were still regularly reported off Carmanah Point. The timing of this influx was typical of previous ones in British Columbia, in which 77% of all records occurred between late July and early November (Campbell et al. 1990). No pelicans were seen from Carmanah Light Station in daily scans in 1996, and only one sighting of two birds, on 28 September 1996 was reported from 75 daily boat trips between Port Renfrew and Bamfield between 6 August and 26 October 1996.

In the area covered by the boat surveys, between Port Renfrew and Bamfield, the highest average counts were in the Carmanah area, with other concentrations in the Pachena area, often on or near Seabird Rocks island, and off the

Klanawa River (Figure 3). South and east of our study area, Brown Pelicans were also seen repeatedly during September and October 1997 within the Strait of Juan de Fuca, particularly at Sombrio Bay, Parkinson Creek, Jordan River, Race Rocks, and occasionally off Victoria (BG's vessel log, Victoria Natural History Society unpublished sight records). North of our study area single pelicans or small groups (<6) were occasionally seen in Barkley Sound and near Cleland Island, off Clayoquot Sound (Bamfield Marine Station unpublished records; RP sight records).

Pelicans were usually seen in groups feeding by plunge-diving within 1 km of the shore, sitting on the water, flying, or roosting on nearshore rock stacks or on sandy beaches. They were also seen in

mixed species flocks feeding on small schooling fish. These flocks included variable numbers of Pacific Loons (*Gavia pacifica*), Common Murres (*Uria aalge*), Heermann's Gulls (*Larus heermanni*), California Gulls (*L. californicus*), Glaucous-winged Gulls (*L. glaucescens*) and, rarely, Sabine's Gulls (*Xema sabini*). Pacific herring (*Clupeus harengus*) and sand lance (*Ammodytes hexapterus*) were the most common schooling fish taken by seabirds in this area, with surf smelt (*Hypomesus pretiosus*), northern anchovy (*Engraulis mordax*), and salmon smolts (*Oncorhynchus* spp.) taken occasionally (Carter 1984, Burger et al. 1993, Davoren 1997). Schools of Pacific sardine (*Sardinops sagax*), normally very rare, were regularly found in 1997 in the study area and in nearby Barkley Sound (Anne

Stewart, Bamfield Marine Station, in litt.). BG reported pelicans feeding at schools of sardines. Pelicans were also occasionally seen circling over or sitting on the water near the muddy plumes created by feeding Grey Whales (*Eschrichtius glaucus*), but feeding was not confirmed there.

On most days more immatures than adults were seen at Carmanah (overall ratio of sightings 99 adults: 155 immatures, Table 1). The proportion of immature birds was five times higher than in previous sightings of Brown Pelicans in British Columbia, in which the cumulative age ratio was 22 adults: 7 immatures (Campbell et al. 1990). The high proportion of immature pelicans is typical of post-breeding northward movements (Anderson and Anderson 1976). Immature birds, being less experienced, are likely to be more severely impacted by decreases in prey availability in their normal feeding range to the south, and hence might move further than adults in search of food during El Niño events.

Following breeding in Mexico and California, Brown Pelicans typically move northward along the California coast in late summer and early fall (Anderson and Anderson 1976), and variable numbers continue northward beyond California (Jaques 1994, Gress 1995). This population of Brown Pelicans declined as a result of DDT and other pollution (Anderson and Anderson 1976), but since the 1970s has recovered (Anderson and Gress 1983, Gress 1995). Consequently, sightings of Brown Pelicans in late summer and fall off Oregon and Washington have increased greatly in the 1980s and 1990s (Jaques 1994, Gress 1995), and might be more likely in British Columbia too.

Previous sightings of Brown Pelicans on the Vancouver Island coast coincided with warm-water events, particularly the 1982-1983 El Niño. Fifteen pelicans were reported at Carmanah Point on 11 November 1983, and the previous high count of pelicans in British Columbia was 24 seen nearby at Port Renfrew on 23 August 1983 (Campbell et al. 1990). The species is well known to prefer warm ocean conditions (Anderson and Anderson 1976). The higher numbers and prolonged presence of the pelicans in 1997 off southwestern Vancouver Island is attributed to their expanded post-DDT population, and the impacts of the persistent warm 1997-1998 El Niño-like ocean conditions.

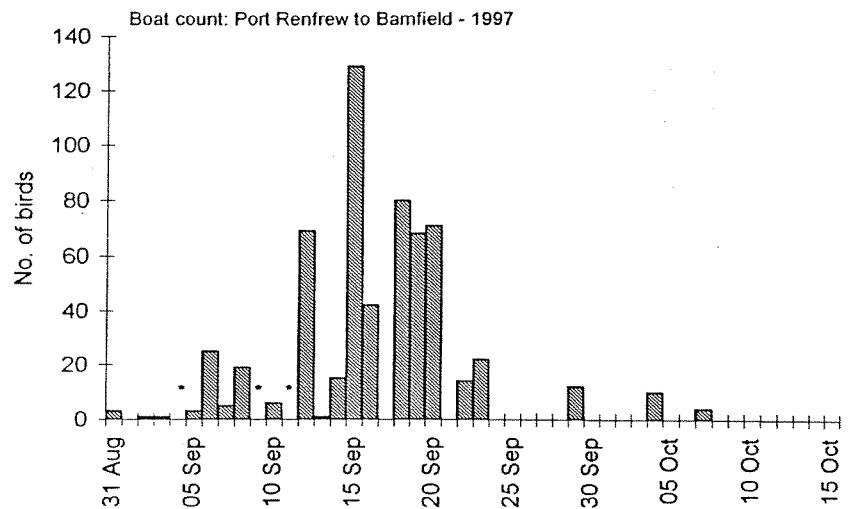
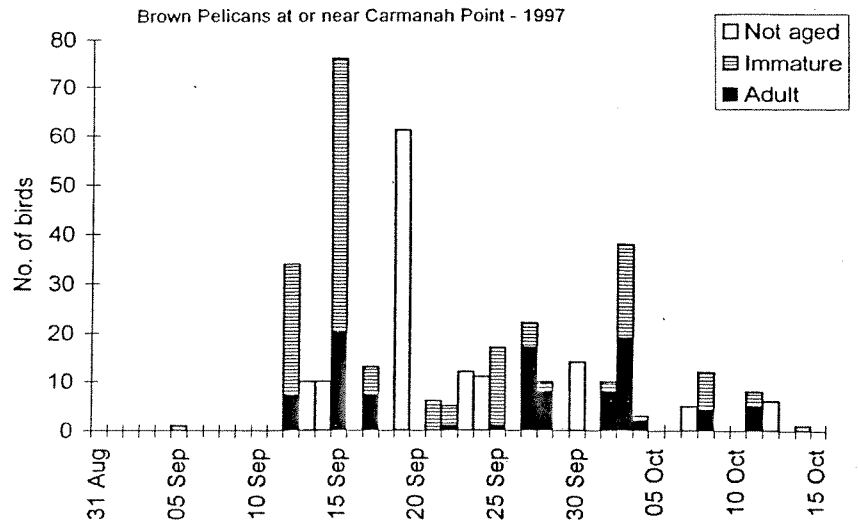


Figure 2. Counts of Brown Pelicans off southwestern Vancouver Island. The upper graph shows daily counts made from or near Carmanah Point. The lower graph shows counts made from a boat between Port Renfrew and Bamfield; no birds were recorded on boat trips on 4, 9 and 11 September (asterisks), but all other days with no birds had no boat surveys.

#### Acknowledgments

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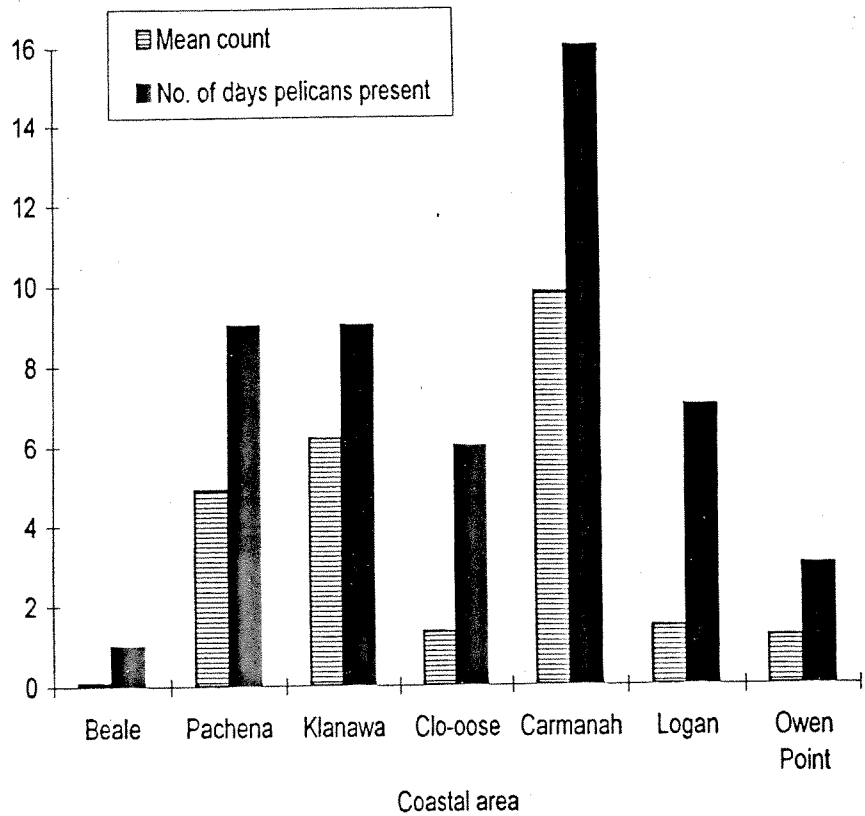
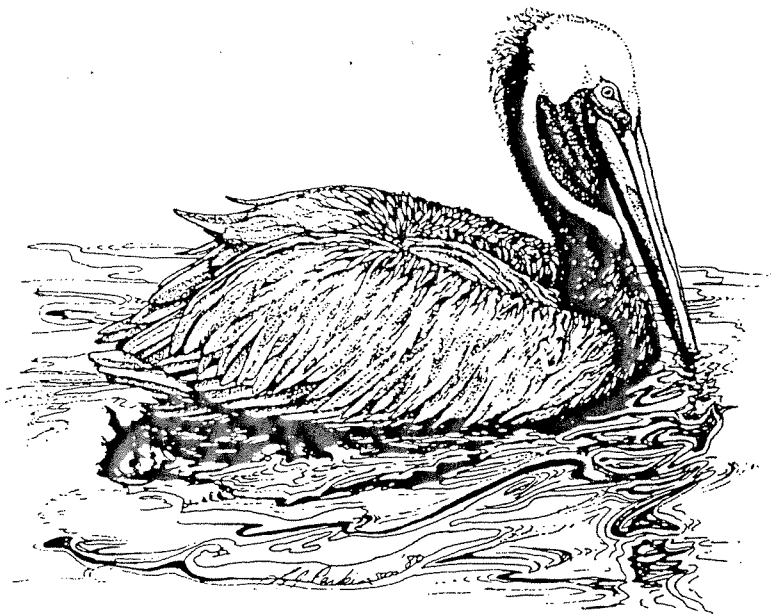


Figure 3. Distribution of sightings of Brown Pelicans off southwestern Vancouver Island, showing the mean count per area and the number of days pelicans were present in 24 days of boat surveys between 31 August and 7 October 1997. See Figure 1 for location of each coastal area.



**TIMING OF BREEDING IN ANCIENT MURRELETS:  
COMPARISON OF EAST AND WEST COASTS OF HAIDA GWAI, B.C**

By Anthony J. Gaston and Anne Harfenist

Approximately half of the world population of Ancient Murrelets *Synthliboramphus antiquus* breeds in the Haida Gwaii archipelago (Queen Charlotte Islands) of British Columbia. Within the archipelago, Ancient Murrelets breed in several large colonies off the West coast of Graham Island, and many smaller colonies scattered along the East coast of Moresby Island (Figure 1). Egg laying at

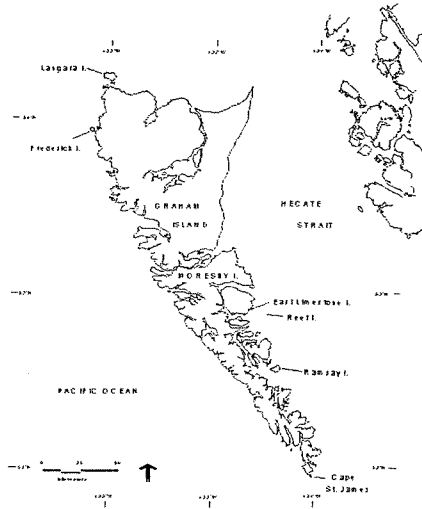


Figure 1. Locations of study sites in Queen Charlotte Islands.

these colonies takes place in April and May (Sealy 1976, Gaston 1992) and chicks depart from the burrows from about 8 May onwards, with most gone by mid-June. Breeding in Haida Gwaii is substantially earlier than recorded in Alaska. There seems to be little or no effect of latitude on date of laying, but there seems to be a close relationship between date of laying and sea surface temperature (Gaston 1992).

Evidence from previous studies at several colonies in Haida Gwaii suggested that colonies on the West (Pacific) coast tend to lay later than those on the East (Hecate Strait) side of the archipelago. However, previous information did not include observations at different colonies in the same year and methods were not standardized. A substantial and consistent difference in timing of breeding for areas of similar sea surface temperature would suggest that additional factors are in-

involved in determining timing of breeding in this species. To further investigate differences in the timing of breeding between different parts of Haida Gwaii, we carried out simultaneous observations at Frederick Island, on the West coast of the archipelago and at East Limestone and Reef Islands on the east coast (Figure 1) in 1996 and 1997. In 1995 we carried out simultaneous observations at the two East coast colonies, only 6 km apart, to compare timing of breeding.

#### Methods

Ancient Murrelet chicks leave the burrow at 1-3 days old and make their way to the sea at night on foot. We captured a sample of chicks departing from a portion of the study colonies by erecting plastic fences that guided chicks to observation stations close to the shore (3 at Reef Island, 6 at East Limestone Island, 1 at Frederick Island). There, they were counted, weighed and banded (not weighed or banded at Frederick Island) and then released immediately to the sea. This procedure is believed to cause minimal disruption to the departure process (Gaston et al. 1988). Fences were kept in exactly the same place throughout the

season, so that the same "catchment area" was sampled nightly at each colony.

The peak of chick departures usually occurred 1-2 h after complete darkness (3-4 h after sunset) and observation points were staffed daily throughout the chick departure period from the time that chicks first began to arrive (roughly 23.00-midnight Pacific Daylight Time) until 2 am (Frederick I. both years, East Limestone I. in 1996), 2.30 am (East Limestone I. in 1997) or 3 am (Reef Island). Daily observations ceased at the end of the season after the first night when no chicks were recorded departing. Observations throughout the night at East Limestone Island in earlier years suggested that about 88% of chicks depart before 2 am, 94% before 2.30 am and 98% before 3 am (AJG unpublished). There is no evidence that the proportion of chicks trapped before a given cut-off time (e.g. 2 am) changes with date (Gaston 1997).

Within-colony variation in departure dates was assessed by comparing departure dates for different observation stations at East Limestone Island, where the catchment area of the fences was believed to collect >50% of the chicks leaving the colony, and where the fences were

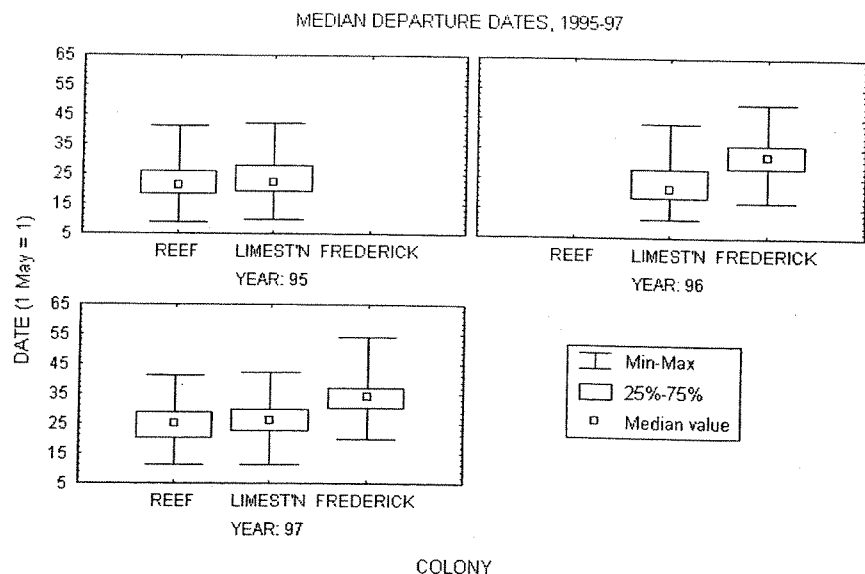


Figure 2. Chick departures, 1995-1997. 1 - Reef, 2 - East Limestone, 3 - Frederick.



Table 1. Dates of Ancient Murrelet chick departures from study colonies.

Colony	Year	N	Median	Mean (1 May=1)	S.D.	Minimum	Maximum
Reef <sup>1,2</sup>	1995	1223	21 May	22.4	6.4	9	41
Limestone <sup>2,3</sup>	1995	617	22 May	23.8	6.4	10	42
Limestone <sup>3,4</sup>	1996	648	21 May	23.3	7.1	11	43
Frederick <sup>4,5</sup>	1996	1265	1 June	31.8	6.4	17	50
Reef <sup>1,6</sup>	1997	1280	26 May	25.0	6.5	11	41
Limestone <sup>6,7</sup>	1997	520	26 May	26.2	5.7	11	42
Frederick <sup>5,7</sup>	1997	1182	3 June	34.3	5.8	20	54

Mann-Whitney U tests: <sup>1</sup> Z=-10.5, P<.001; <sup>2</sup> Z=-4.8, P<.001; <sup>3</sup> Z=2.6, P=.008;

<sup>4</sup> Z=22.0, P<.001; <sup>5</sup> Z=-8.8, P<.001; <sup>6</sup> Z=-3.44, P<.001; <sup>7</sup> Z=22.7, P<.001

separated in such a way that they sampled most of the periphery of the colony.

### Results

The earliest departure of chicks began on 9 May at Reef Island in 1995 and the latest on 20 May at Frederick Island in 1997. First nights when no chicks were recorded occurred on 10 June at Reef Island in 1995 and on 23 June at Frederick Island in 1997. Hence the spread of departures over the whole of Haida Gwaii during 1995-97 was approximately 47 days. The distribution of departure dates differed significantly from normal for all samples, being left-skewed at Reef Island in all years, and at East Limestone Island in 1995 and 1996, and being platykurtic in all samples (Figure 2).

Median dates of departure were earliest at Reef Island in 1995 and East Limestone Island in 1996 (21 May) and latest at Frederick Island in 1997 (3 June). The median date of departures differed significantly among all colonies and years (Table 1, Figure 3). Median date of departure at East Limestone Island was 5 days later in 1997 than in 1996 and at Reef Island 5 days later in 1997 than in 1995. Median departure at Frederick Island was 2 days later in 1997 than in 1996.

Although median departure dates differed significantly between Reef and Limestone islands in both 1995 and 1997, these colonies were rather similar, their median dates differing by less than 1.5

days in both years. However, median departure at Limestone Island was 11 days earlier than at Frederick Island in 1996 and the medians at both East Limestone and Reef Islands were 8 days earlier than at Frederick Island in 1997.

Comparing the different trapping funnels at East Limestone Island, we found no significant difference in median departure dates among funnels in any year.

### Discussion

Our results confirm the evidence,

previously only anecdotal, that timing of breeding of Ancient Murrelets is generally earlier at colonies on the East coast of Haida Gwaii than at those on the West coast. This difference persisted despite the fact that departures were later in 1997 than in 1996. The difference in median departure dates was 8-11 days.

Information on timing of breeding available previously for the West coast of Haida Gwaii includes median date of first eggs on 2 May (Sealy 1976), median start of incubation on 1 May (Bertram 1989), both at Langara Island, and median date

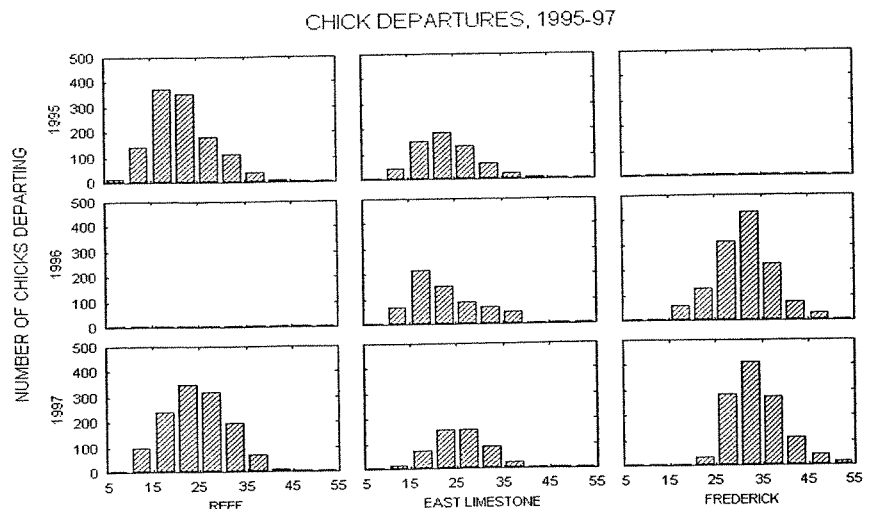


Figure 3. Median departure dates, 1995-1997.

## ARTICLES

of hatching on 3 June at Frederick Island (Vermeer and Lemon 1986). These can be used to estimate median departure dates of 11, 3 and 4 June, respectively (Gaston 1992): the latter two dates are very close to those observed at Frederick Island in this study. In contrast, earlier data from East coast colonies (Gaston 1992, Table 4.1) yielded median departure estimates of 27 May (Reef and East Limestone islands), 22 May (Lyll Island) and 6 June (Ramsay Island). Only the last estimate, made in 1984, when breeding at Reef Island was later than normal, overlaps with estimates for the West coast.

Gaston (1994) showed that, taken over the Ancient Murrelet's entire range, timing of breeding advanced by 6 days for every 1° C increase in April sea surface temperature (SST) of the nearby ocean. SST data is available from Cape St. James, at the southern tip of Haida Gwaii, and Langara Island at the NW corner and not far from Frederick Island. However, the mean difference in March SSTs between the two sites was only 0.7° during the period 1980-1995. Synoptic SST maps for northern BC waters show that water temperatures rarely differ by more than 1° over coastal waters surrounding Haida Gwaii. Hence, the difference in median departure dates between Frederick Island and the East coast colonies appears too large to be accounted for solely by varia-

tion in SST. Nor does it seem likely that the difference in timing could be accounted for by the small difference in latitude (Frederick I. - Reef I., 1° 5'), given that colonies in the Aleutians at a similar latitude breed a month later. It seems more likely that the consistent differences observed in timing of breeding between colonies on the Pacific and Hecate Strait sides of the archipelago relate to the timing of events in their respective marine ecosystems. However, the main determining factors remain unknown.

### Acknowledgments

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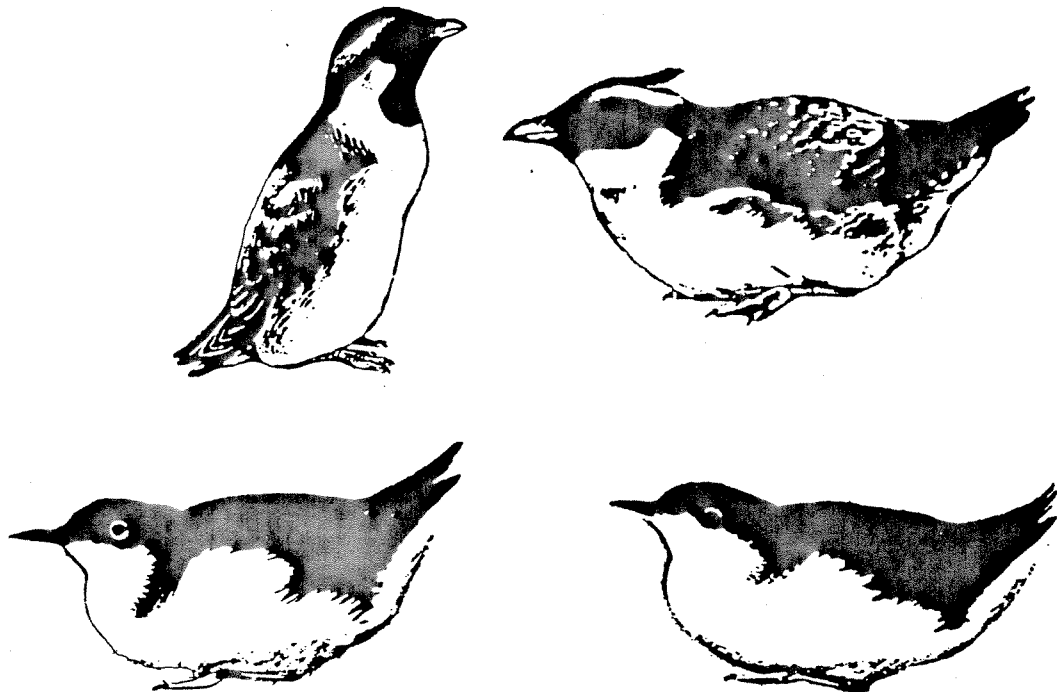
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# CONSERVATION NEWS

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## SPOONBILL WINTERING AREA PROTECTED

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More than half the world's 550 Black-faced Spoonbills (*Platalea minor*) winter in Tseng-Wen estuary in southwest Taiwan. This region has been threatened by the proposed construction of the giant Bin-nan project petrochemical complex. Having evaluated developers' environmental impact assessment for the proposal, the Taiwanese Environment Protection Agency has ruled that no part of the wetland can be affected by the development-all but defeating the proposal. Malcolm Coulter, co-chair of the IUCN specialist group on Storks, Ibises and Spoonbills lead the effort in the USA to protect this habitat.

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## NORTH AMERICAN COLONIAL WATERBIRD CONSERVATION PLAN

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An initiative to develop a North American Colonial Waterbird Conservation Plan to advance the conservation of seabirds and other colonial-nesting waterbirds in North America began with a meeting of its Steering Committee in July 1998. A partnership of non-governmental agencies, researchers, private individuals, academics, and federal and state agencies will develop the Plan over the next two years. The goal is to develop a Plan whose implementation will result in sustainable populations, distributions, and habitats of colonial-nesting waterbirds throughout North America, including breeding, migratory, and wintering ranges. The Plan will be developed in concert with other bird conservation planning efforts underway, including the North American Waterfowl Management Plan, Partners in Flight Bird Conservation Strategy, Important Bird Areas, and the Western Hemisphere Shorebird Reserve Network. A series of workshops will be held to gather information and to develop different portions of the plan, including research and information needs, monitoring needs, management needs, and outreach and information needs. Workshops to identify research and information needs

for management, were held in October 1998 at the annual meeting of the Colonial Waterbird Society in Miami, Florida, and will be held in February 1999 at the Pacific Seabird Groups' annual meeting in Blaine, Washington. Workshops on other portions of the plan will be announced soon. Information about the conservation Plan is available at [www.nacwcp.org](http://www.nacwcp.org) or from Melanie Steinkamp (301-497-5753) and Dr. James Kushlan (301-497-5500).

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## FWS DOES NOT LIST HARLEQUIN DUCK AS ENDANGERED

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The U.S. Fish & Wildlife Service announced in May 1998 that it would not list the Harlequin Duck (*Histrionicus histrionicus*) in eastern North America under the Endangered Species Act. FWS based its decision on: (1) prohibition of hunting since 1990 throughout eastern North America; (2) lack of information indicating that the duck's breeding, wintering, or staging habitat is likely to be harmed; (3) lack of information indicating that overutilization significantly affects the species; (4) lack of information indicating that disease or predation causes significant loss of individuals; (5) lack of information that the duck's population is at or below a minimum viable population size; (6) limited population trend data; and (7) regulatory mechanisms that adequately protect and conserve the species. In 1993, PSG sent copies of a report entitled "The Status of Harlequin Ducks in North America" to FWS and the Canadian Wildlife Service, and asked those agencies to investigate the status of the harlequin duck. See *Pacific Seabirds* 21:23 (1994).

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## CANADIAN WILDLIFE SERVICE ERADICATES RATS ON LANGARA ISLAND

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Environment Canada decided that restoring breeding habitat for seabirds is a viable use of oil spill restoration funds from the *Nestucca* oil spill. In 1993 it embarked on a program to eradicate rats

from Langara Island, British Columbia, and its associated islands. Norway rats were introduced to Langara Island in the Queen Charlotte Islands and contributed to the decline of Ancient Murrelets and other nesting seabirds. The Canadian Wildlife Service conducted feasibility studies and pilot tests in 1993-94, followed by eradication in 1995. The project employed a technique used successfully in New Zealand which dispensed anti-coagulant poison baits from stations fixed at regular intervals all over the island. Monitoring was completed in 1997, and the eradication appears to have succeeded. Biologists have not detected signs of rats on Langara island and its associated islands since February 1996. Common Ravens likely suffered greater than 50% mortality from the eradication after apparently gaining access to the poison directly from the bait stations and from scavenging rat carcasses. Dusky shrews, Bald Eagles, Song Sparrows and Northwestern Crows probably were exposed to the poison but suffered no detectable population decline.

Boat traffic or barges servicing the fishing lodges on Langara could reintroduce rats. Planning by the managers of the fishing lodges and the development of conservation initiatives by local groups must be encouraged. Further information is available in: Kaiser, G.W., R.H. Taylor, P.D. Buck, J.E. Elliott, G.R. Howald, and M.C. Drever, 1997. *The Langara Island Seabird Habitat Recovery Project: Eradication of Norway rats - 1993-1997. Technical Report Series No. 304.* Canadian Wildlife Service.

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## SLAUGHTER OF CORMORANTS IN NEW YORK STATE

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On July 29, 1998, nearly 1,000 Double-crested Cormorant adults and chicks were killed on Little Galloo Island, eastern Lake Ontario, near Watertown. The New York State Department of Environmental Conservation recovered buckets of 12 gauge shotgun shells at the scene. FWS has offered to pay for information leading to the arrest and conviction of individuals responsible for "a brazen act

of environmental terrorism." Recreational fishing interests had been threatening for months to take the law into their own hands if FWS did not act to control the fish eating birds. However, game fish comprised less than 2% of the cormorant diet on this island from 1992-1996, and over 30 studies show that cormorants have no significant impact on sport fish populations. To help minimize cormorant predation on young fish, New York State has changed its fish stocking methods. With increasing harvest and competition for fish, spawning area blockages from dams and highways, and pollution of critical fish habitat, cormorants are being made scapegoats for declines in fish populations. Without a better educated public such vigilante action may recur.

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### SEABIRDS VS SATELLITES ON SOMBRERO ISLAND, LESSER ANTILLES

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Sombrero Island is the northernmost islet in the Lesser Antilles. The 95-acre, rocky island is one of the most important seabird breeding colonies in the eastern Caribbean, including Brown Boobies, Masked Boobies, Brown Noddies, Bridled Terns, Sooty Terns and possibly Magnificent Frigatebirds and Roseate Terns. It is free from rats, cats and other introduced predators and its sole human inhabitants are lighthouse keepers. Beal Aerospace in Texas is working with the Anguillan Government and the British Space Agency to construct a satellite launching rocket facility on Sombrero. Apparently tropical locations are favored as satellite launching sites. The American Bird Conservancy, PSG, the Royal Society for the Protection of Birds, and the Island Resources Foundation in the Caribbean are alarmed at these developments and have been communicating their concerns to Beal, Anguilla and the British Space Agency.

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### SUCCESS IN LIMITING SEABIRD BYCATCH IN WASHINGTON STATE

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The 1998 non-treaty (non-Indian) Fraser River sockeye fishery took place in the San Juan Island/Point Roberts areas of northern Puget Sound and the Gulf of

Georgia for 8 days between 29 July and 21 August. Despite a court challenge, fishermen used modified gillnets to reduce seabird entanglement. A lower court issued an injunction to prevent the Washington Department of Fish and Wildlife from requiring the use of the nets, which was overturned on appeal just before the fishery opened. Despite short notice, compliance with the net requirement was good. 1998 was the first year that the non-treaty gillnet fleet was required to use "bird strips" on their gillnets - a 5 inch opaque twine about two meters below the corkline that presents a visual barrier to Rhinoceros Auklets, Common Murres and other diving birds. When combined with daytime and dusk or daylight-only fishing and abundance based fishing (fishing when fish abundance is maximized and bird abundance minimized) this gear adjustment reduces seabird bycatch by 70-75% (E. Melvin, L. Conquest and J. Parrish. 1997. Seabird bycatch reduction: new tools for Puget Sound drift gillnet salmon fisheries. Washington Sea Grant). In 1994, when the fleet size was 300-400 vessels, the non-treaty fleet killed about 3,500 birds. Washington Department of Fish & Game observers monitoring the purse seine fleet for incidental chinook catch during the sockeye fishery found few seabird mortalities.

An editorial in "The Fisherman's News" entitled "Bird Panel a Real Success" (September 1998) stated the bird panels were "an unqualified success" and that gillnetters indicate that "the panel has reduced the mortality of birds . . . by as much as 98 percent in some cases." It heralded this development as "very much a success story" because fishermen "were in danger of being banned from fishing" if they could not reduce bycatch.

Neither the U.S. Treaty Indian fishery managers nor Canadian authorities require similar gear for their fleets. Reports of dead murres and Rhinoceros Auklets from Point Roberts and south of San Juan Island this year seem to be associated with tribal fisheries. PSG has written fishery managers for the U.S. Treaty tribes, U.S. federal and state officials, and provincial and federal officials in Canada and the United States to request that they work together to insure that avoidance measures are used in all fisheries that take significant numbers of seabirds in the marine ecosystem, that the U.S. and Canada share on the Pacific coast. The Washington Department of Fish & Game will compare

treaty and non-treaty sockeye fishing efficiencies to determine whether there was a loss to the non-treaty sockeye salmon catch. Before wide scale application, gear testing indicated that there might be a 12-24% loss of catch efficiency (12% due to gear alone and 24% when gear is combined with the loss of dawn fishing), but preliminary data now indicate that there may have been no loss of efficiency. This fishery may be the only one that has been surveyed for the magnitude of its seabird bycatch, had studies of alternative gears, and has had imposed gear, time and area restrictions specifically to reduce seabird impacts in a gillnet fishery. The results so far seem to be a stunning success for all parties.

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### FEDERAL GOVERNMENT POISED TO DESTROY LARGEST CASPIAN TERN COLONY IN NORTH AMERICA

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The federal government seems poised to destroy the nesting habitat on Rice Island, Columbia River estuary, for Caspian Terns. The colony has grown to about 10,000 pairs, accounts for 30% of the North American population, and is probably the largest colony of this species in the world. The National Marine Fisheries Service (NMFS) blames terns for the demise of certain populations of salmonids because the birds (over which it has no management authority) eat smolts. NMFS does not seem to be concerned about seals or fishermen (over which it has management authority) who take large numbers of adult salmon returning to spawn. In addition to the terns, 5,300 pairs of cormorants and 7,100 pairs of hybrid Western X Glaucous-winged Gulls nest on this island.

Dan Roby's (USGS, BRD) study on the feeding ecology of Caspian terns indicates that much of their diet consists of hatchery-raised smolts of federally listed coho salmon and steelhead populations. They consumed 6-25% of the hatchery smolts in 1998. Roby's findings are explained in detail in the Regional Report for Oregon.

Caspian Tern populations may be declining in California and it is considered a vulnerable species in British Columbia. There is an ever-decreasing availability of suitable nesting habitat for Caspian Terns

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in this nation. They need vegetation-free and predator-free habitat near aquatic food. In many cases, the only such habitat is sand bars, which are notoriously unstable. In San Francisco Bay, which harbors the largest colony in California, Caspian terns are now relegated to nesting in just three major sites, all of which are artificial because no natural habitat remains. Maintaining these sites is expensive, and the existence of two on salt evaporation pond levees is tenuous because this activity is uneconomic. The San Francisco Bay area is a microcosm of this species' predicament on a larger scale.

NMFS proposed destroying the habitat at Rice Island in April of this year. In July, the Oregon Department of Fish & Wildlife proposed destroying the habitat in a plan related to seabirds preying on salmon, trout and steelhead. Objecting to these actions, the Pacific Seabird Group, American Bird Conservancy and Portland Audubon Society wrote NMFS and the FWS urging them to assess whether disturbing the colonies would increase the survival of the smolts - only a tiny fraction of which ever survive long enough to breed. We pointed out that the agencies had not complied with the Migratory Bird Treaty Act or the National Environmental Policy Act. We have asked the natural resource agencies to focus recovery efforts for endangered salmon populations on habitat destruction and other genuine causes for depleted salmon runs on the Columbia River. For example, changing water flows at the series of enormous dams that has been built on the Columbia River would yield far more benefits to coho salmon and steelhead than destroying seabird colonies. In addition, fishery managers have not devoted the resources necessary to enable the salmonid populations to reproduce successfully in an alien environment that has destroyed their natural breeding strategies. The percentage of smolts that return to breed in Pacific Northwest drainages is less than 1%, far less than returns of 4-5% in Iceland and

parts of Alaska. Hatchery-raised smolts aggregate in the upper water column searching for food when they are released, lack resilience and tend to be dazed when they are placed in the wild. Fishery managers also barge the smolts, which by most accounts is inimical to their ability to survive in the wild. Improving these practices would likely increase the percentage of smolts that return to spawn much more than limiting seabird predation.

PSG has opposed actions to significantly alter the nesting habitat (e.g., harassment, altering substrates) of Caspian Terns on Rice Island because there is no certainty that suitable habitat will be created elsewhere. Nevertheless, NMFS, FWS and the Corps of Engineers promised Senator Kempthorne in a hearing in October that they will do so before the 1999 nesting season. PSG has sent a Freedom of Information Act request to NMFS asking for data on the past twenty years on the percentage of smolts that have returned each year to spawn in the Columbia River system. We will analyze this information to assess whether the growth of the Caspian Tern colony since 1987 has affected the recruitment of salmonids.

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### HUGE NEW FUNDING SOURCE FOR STATE NONGAME WILDLIFE PROGRAMS

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Nongame wildlife programs in state fish and game departments in Washington, Oregon, California, Alaska, Hawaii and elsewhere could receive a major source of new funding in a proposal by Representatives Young (R-AK), Dingell (D-MI), John (D-LA) and Tauzin (R-LA). For many coastal states, this funding could provide five times the current funding levels for nongame wildlife such

as seabirds. It could provide state agencies with funds to do comprehensive annual surveys of seabirds, monitor nesting success, improve habitat, and similar activities.

Under this new proposal, monies would come from federal Outer Continental Shelf revenue from oil and gas leases, and may exceed \$350 million a year. The proposal is an alternative to the Teaming with Wildlife proposal that proposed funding such programs with an excise tax on certain outdoor equipment. This proposal would permanently appropriate 27% of Outer Continental Shelf revenue to coastal states to mitigate environmental and economic impacts of Outer Continental Shelf activity, and 13% to all states for land-based conservation and recreation. This funding package would include 10% for primarily non-game wildlife conservation and education.

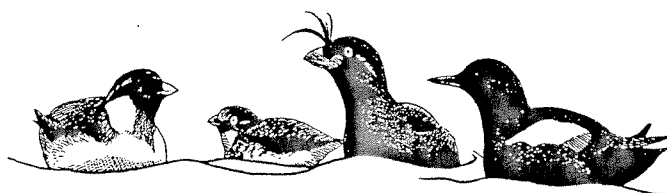
The Teaming with Wildlife coalition, including PSG, has worked with Congress to ensure the funds will be earmarked for nongame wildlife programs. Unfortunately, several national "environmental" organizations oppose this approach, apparently applying the principle that the perfect must be the enemy of the good. The legislation was introduced too late in the session to be enacted this year, but its sponsors are optimistic that it could become law in 1999.

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### PSG ADMITTED TO IUCN

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The International Union for Conservation of Nature and Natural Resources (IUCN) has admitted PSG as an international non-governmental organization. The IUCN Council took this action during its 49th Meeting in Fountainebleau, France, which took place November 6-7, 1998.



Courtesy Yoshitaka Minowa

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# PSG NEWS

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## SPECIAL ACHIEVEMENT AWARDS PRESENTED PSG HONORS CRAIG S. HARRISON AND GEORGE J. DIVOKY

By *Bill Everett*

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At the 24<sup>th</sup> Annual PSG meeting in Portland, Oregon, the Executive Council voted unanimously to recognize the efforts of two of our most dedicated members. It was appropriate that Craig S. Harrison and George J. Divoky received PSG's Special Achievement Award at our Silver Anniversary in Monterey, California, in 1998. Both are long-time PSG members who have provided continuity and service to the organization for decades.

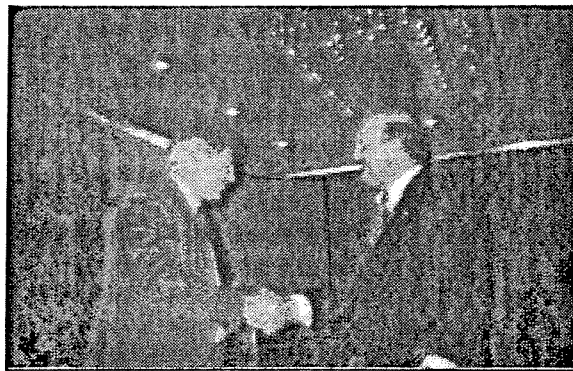
The Special Achievement Award is intended to honor individuals who have made an outstanding contribution to the success of the Pacific Seabird Group, and whose accomplishments have resulted in the betterment of seabird research, education, or conservation. The only other person to receive the award was Art Sowls, the first recipient, who was so honored at the 20<sup>th</sup> meeting in Seattle, in 1993.

### **Craig S. Harrison**

Craig was born in Santa Monica, California, and attended the University of California at Berkeley where he graduated summa cum laude with a degree in Biochemistry in 1970. He was elected to Phi Beta Kappa, received National Merit and U.C. Regent's Scholarships, and spent his junior year at the University of Sussex, England. Upon graduation he turned down a full scholarship in Berkeley's Zoology Department to indulge his wanderlust. He set off for Europe and then Africa - a naturalist's paradise which would call him back repeatedly in the following years. After shaking travel out of his system (and running out of money), he took a job as a chemist for the U.S. Department of Agriculture conducting analytical research on heavy metal water pollution. He was soon accepted into a Masters' program at California's Humboldt State University where he earned his Master's of Biology degree in 1974. Shortly thereafter he accepted a position as a Wildlife Biologist with the U.S. Fish and Wildlife Service. This work took him first to Alaska, where he participated in danger-

ous OCSEAP aerial seabird surveys in the Gulf of Alaska, Prince William Sound, the Bering, Beaufort, and Chukchi Seas. Seeking a warmer climate and safer work, Craig moved to Hawaii in January 1978 and directed research programs for the FWS on wildlife, pollution, and the environmental effects of fisheries. He had been bitten by the seabird bug in Alaska, and now had the opportunity to experience the world of tropical seabirds.

Having long been concerned and active in the area of conservation, however, Craig soon realized the constraints and limitations of working for a federal bureaucracy. A career in government was not to be his destiny. He applied to and was accepted at Oxford University for a Ph.D. program, but the logistics proved too difficult to overcome. Deciding to put his talents to work in a parallel arena, he enrolled in the University of Hawaii's Law School. This was to create a potent force in conservation, because few law-



Craig Harrison receives Special Achievement Award from Bill Everett.

yers had the depth of understanding of science and biology that Craig was acquiring. True to his well-established pattern, he excelled at this endeavor, receiving his Juris Doctor Degree in 1984. Craig graduated first in his class - an astounding accomplishment. He made the *Law Review*, received the American Planning Institute Award, and was recognized for superior exams in Environmental Law,

Constitutional Law, International Law, and an impressive array of other legal specialties.

While in law school, Craig worked part-time for the Environmental & Policy Institute's East-West Center in Honolulu. There he honed his skills delving into legal and policy research on fisheries, marine pollution, deep-sea mining, and oceanic disposal of nuclear waste. After graduating, however, he practiced his trade in the trenches - appearing regularly in Hawaii's state courts as a member of the firm of Goodsill, Anderson & Quinn. Practicing real property law was interesting but not what he really wanted to do. That opportunity came in 1988 when he was invited to join the prestigious Washington, D.C. law offices of Hunton & Williams. He was now specializing in federal environmental law - dealing with compliance and litigation involving the Clean Air Act, Endangered Species Act, National Environmental Policy Act, Clean Water Act, and others.

In both Hawaii and Washington Craig has worked tirelessly on a wide array of important conservation issues. In 1986 he organized the Wildlife Society's Wildlife Law Symposium in Honolulu. In 1987 he put together the Natural Resource Program for the Law of the Sea Meeting, also in Honolulu. He currently serves as a Director of the American Bird Conservancy (formerly the U.S. Section of the International Council for Bird Preservation), and maintains involvement with many conservation organizations. He has authored over 40 articles on wildlife biology, natural resource law and policy, and pollution. In 1983 he published a monograph on Hawaiian seabird feeding ecology, and in 1990 produced his magnum opus (to date): *Seabirds of Hawaii* published by Cornell University Press. This



book has been widely acclaimed for its scientific content and political candor - a rare and seldom seen combination. It remains to this day as a standard reference on the subject of Hawaii's seabirds.

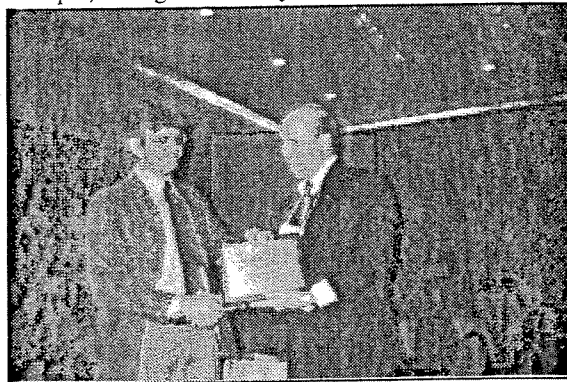
It is, however, his contributions to PSG and seabirds that warrant his recognition with the Special Achievement Award. Craig joined PSG shortly after its founding and has remained a deeply involved member ever since. Like many long-time members, he has done nearly every job in the organization. He has been a Regional Representative, Chair, organized the Hawaii PSG meeting, and served on a variety of committees (as coordinator and member). He got funding for PSG to convene a special meeting and produce a technical publication on seabird restoration (*Exxon Valdez*). In 1993 it was decided that conservation was to be a major element of PSG's activities, and Craig was elected to the newly-created position of Vice-Chair for Conservation. He has held that position ever since. Craig's conservation reports in *Pacific Seabirds* keep us all informed, but show only the tip of the iceberg when it comes to the work done behind the scenes. It is safe to say that rarely does a work day pass when Craig does not spend time on some issue or matter of importance to PSG. Craig's scientific and legal expertise have played a significant role in making the organization the recognized success that it is. For this we express our gratitude and appreciation.

**George J. Divoky**

George is a native of Cleveland, Ohio, who received his Bachelor's degree "with honors" from Michigan State University in 1969. His first contact with seabirds came the summer after graduation when he was an observer in the Program for Integrated Research on Pelagic Birds (PIROP) and spent the summer in the Gulf of St. Lawrence, primarily conducting observations from research vessels. The following fall he began a Master's program at Michigan State hoping to be able to pursue his interest in seabirds. This opportunity came while he was an intern at the Smithsonian Institution during the summer of 1970, and the Coast Guard began a program to gather baseline data in the Alaskan Beaufort Sea. Oil had recently been discovered at Prudhoe Bay and supertanker traffic through the Beaufort was being seriously considered as a transportation option. Since his first season in Alaska in 1970, he has conducted seabird research there every year. After

completing his Master's degree he worked at the Smithsonian until 1973, assisting George Watson, Curator of Birds. His work included completing the cataloging of seabird specimens collected during the Pacific Ocean Biological Survey Program (POBSP), the major governmental seabird program of the previous decade.

In 1973 he traveled to Fairbanks to work for the U.S. Fish and Wildlife Service in the embryonic seabird program being instigated by Jim Bartonek, a recent recipient of PSG's Lifetime Achievement Award. Increasing concern about foreign oil markets in the mid-1970's led to increased interest in development of the U.S. Outer Continental Shelf (OCS), and from 1975 through 1981 he worked on OCS research in the Bering, Chukchi, and Beaufort Seas. During this time he encountered this year's other award recipient, Craig Harrison. They had many interesting and contentious discussions. For example, George saw many seabirds fol-



George Divoky receives Special Achievement Award from Bill Everett.

lowing the icebreakers on which he worked, and contended that birds are attracted to ice. Craig contended from his aerial surveys that the ice pack was inhospitable habitat for seabirds. When Craig allowed George to participate in one of his aerial surveys over the Chukchi Sea, George fell asleep, thereby confirming Craig's conclusion. They have since frequently collaborated on issues or programs that benefit PSG.

From 1977 through 1981 George also worked at the Point Reyes Bird Observatory. In 1981 he left for the east coast and worked with William Drury of the College of the Atlantic, leaving in 1984 to enroll in a Ph.D. program at the University of Alaska at Fairbanks, under the professorship of Ed Murphy. Since his first cruise in the Gulf of St. Lawrence, George has been intrigued by the genus *Cephus*

and he has been able to maintain a study of Black Guillemots on an isolated island north of Barrow Alaska for more than 20 years. The study colony, which he increased from 10 to 225 pairs through the provision of nest boxes, was the subject of his Doctoral Dissertation. One of the birds he banded as a chick in 1975 was still alive and breeding during the summer of 1998.

George was part of the core group that worked in the "early days" of seabird research related to oil development in Alaska. This core group perceived the need for a professional organization serving the needs of seabirds and the researchers, educators, managers, and others interested in the rapidly expanding arena of Pacific seabirds. In 1973 George played a major role in organizing a weekend retreat for what would be the founding members of the Pacific Seabird Group. Since this watershed event, George has played a continuous and major role in the growth and development of PSG.

No other member of PSG has had as long and deep an involvement in the organization as George Divoky. He has served as Chair twice, edited the *PSG Bulletin*, served as Secretary and Treasurer, has been a Regional Representative a number of times, served on numerous committees, has organized two annual meetings, and was co-editor of PSG's *Technical Publication No. 1*.

George is ever-present at PSG meetings, reminding us of our past and chiding the organization to grow and flourish, and reminding us that the serious subjects of seabird research and conservation are not immune from having humorous connotations. He has been called the Tribal Leader of PSG, and through tireless effort and a vast amount of uncompensated work he has played a keystone role in making PSG one of the most successful and vital ornithological organizations in the world. All of us are deeply indebted to George for his steadfast support and dedication.

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OBITUARY  
IN MEMORIAM: Miklos D.F. Udvardy

By Steven M. Speich

Miklos Dezso Ferenc Udvardy passed away unexpectedly from complications following throat surgery, in his sleep the morning of January 17, 1998 in Sacramento, California. He is survived by his loving wife, his longtime friend and companion, Maud E. Udvardy. They have two daughters, Beatrix and Monica, a son, Andrew, and grandchildren, Jacob and Sarah. He was devoted to his family and loyal to his friends, and will be missed by all those who had the privilege of knowing him. He was born March 23, 1919, in Debrecen, Hungary.

Miklos was a founding member of the Pacific Seabird Group and a recipient of the Pacific Seabird Group's Lifetime Achievement Award (see *Pacific Seabirds*, 1995, 22(1): 15, for a summation of his professional career). In addition, he was a fellow of the American Association for the Advancement of Science and the American Ornithologists' Union, a consultant to the International Union for Conservation of Nature and Natural Resources, and a member of the Hungarian Academy of Sciences. He was honored with the title, Honorary Doctor at Debrecen University. Miklos was a professor in the Department of Zoology at the University of British Columbia, Vancouver, British Columbia, Canada, from 1952 through 1967, and a member of the faculty of the Department of Biology at California State University, Sacramento (CSUS) from 1967 through his retirement in 1991.

I first came to know Miklos when I was an undergraduate student at CSUS. Although I "took" his ornithology class, it was not until I enrolled in a special studies class that I came to appreciate him. Once accepted as a serious student he took it upon himself to expose and educate me of the world literature of birds and zoogeography. He directed me to the literature that he thought was important and fundamental, giving me a constant stream of reprints to read. This exposure taught me the importance of looking beyond the literature of North America, especially that of America, as there are other ways to conceptualize, model, and think about the world. Now I realize how

rare it was to have a major professor who would take the time to verbally translate for me articles from Germany, Finland, Russia, Spain, etc., because he thought it was important for my education.

During the year he was on sabbatical with a Fulbright Fellowship to Tegucigalpa, Honduras, I was left to take care of his library. The flood of reprints and books that came in the mail was overwhelming. But I endured and was able to fill many hours of reading the writings of L. and N. Tinbergen, Lack, Stresemann, Rensch, Palmgren, Niethammer, von Haartman, Darlington, and others. What great preparation he gave me for when I went on to the University of Arizona and came into contact with the students and followers of MacArthur.

Miklos was a linguist, able to converse and write in several languages. He spoke and thought in English when dealing with the likes of me. When at home the family often spoke Swedish. When in deep thought he reverted to Hungarian, and when dealing with technical matters he thought in German. He spoke and wrote Spanish, to the delight of the Hondurans, when he was at the university on sabbatical. He was fluent in Latin, spending one summer at an island research station with another researcher, their having only Latin in common. If this were not enough Miklos could read Greek. During one six month period I watched as he taught himself Russian, as he needed to read Russian papers. Needless to say he was in demand at international conferences. Useful as these linguistic skills were, they were not of help when he wrote his book *Dynamic Zoogeography*. I saw the early manuscripts, where the editors were arguing among themselves - Miklos was used to writing with German sentence word order, he understood the derivation of words though the meanings are now often different.

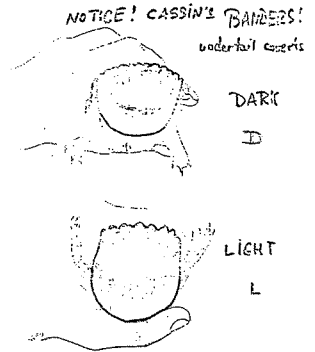
If there was any group of birds that Miklos felt most at home with and intellectually interested in, it was the seabirds. This is reflected in the work of his students (see *Pacific Seabirds*, 1995, 22(1): 15). The only time that I spent in the field with him was on the Farallon Islands

when he came out to visit and help Dave Manuwal and I when we were studying Cassin's Auklets. Long hours were spent in banding and measuring captured auklets. As usual he was full of questions, seemingly about everything related to the breeding seabirds on the island. This was a period of great intellectual excitement and learning for me. The only downside to his presence on the island was breakfast. He would get up early and proceed to empty everything in the refrigerator into a frying pan and create a "Hungarian breakfast." We politely endured.

Miklos and Maud traveled the world, as Maud almost always accompanied him when he went to meetings, here and abroad. I know he tried to have "vacations" where biology was supposed to be left behind, but alas, I think he always failed as there was always a bird, flower, insect, an animal of some sort that caught his interest.

I do not know how to write the sum and essence

of a man's life on a single page. I can only relate my experiences and impressions. Miklos was always intellectually active. His home was full of book and journals in several languages, and he was always reading. He was always questioning, reasoning and trying to explain what he saw in the world. In recent years I often received directions to read this or that, or he would call with a new idea for me to consider. I am sure he was as helpful to many others. At the same time, I believe his family was his real center, as he always spoke of them, and related their latest adventures. And Maud was his wife, friend, companion and nurturer of his intellect. [I just received a card from Maud. She is in Hawaii. I am sure she will continue to travel, including visiting her native Sweden.]





**PSG TECHNICAL  
PUBLICATIONS SERIES  
STARTED WITH EXXON  
VALDEZ RESTORATION  
REPORT**

The Pacific Group Technical Publications series was launched with the publication of the *Exxon Valdez Oil Spill*

*Seabird Restoration Workshop* report. This is the first in a series of publications that are of potential interest to the members of the Pacific Seabird Group, but that are too long for inclusion in *Pacific Seabirds*. Any manuscripts that deal with the biology or conservation of marine birds or their environment are potential items for inclusion in the series. Symposia are also potentially appropriate for inclusion in the series. Publication can be in the form of a

CD or hard copy, or both. If you have a manuscript completed or in preparation, or are considering of holding a symposium, and you think the item would be suitable for publication as a PSG Technical publication, please contact the Coordinator of the Publication Committee.

The PSG Technical Publication Number 1 can be purchased for \$18.00 USD (See Application/Order Form at end of this issue of Pacific Seabirds.)

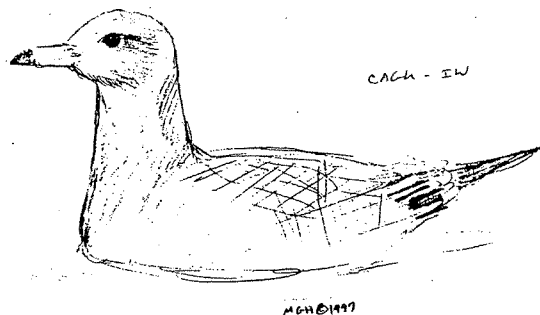
**PACIFIC SEABIRD GROUP  
1999 ANNUAL MEETING - BLAINE, WASHINGTON**



**TWENTY-SIXTH ANNUAL MEETING  
24-26 FEBRUARY 1999**

The Twenty Sixth annual meeting of the Pacific Seabird Group will be held 24-26 February 1999, at The Inn at Semiahmoo, near Blaine, 18 miles north of Bellingham, Washington. Contact Lore Leschner at leschl11@dfw.wa.gov of the local committee for additional information. Details will be posted on the PSG web site as arrangements for the meeting develop

**CONSULT THE PSG WEB SITE FOR THE MEETING TIME SCHEDULE, PAPER AND POSTER SESSIONS, COMMITTEE MEETINGS, SOCIAL EVENTS, AND PAPER ABSTRACTS**



Courtesy Matt Hunter

# REGIONAL REPORTS

Edited by *Elizabeth Flint*  
Honolulu, Hawaii

## ALASKA - RUSSIA

Summarized by *Rob Suryan*,  
Anchorage, Alaska

Biologists at the Alaska Maritime National Wildlife Refuge continued a wide variety of ongoing studies in addition to a couple of new projects. **Leslie Slater** and camp leader **Valerie Baxter** continued the annual monitoring program for seabirds at St. Lazaria Island. Leslie also coordinated EVOS (*Exxon Valdez Oil Spill*) Trustee Council funded APEX (Alaska Predator Ecosystem Experiment) work at Chisik and Duck islands, Cook Inlet, and she participated in murre population surveys in the Chiswell Islands. **Dave Roseneau** and camp leader **Arthur Kettle** continued the EVOS APEX research in the Barren Islands. Dave also monitored murre populations in the Chiswell Islands; a project funded by the EVOS trustees. **Dave Roseneau** and **Vernon Byrd** continued the EVOS study involving the use of predatory fish to sample relative abundance of forage fish in lower Cook Inlet. **Dave Roseneau** and camp leader **Mary Chance** continued the annual monitoring program for seabirds at Cape Lisburne, a project co-sponsored by Minerals Management Service. **Art Sowls** continued to lead annual monitoring programs for seabirds in the Pribilofs with camp leaders **Rachel Schindler** at St. George and **Terry Carten** at St. Paul. He also coordinated a project conducted by **Tonia Bittner** to collect halibut stomachs at St. Paul to describe relative abundance of forage fish. **Art Sowls** continued to work on the Pribilof rat prevention project and he coordinated a training program for responding to shipwrecks that could introduce rats on islands. **Steve Ebbert** and camp leader **Greg Thomson** led a project to restore seabird nesting habitat on Kanaga and Great Sitkin islands by removing introduced arctic foxes. They conducted cormorant surveys on Great Sitkin as well. **Jeff Williams** coordinated annual seabird monitoring projects at Kasatochi and Buldir Islands with camp leaders **Lisa Scharf** at Kasatochi and **Julian Fisher** at Buldir. **Jeff Williams** conducted surveys of seabird

populations at Nizki-Alaid Islands to document recovery following removal of introduced arctic foxes. **Vernon Byrd** coordinated annual seabird monitoring projects at Chowiet and Aiktak Islands with camp leaders **Josh Adams** at Chowiet and **Susan Woodward** at Aiktak. The Chowiet project was partially funded with a grant from NOAA. **Vernon Byrd**, **Jeff Williams**, and **Don Drago** participated in the cooperative "seabird, marine mammal, and oceanography coordinated investigation" near Buldir Island. They also conducted seabird surveys at Pillar Rock, Kiska, Ulak, Koniuji, and Adak islands. **Dave Roseneau** and **Vernon Byrd** coordinated collection of murre eggs for the National Biomonitoring Specimen Bank. This is a partnership with the U.S. Geological Survey and the National Institute of Standards and Technology. **Joel Cooper** added food habits data for several of the annual monitoring sites on the Alaska Maritime NWR to Pacific Seabird Monitoring Database. **Vernon Byrd**, **Don Drago**, and **David Irons** compiled the second annual report summarizing seabird monitoring data in Alaska. This report is available from the refuge office (2355 Kachemak Bay Drive, Suite 101, Homer, AK 99603).

Crews with the Alaska Predator Ecosystem Experiment (APEX, funded by the *Exxon Valdez Oil Spill Trustee Council*) completed their fourth of five field seasons in Prince William Sound (PWS) and lower Cook Inlet. **David Duffy** is still leading the APEX project despite his move to Hawaii. As usual, David is involved with a wide variety of projects in Hawaii including a new project with seabirds in American Samoa.

In Prince William Sound, **Greg Golet** and crews continued their APEX research on factors limiting the recovery of Pigeon Guillemots following injury sustained during the 1989 *Exxon Valdez* oil spill. **Jim Hamon**, **Amy Hahn**, **Christopher Kuntzsch** and **Laura Ballock** assisted Greg at the Naked Island colonies, and **Adrian Gall**, **Michael Walgren**, **Kelsey Sullivan** and **Pam Seiser** worked at the Jackpot Island area colonies. Comparisons are being drawn between guillemot

populations at Naked (oiled) and Jackpot (not oiled) along several lines: 1) In collaboration with **Dan Roby**, prey energetics, adult prey selection and feeding frequency are being related to chick growth and productivity; 2) In collaboration with **Leslie Holland-Bartels**, recent exposure to residual dietary hydrocarbons is being assessed through assays of cytochrome P4501A performed on liver samples collected from chicks (biopsies were performed by **Laurel Degernes**, College of Veterinary Medicine, North Carolina State University); 3) In collaboration with **Scott Newman** (Wildlife Health Center, UC Davis) blood parameters of adult guillemots are being compared as indicators of health to evaluate possible long-term effects of exposure to dietary hydrocarbons; and 4) guillemot foraging ecology is being investigated through radio telemetry to relate individual patterns of prey choice to foraging mode.

**David Irons** and **Rob Suryan** continued APEX work on the demographics, reproductive biology and foraging ecology of Black-legged Kittiwakes in Prince William Sound (PWS). This was a moderate to poor year for kittiwakes in PWS with regional variation in chronology, foraging effort, and breeding success indicating differential prey availability throughout the Sound. Additional field work this year included increased radio-tracking efforts of adult kittiwakes with concurrent aerial mapping of surface schooling forage fishes by **Evelyn Brown** (University of Alaska Fairbanks) and pilot **Tim Veenstra**. These concurrent surveys were particularly valuable to the APEX modeling component (**Glenn Ford**, **David Ainley**, and **David Schneider**). Field work was conducted by **Max Kaufman**, **Matt Becker**, **Greg Spencer**, **Caroline Ven Hemert**, and **Brenda Bilotta** at the Shoup Bay colony; **Rob Suryan**, **Tim Meehan**, **Janet Rothermel**, **Ruth Smith**, and **Chris May** at the Eleanor Island colony; and **Teresa Sauer** and **Kristen Mosher** at the North Icy Bay colony. With the help of **Dianna Brann**, **David Irons** also continued monitoring Black-legged Kittiwake colonies in Chiniak Bay on Kodiak Island.

## REGIONAL REPORTS

**Dan Roby, Pat Jodice, Kathy Turco** and **Ryan Wilhite** completed their second successful season of measuring foraging energetics of Black-legged Kittiwakes using doubly-labeled water at the Shoup Bay and N. Icy Bay colonies. Dan and crew completed data collection with an amazingly successful visit to a kittiwake colony on Middleton Island, working with **Scott Hatch** and **Verena Day**.

The Marbled Murrelet restoration project, now part of APEX, finished its third year of monitoring murrelet productivity in Prince William Sound. PI **Kathy Kuletz** was joined this year by **Joe Meehan** (fresh from Adak), returnee **Karen Brenneman**, and **Brad Callos**. In the last half of the season **Andy Day** and **Brian Healy** joined the crew. For the third year (1995, 1997, 1998), they found a positive relation between June adult densities and juvenile densities in July-August. Adult densities were closer to those in 1994-96, leaving the very high numbers observed in 1997 an outlier. Compared to previous years, juvenile densities remained high at Naked Island, but were significantly lower at two other sites. One speculation is that traditional 'hot spots' maintained productivity, but general conditions were not favorable this year. They are waiting to see what fish biomass results reveal, but aerial surveys by **Evelyn Brown** (Univ. Fairbanks) and dipnet catches indicate that Naked had abundant sandlance and herring, whereas other sites had low prey availability. As in 1997, birds at Naked fed their chicks primarily sandlance, whereas birds at Jackpot (southwest PWS) used herring. In a pilot effort, the murrelet crew dipnetted birds at night, and caught 5 adults and 4 juveniles in early August. Radio-tags were glued to the juveniles and birds were tracked sporadically via boats for up to 10 days. This effort may be expanded in 1999, to track juvenile post-fledging movements and possible changes in body mass. Records on juvenile murrelets were also reported for fledglings turned in to **Dennis Zweifelhofer** at Kodiak, and the Alaska SeaLife Center in Seward, which contributes to the database on juveniles. Kathy is also working with **Rob DeVelice** (U.S. Forest Service), to map potential murrelet nesting habitat in Prince William Sound. The final product should blend the inland and marine habitat features to describe probable nesting distribution. One goal is to match marine habitat associations, forage fish distribution, and inland features to murrelet productivity. Portions of this

work will be incorporated into Kathy's thesis, which she started last year at the University of Victoria, B.C., with **Alan Burger**. As part of the EVOS restoration effort, EVOS Trustees purchased valuable murrelet nesting habitat on Afognak Island. Securing murrelet habitat, while only one of many concerns, was key to making protection of this area a priority.

**Bill Ostrand, Christy Mather, and Rikki Rife** with the Seabird/Forage Fish Interactions component of APEX collected bird location data in conjunction with hydroacoustic sampling being conducted by the APEX's forage fish component. They also collected bottom composition data to ground truth the interpretation of hydroacoustic data using bottom-typing software. This was the fourth year of data collection for this project. Bill, Christy, and Rikki also assisted the APEX kittiwake component in the collection of radio tracking data.

**John Piatt's** Cook Inlet Seabird and Forage Fish Study (CISeaFFS) has completed its fourth field season with funding and logistic support from the USGS, EVOS Trustee Council (APEX), USFWS and Univ. Alaska Fairbanks. Effects of the recent ENSO were documented in the form of lower productivity of murres, kittiwakes, puffins and guillemots in Kachemak Bay (**Yumi Arimitsu, Dave Black, Jeb Benson, Mike Litzow, April Nielsen, Mike Schultz, Brian Smith**), Chisik Island (**Ann Harding, Michael Gray, Tom Van Pelt**) and the Barren Islands (by USFWS, **Dave Roseneau, Arthur Kettle** and others). Forage fish abundance as determined by acoustic surveys (**Suzann Speckman**) and trawls (**Alissa Abookire, Jared Figurski, Greg Snedgen**) was also down in all areas. Monitoring of primary and secondary production was in its second year (**Gary Drew, Peter McRoy**). John et al. continued a third year of stress hormone studies (**Sasha Kitaysky, John Wingfield**, Univ. Wash.). Work at the Chisik Island colony was typical of the CISeaFFS field camps. Ann, Tom, and Mike measured productivity, attendance, prey deliveries, and chick growth of kittiwakes, murres, gulls, and puffins. In addition, they continued banding kittiwakes and murres (second year of banding) to measure adult survival, collected blood samples of captured birds, beach-seined to track seasonal and between-year prey availability, and explored the use of radio transmitters as tools to monitor kittiwake and murre provisioning rates and atten-

dance at the colony. Ann conducted an experiment involving supplementary feeding of puffin chicks to learn more about parent-chick feedback and provisioning costs to the parent. Unfortunately data collection stopped a bit prematurely with the arrival of a brown bear on the six-acre island. The bear disturbed parts of the colony where murres were breeding inland of the cliff tops, under vegetation. Some chicks on inland study plots were killed and eaten; all nearby murres left the colony and did not return...and within a few days the biologists also left the island! Ann and Mike returned to Sheffield University, England and Tom is beginning a master's degree program at Glasgow University, Scotland.

CISeaFFS will continue at least through 1999 and is based out of the Alaska Biological Science Center, USGS, Anchorage.

**Dee Boersma** and associates with the University of Washington continue to analyze data on the long-term study of Fork-tailed Storm-petrels and Common Murres that Dee has followed in the Barren Islands, Alaska since the mid-1970's.

**Bob Day** and **Debbie Nigro** with Alaska Biological Research, Inc. completed their third (and final) year of data collection on their study on the status and ecology of Kittlitz's Murrelet in Prince William Sound. Bob also collected data on the at-sea distribution of seabirds and marine mammals in the northern Gulf of Alaska in conjunction with the NSF project GLOBEC.

**George Divoky** FINISHED his Ph.D. dissertation and officially graduated from the University of Alaska Fairbanks. A big congratulations to George. Immediately following he began a post doctoral (almost posthumous) position with Oregon State University. This project (funded by the *Exxon Valdez* Trustee Council) was conducted at the Alaska Sea Life Center in Seward with **Dan Roby** and **Andrew Hovey** and involved hatching Pigeon Guillemot chicks, then raising them on a variety of diets to assess the affect on growth and development. After the experiments, guillemot chicks were released from the center in hopes they may return to breed at established nest boxes. The second part of this project was using guillemot decoys and audio attraction to encourage adults to nest in boxes on an artificial platform. The decoys were successful at attracting eagles and ravens, but no luck with guillemots this year. This was the first year of a three year study.

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George also continued to monitor the Black Guillemot colony on Cooper Island in the Beaufort Sea. In September George participated in an ice edge cruise on the Greenpeace ship, *Arctic Sunrise*. The purpose was to examine Black Guillemot density (in addition to walrus and polar bear) at the ice edge along the Chukchi Sea. This cruise permitted many hours of surveying seabirds in Russian waters adjacent to Harold Island.

The Ecological Services, Anchorage field office (US Fish and Wildlife Service) assisted in the production of the North Pacific Albatross identification guide by **Elizabeth Mitchell**, which is being widely distributed to longliners who fish Alaskan waters. In addition, **Bev Short** produced a short-tailed albatross fact sheet, as part of a contract to produce fact sheets for all of Alaska's endangered species under Fish and Wildlife Service jurisdiction. Ecological Services conducted a formal section 7 consultation for the Pacific halibut fishery in Alaska. Take of short-tailed albatross by this fishery is not expected to exceed two birds every two years. Several conservation measures resulting from this consultation are likely to further reduce take of albatrosses by halibut longliners in the future. **Greg Balogh** continued to provide assistance in teaching the seabird module of the North Pacific Fishery Observer Program training course. Greg and **Tony Degange** will be assuming a larger role in training observers upon the retirement of **Vivian Mendenhall**, who was the principle instructor of these classes. Reports of short-tailed albatross observations in the Bering Sea and Gulf of Alaska continue to arrive in our office, and are scheduled for inclusion in the short-tailed albatross observation database this winter. Ecological Services is continuing to partner with NMFS and North Pacific Longliners Association to field test various seabird deterrent devices (e.g., weights on lines, lights or whatever) in order to maximize their deterrent ability while not affecting fishing success.

**Kent Wohl** (USFWS) and **Kim Rivera** (National Marine Fisheries Service, Juneau) served as members of the Seabird Technical Working Group of the FAO Consultation on Reduction of Incidental Catch of Seabirds in Longline Fisheries that met in Tokyo in March and attended the consultation in Rome in October.

**Scott Hatch**, **Verena Day**, **Rick Lanctot** and crew conducted a third iteration of a supplemental feeding experiment

with Black-legged Kittiwakes in which the breeding performance and behavior of unfed kittiwakes was compared to responses in three treatment groups, each group receiving supplemental food ad libitum over a different portion of the breeding cycle. In addition, special investigations were mounted on the social behavior of kittiwakes during pre-nesting, on sibling rivalry as mediated by hormonal factors, and on daily energy expenditure of adult kittiwakes using the doubly-labeled water technique. These studies involved collaboration among researchers from the University of Alaska Anchorage, Oregon State University, University of Antwerp (Belgium), Konrad Lorenz Institute for Comparative Ethology (Vienna), and the Biological Resources Division of USGS. Also in 1998, the National Oceanic and Atmospheric Administration funded studies of the breeding performance of rhinoceros auklets on Middleton as part of a broader assessment of El Niño effects on seabird populations in the northeastern Pacific.

**Pacific Seabird Monitoring Database:** Data acquisition for the retrospective phase of this project is nearing completion. **Charla Sterne** has developed a stand-alone application using Microsoft Access software for data entry and retrieval as well as an interface to ArcView 3.0 for simple mapping or other GIS applications. She also has completed a comprehensive user's guide and is now able to create and issue copies of the entire database and application software on CD-ROM. Distribution to data contributors and other selected stakeholders for error-checking and review is planned for the near future.

**Alexander Ya. Kondratyev** (Institute of Biological Problems of the North, Magadan, Russia) reports that he is continuing to prepare the manuscript of "Seabirds of the Russian Far East" in cooperation with **Gary W. Kaiser** (Canadian Wildlife Service, Delta, BC). Many seabird ornithologists from Magadan, Petropavlovsk-Kamchatsky and Vladivostok participated in writing this book, which will be published by Environment Canada. During the last field season **A.Ya.Kondratyev** with staff of the lab of coastal ecology IBPN continued seabird population monitoring in northern Sea of Okhotsk. The nesting of many species of seabirds began unusually late with the very hard icy conditions. The productivity of Black-legged Kittiwakes as well as Horned and Tufted Puffins was quite

good in contrast to the near crash of Crested Auklets and continued decrease in number and productivity of Pelagic Cormorants.

**Brian Lance**, **Steve Kendall**, and **David Irons** conducted marine bird and sea otter surveys of Prince William Sound (PWS). Surveys were conducted in March and July of 1998 as part of an ongoing study of population trends of marine birds and sea otters in PWS since the 1989 *Exxon Valdez* oil spill. This year's survey brings the total to six survey years over a period of 10 years (1989-1998). Field personnel included: **Max Kaufman**, **Brian Browne**, **Brian Lance**, **Steve Kendall**, **Debbie Nigro**, **John Maniscalco**, **David Irons**, **Kim Raum-Suryan**, **Jeb Benson**, **Diana Brann**, **Brian Healy**, **Ann Zoidis**, **Andy Day**, **Shawn Stephensen**, and **Justin Harth**. In addition, the July survey included a delegation of visiting scientists from Saklin Island, Russia (**Vladimir Zykov**, **Svetlana Fatykhova**, **Zoya Revyakina**).

**Vivian Mendenhall** has been working to finish an Alaska Seabird Inventory and Monitoring Plan for the Fish and Wildlife Service, and an International Murre Monitoring Plan for CSWG. Vivian also coordinated acquisition of reports and specimens during a die-off of murrelets in south-central and western Alaska in late winter 1998. Vivian will be retiring September 30th. She plans to remain active in seabird conservation, including PSG, but also will have time to enjoy birds in new places, write, and maybe even incorporate birds into art and crafts. She will continue living in Anchorage.

With the assistance of a large flock of short-term field assistants and volunteers **Ed Murphy** studied numbers and breeding chronology and success of common murrelets, black-legged kittiwakes and pelagic cormorants at Bluff, Alaska, early June to late August 1998. This study was part of a multi-investigator, multi-colony study of the effects of El Niño on North Pacific alcids (**Bill Sydeman**, PI) and was also funded by the Alaska Maritime National Wildlife Refuge.

**Kim Nelson** (OCWRU-Oregon State University), **Darrell Whitworth** (Biological Resources Division, U.S. Geological Survey) and **Scott Newman** (Wildlife Health Center, University of California Davis), with support and assistance from **Gus van Vliet** (Auke Bay, Alaska), conducted a pilot telemetry project on Marbled Murrelets in Auke Bay (Juneau),

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Alaska. The U.S. Forest Service's Forestry Sciences Lab in Juneau and U.S. Fish and Wildlife Service, Ecological Services - Southeast Alaska, funded this project. The Alaska Department of Fish and Game and the National Park Service (Glacier Bay) provided logistical assistance. Nine Marbled Murrelets (7 females and 2 males) were captured using a night-lighting dip-net technique and fitted with Holohil BD-2G transmitters using a subcutaneous anchor method. A total of 58 inland fixes were recorded at 18 inland sites, usually between 0200 and 0500 hrs. Inland visits for each individual were consistent to a particular location, but short in duration. These short visits to inland sites precluded following murrelets to potential nest sites and suggested that breeding may not have been occurring, perhaps due to ENSO '98. With one possible exception, no murrelets were recorded participating in 24-hour incubation shifts. Murrelets were located at 43 at-sea locations up to 124 km from inland sites. A majority of these at-sea locations were at the very productive feeding grounds in Icy Strait, near the mouth of Glacier Bay, almost 100 km distant from Auke Bay. This study provided the first direct evidence that murrelets in Southeast Alaska are consistently traveling considerable distances (up to 250 km round trip) on a daily basis. In addition, if none of these radio-marked birds were nesting, then the consistent inland attendance patterns indicate that "nonbreeders" (including failed breeders, post breeders or subadults) do visit inland sites during the latter half of the breeding season, perhaps for social, nest-site prospecting, or territorial purposes.

**Robert Suydam** reports that recent counts of King and Common eiders that migrate across the Beaufort Sea have declined by more than 50% in the past 20 years. Studies will continue to better understand the declines of these populations. In addition, the North Slope Borough and the US Fish and Wildlife Service's Northern Alaska Ecological Service office is cooperating in the breeding biology study of Steller's Eiders (a threatened species) nesting near Barrow, Alaska.

**Kent Wohl** and **David Irons** resumed monitoring seabirds on Little Diomedes Island, which was last surveyed in 1992. **Larry Barnes** and **Jayson Benoit** spent the summer on this small island in the Bering Strait that is rich in seabird life and native culture. Kent and David are

optimistic that this project will be continued annually.

### CANADA

Summarized by *Tony Gaston*,  
Ottawa, Ontario

Seabird research and monitoring is at an all time high on the Atlantic and Pacific coasts of Canada at present. This is largely because of the activities of the two cooperative wildlife research chairs, Fred Cooke at Simon Fraser University, and Tony Diamond and junior chair Ian Jones at University of New Brunswick and Memorial University of Newfoundland, respectively (<http://www.mun.ca/acwern>). We continue to have good involvement by NGO groups, but activities by the Canadian Wildlife Service are somewhat reduced, especially on the Pacific Coast. We hope that further activity may be promoted by the forthcoming North American Colonial Waterbird Conservation Plan. Some accounts of recent seabird activities follow:

#### Eastern Canadian Arctic

**Tony Gaston**, with graduate students **Kerry Woo**, **Mark Hipfner** and **Kerstin Kober** of University of Gottingen continued studies of Thick-billed Murres at Coats Island. This summer was a record for warmth and, combined with bad mosquitoes, this led to some desertions of eggs and a small number of birds died of dehydration/heat stress. However, recruitment by young first-time breeders reached an all-time high, probably because of recent restrictions on hunting in Newfoundland. A trend towards reduction in the importance of Arctic Cod as a food for chicks continues. **Grant Gilchrist** (Canadian Wildlife Service (CWS) Yellowknife) continued studies of breeding and survival for Common Eiders at East Bay, Southampton Island. In collaboration with **Keith Hobson** (CWS, Saskatoon), **George Hunt** (UC Irvine), and **Ross Nortstrom** (CWS, Ottawa), he also participated in the multi-disciplinary "North Water" study, aimed at understanding the trophic pathways within the North Water polynya. Grant's work included a re-survey of the Coburg Island Thick-billed Murre and Black-legged Kittiwake colony, one of the largest in the Canadian Arctic. Not far away, **Jane Whitney** and **Steve Smith** of *Legendary Expeditions* reported hitherto undiscov-

ered kittiwake and gull colonies on the East Coast of Ellesmere Island. **Birgit Braune**, assisted by **Garry Donaldson** and **Ilya Storm**, continued monitoring, ongoing since 1975, of population status and chemical residues for several species of seabirds including Thick-billed Murres, Black-legged Kittiwakes and Northern Fulmars at Prince Leopold Island. Glaucous Gull eggs were measured to look at intra-clutch variation for that species and a census of Glaucous Gulls was carried out on the East Coast. In general, all species laid their eggs about one week earlier than in 1993. Adult trapping included one bird banded as a breeder in 1976, hence at least 27 years old.

#### Western Canadian Arctic

**Lynne Dickson** carried out the second year of a study jointly funded by CWS, USFWS and North Slope Borough of Alaska to learn more about the at-sea location of King Eiders after the nesting season. As in 1997, transmitters were implanted in ten King Eiders just prior to nest initiation on Victoria Island, NWT. Their movements were subsequently tracked by satellite. The males spent most of the month of July along the coast of Victoria Island this year rather than off Cape Bathurst in the Beaufort Sea where they were last year. Moulting areas were again located primarily along the West Side of the Bering Sea. Last year the eiders crossed over to the Alaskan coast to winter. It will be interesting to see if they do so again this year.

#### Atlantic coast

**John Chardine** (CWS) reports: "with graduate student **Melanie Massaro**, commenced a study of predator-prey interactions between large gulls and kittiwakes/puffins; continued breeding success and mark-recapture survival studies of Black-legged Kittiwake at Witless Bay, Newfoundland; completed study of tour boats and seabirds breeding at Witless Bay with graduate student **Ed Hearne**; studied winter diet of murres, and age and species composition of hunt; colour-banded Atlantic Puffin adults to determine survival rates (400 adults have been colour banded so far); 14th year of work completed on Brown Noddies nesting near Culebra, Puerto Rico; seabird training program for Caribbean currently under development."

At Memorial University of Newfoundland, now a hotbed of seabird research, **Anne Storey** and three graduate

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students formed part of an ongoing research program on alcid reproductive biology and behavior. **Mark Hipfner** (co-supervised by Tony Gaston) continued his research on the evolutionary ecology of alcid chick development, **Carolyn Walsh** (co-supervised by Willie Davison) and **Sabina Wilhelm** continued work on paternity and parental behavior in a color-banded population of Common Murres on Great Island, Newfoundland. Within **Ian Jones'** ACWERN (Atlantic Cooperative Wildlife Ecology Research Network) lab there were six graduate students and one honours student. All but one spent their field seasons at various seabird islands: **Gail Fraser** (Ph.D.) returned to Buldir Island, Alaska to continue her work on the breeding biology and behavioural ecology of Crested Auklets. **Rachel Bryant**, who had finished her M.Sc. continued her research on Common Murre and Thick-billed Murre chick diet and its relation to parental behaviour and time budgets on the Gannet Islands, Labrador. **Sabir Bin Muzaffar** also worked on the Gannet Islands, evaluating the diversity of ectoparasites and their influence on the breeding biology of Alcids. **Gail Davoren**, in the first year of a doctoral programme, examined time budget and dietary differences between Common Murres breeding at an inshore (Witless Bay) and an offshore colony (Funk Island) in Newfoundland. She found that murres at both colonies fed primarily on spawning capelin, but murres at the offshore colony conducted much longer foraging trips than those breeding inshore, with consequently reduced chick-feeding rates at the offshore colony. She also examined the post-breeding dispersal of Common Murre adults and chicks over the eastern Newfoundland shelf, through collaborative work with a pelagic juvenile cod survey.

**Gail Davoren, Ian Fong, Sarah Jamieson, Ian Stenhouse and Bill Montevocchi** (Memorial University) continued long-term seabird diet studies. Prey delivered to chicks during 1998 indicated a number of changes from previous trends. As they have since 1990, Northern Gannets on Funk Island delivered primarily capelin but also for the first time since 1989 landed substantial proportions of Atlantic saury, a highly pelagic warm-water migrant (corresponding with warm sea-surface temperatures in the Newfoundland region). Gannets were also observed feeding in estuaries of rivers with Atlantic salmon smolt runs, but less than 1 % of their regurgitations in August

contained salmon, contrasting with 3 to 6% harvests through the 1990s. Common Murres delivered almost exclusively female capelin to chicks on Funk Island. However, the percentage of gravid females (21%) was noticeably lower than that delivered in previous years and the capelin appeared smaller. Foods of Atlantic Puffin chicks were collected at an inshore colony (Great Island, Witless Bay) and an offshore one (Funk). Food consisted on capelin, sandlance, larval fishes, euphausiids, sculpins, daubed shanny, alligator fishes, squid and Atlantic cod. On Great Island, scaled capelin comprised ~50% of the dietary items collected in July but only 15% in late August. In other news, the breeding population of Northern Fulmars in eastern Canada continues to increase and expand: 50+ breeding pairs were recorded on Funk Island where 2 dark morph individuals were present. Northern Fulmars were prospecting at Cape St. Mary's for the first time. **Ian Stenhouse** analyzed the habitat utilization of Leach's Storm-petrels on Great Island; social factors and forests were found to be important features for nesting storm-petrels. Gull predation on them was highest before inshore migrations of spawning capelin and was protracted when capelin were delayed. Breeding failure of Black-legged Kittiwakes continued on Funk Island where <5% of the pairs fledged a chick.

Field crew of CWS: In Quebec, a field crew of CWS (**Gilles Chapdelaine, Jean-François Rail, Jocelyn Thibeault and Pierre Brousseau**) and Parks Canada (**Benoît Roberge, Charles Kavanagh**) partially surveyed the sanctuaries network on the North Shore of the Gulf of St. Lawrence (Corrossol Island, Betchouane and Watshishu sanctuaries). Lack of funds and logistics problems forced them to postpone other surveys until next year. They concluded that the spectacular decrease of the Herring Gull (HG) population between 1985 and 1998 has ceased. Corrossol Island harboured one of the largest populations of HG in the Gulf of St. Lawrence, with about 7,300 pairs in 1985, but only 650 pairs in 1993. This year there were about 850 pairs. The general decline of HG has been attributed to the decrease in commercial fishing activities in the region, making fish offal discarded at sea less available than before. Razorbill in Corrossol Island and Betchouane sanctuaries almost doubled their numbers and they anticipate an important increase next year in the

densely populated area of Wolf Bay and St. Mary's Islands based on observations during other research work done in 1995-96 and 97. They also found Atlantic Puffin breeding at Corrossol Island for the first time. Common Eider, a very important breeding species, mainly abundant in the Mingan archipelago and Watshishu sectors, were numerous. Former estimate in 1988 for this huge areas encompassing more than 200 km of coastline peppered with more than 600 islands and islets was ca. 4,500 pairs. The 1998 survey suggests an increase to 6,000 pairs but analyses are not yet complete.

The same CWS crew studied breeding performance, and feeding ecology of Razorbill, Kittiwake and Herring Gull at Corrossol Island in 1998: the last year of a three years study initiated in 1996. While the Razorbill colonized new sectors of the island, their breeding performance was low this year, despite abundant capelin. Heavy rainfall could have been involved as a negative factor because at some breeding sites soaked eggs were found after a stormy shower. They still observed high predation by Herring Gulls on Kittiwake chicks, mostly those >20 d old. Prey of Kittiwake were mostly sandlance and some capelin all through the summer. Prey of Herring Gull was mainly capelin when starting to raise their chicks. Later in the season, when capelin appears less available, they switched to mussels, urchins, starfish (!) and refuse. This was the period when most predation on young kittiwakes was observed.

### Pacific coast

Lots of activity in the Queen Charlotte Islands this year. The usual seabird monitoring continued at East Limestone Island, Laskeek Bay, where **Colin French** and **Joanne Smith** ran the **Laskeek Bay Conservation Society** camp, now in its ninth year. Ancient Murrelets began laying fairly early, but the laying period was very protracted and many clutches were deserted. Overall, production was lower than in previous years. At Reef Island, despite the poor year, more of the nest-boxes installed in 1997 for Ancient Murrelets were occupied, although desertion was similar to that seen at East Limestone Island (**Joelle Fournier**). Conversely, Glaucous-winged gulls continue to increase in the area, with many birds switching islands so that one colony is growing rapidly while others are declining.



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Anne Harfenist's reaction to this year's events was "where have all the seabirds gone?" At her study site on Frederick Island and elsewhere in the Charlottes, this was a common theme: whether the birds reproduced successfully or not, there seemed to be many fewer birds trying than usual. Cassin's Auklets were 5-7 days later than in the last 4 years, growth of chicks was more or less normal but in burrows and knock-down nets only 60-70% of the normal numbers of birds were recorded. The question is whether the adults died over winter (due to El Niño of course!) or just held off breeding this year: next year will tell!

In the face of the El Niño, **Todd Columbia** and Anne Harfenist added a fourth year to their three year project to examine diet and chick-growth of Rhinoceros Auklets at S'gan Gwaii, near the southern tip of Haida Gwaii. The auklets may have been a bit earlier than in previous years, but growth and chick diet did not seem to differ. More burrows that had been used successfully in previous years were empty this year, but the habitat in the colony is fragile and obviously affected by winter storms, so they are not sure whether this indicates lower over-winter survival. Todd reports that raccoon monitoring continues on Haida Gwaii. All the surveys are not yet in, but no one has indicated that any raccoons are present on high-risk colonies. Survey and control protocols are being revised based on four years of data collection and experience and Parks Canada has compiled the data in their GIS database. They also continue to compile digital data on distribution (land and sea) for purposes of oil spill contingency planning.

Anne notes that the Marbled Murrelet Recovery Team is still awaiting the proclamation of habitat conservation guidelines for the species (and other species at risk) by the provincial government.

Under the direction of **Alan Burger**, research on Marbled Murrelets continued in the Carmanah-Walbran area, focusing on long-term monitoring of inland behaviour linked with changing conditions in the nearshore ocean. This year, his team also compared detection rates and behaviour in forests of the coastal fringe (<300 m of the shore) vs. those further inland. **Michelle Masselink** is wrapping up her research on the distribution and behaviour of Steller's Jays as predators of Marbled Murrelets, with reference to the effects of forest fragmentation. Burger initiated a new study of habitat use by

Marbled Murrelets within the Douglas-fir biogeoclimatic zone. Burger's three-year field study of the distribution and densities of seabirds over the shelf off Vancouver Island is completed and data analysis is under way.

In the Caren Range, **Paul Jones** and the **Friends of Caren** monitored Marbled Murrelet activity again, but the moss pad where a nest was observed last year fell off during the winter, so the site was not reused. Murrelet activity seems to have been lower than normal in the Caren in spring and summer: no new nests were found. Observations of birds at sea in Middlepoint Bight produced new information on pair bonding, mating and fish-holding behaviours, as well as the behaviour of juveniles on the water. Both **Friends of Caren** and the **Vancouver Natural History Society** attempted to have logging halted in the Bunster Range, where the CWS/SFU field crews have found one of the Pacific Coast's largest concentrations of breeding Marbled Murrelets. However, the provincial government has not responded so far.

**Doug Bertram** summarized work by the **CWS/SFU Wildlife Ecology Chair**. The main field camp at Triangle Islands, along with Anne Harfenist's work at Frederick Island is contributing to an international collaborative study on the effects of the 1997-1998 El Niño on colonial seabirds from California to Alaska. Funds for the El Niño work came from the US National Oceanographic and Atmospheric Administration (NOAA). The Nestucca Trust Fund supported funding for the first year of a new collaborative program with Department of Fisheries and Oceans on marine ecosystem functioning on coastal Vancouver Island. **Parks Canada** collaborated by supporting a study of Rhinoceros Auklet nestling production and diet in the Queen Charlottes.

The birds at Triangle Island (North-west tip of Vancouver Island) were studied by field crew **John Ryder**, **Ginny Collins** and **Laura Cowen**. Cassin's Auklets commenced breeding significantly later (about 10 days) this year than in the past, fewer burrows were occupied than usual, fledging success was much lower than normal, chicks were lighter at departure and many died before reaching the sea. Due to low adult attendance, the field crew had to devote considerably more effort than in previous years to obtain the usual numbers of food samples. Diets were mainly fish in contrast to the zooplankton dominated nestling meals

from 1978-1982. Common Murre, Rhinoceros Auklet (10 d earlier, median 3 May), and Tufted Puffin all bred earlier than in previous years with varied success. The murrelets were very successful and most chicks fledged, as in other years: they fed mainly on sand lance. Rhinoceros Auklets managed to fledge some young but their masses were low, as has been observed in previous years in the 1990s: diets were predominantly sand lance, rockfish and herrings. Many dead and dying chicks were seen on the beaches. Common Ravens ate the brains and often left the emaciated bodies of the failed nestlings. Tufted Puffins started off well but nestling mortality was massive in late July and all chicks were dead by 10 August, as in 1997, and consistent with the general trend of poor nestling production in the 1990s. The intensive mark-recapture project on Cassin's Auklet and Rhinoceros Auklet continued. The SFU crew also conducted research on using radar to monitor the Cassin's Auklet population.

**Doug Bertram** and **Moirá Lemon** visited Seabird Rocks, off SW Vancouver Island, on 20 and 21 July. The nestlings were similar in size to previous years (1995-1997) and larger-at-age than those on Triangle Island. "Bill loads" delivered to nestlings were much larger (mean =41.5g, SD = 13.5, n=12) than those collected on Triangle Island. The prey consisted of sand lance, herring, salmon, surf smelt, and a few Pacific sand fish.

**Louise Blight** studied egg predation on Rhinoceros Auklets by native *Peromyscus* at Triangle Island. Egg predation was high - at least 25% and possibly as many as 36% of eggs in one plot were depredated. Duration of egg neglect was measured using temperature loggers located in artificial eggs, showing that some Rhinoceros Auklet pairs may be absent from the nest for several days during the incubation period: this may facilitate mouse predation.

Further news from Simon Fraser University. In addition to the field work, **Laura Jones** is writing up her work on provisioning behaviour in Rhinoceros Auklet in relation to nestling condition and **Hugh Knechtel** is writing up his work on age related differences in the maternal body reserves and the influence of egg size on hatchling size in Cassin's Auklet.

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### NON-PACIFIC UNITED STATES

Summarized by *James Lovvorn*  
Laramie, Wyoming

**Stephen Kress** reports that seabird restoration projects on the Maine coast continued in summer 1998. Atlantic Puffin populations at three islands reached record highs. The newly restored colony on Seal Island National Wildlife Refuge increased by 34% from 58 to 78 pairs, and the restored colony on Eastern Egg Rock continued a slower increase to 25 pairs. Efforts to attract Razorbills with social attraction at Seal Island led to the first-ever nesting there by Razorbills. Roseate Terns continued 12 years of increase at Eastern Egg Rock, where 144 pairs make up over half the Maine population. Work to attract Northern Gannets continued for the second year at Perroquets Island, Quebec, where one gannet spent most of the summer prospecting among 48 decoys and sound playbacks. At Devil's Slide Rock, 15 murre eggs were laid in 1998 among nearly 400 decoys. These eggs produced 6 fledglings. Social attraction methods were also used at San Pedro Rock where 380 decoys and two sound systems were installed in April. As many as 28 murres were observed prospecting among the decoys.

**Debbie Zombeck** at the North Carolina Zoological Park is pleased to announce what is believed to be the first captive breeding of Horned Puffins and Parakeet Auklets. Four Horned Puffin chicks hatched between 20 July and 10 August 1998. Two of the chicks were reared by their parents until about 3 weeks old, and were then removed for hand rearing. The other two puffin chicks were removed for hand rearing within a few days of hatching due to inadequate parental care. The two Parakeet Auklet chicks hatched on 26 and 29 July. Both these chicks were removed for hand rearing within a few days of hatching due to low food provisioning by the parents. The parent birds were 3 to 4 years old. All six chicks have now fledged, and are housed in a non-exhibit holding room. Debbie hopes to transfer these chicks to the alcid exhibit within 3 weeks. The alcid exhibit at the North Carolina Zoo in Asheboro was opened to the public in 1995. It consists of an 8.5-m high rocky cliff and a 45,000 gal pool, where visitors

can observe the birds on land or foraging in water. This exhibit is climate-controlled with an air temperature of 10°C and a water temperature of 12°C. The Park now has eight Thick-billed Murres, 25 Parakeet Auklets, and 19 Horned Puffins on exhibit. Any PSG member visiting the zoo is invited to contact Debbie Zombeck or the arctic seabird staff for a special tour of this facility.

**Doug Forsell** has completed the first year of a study to assess the mortality of birds in anchored gillnets along the mid-Atlantic Coast. The study involves censusing birds along the coast, surveying beached birds, and observing fishermen. Red-throated Loons made up over 80% of birds observed killed in 1998.

**Jim Lovvorn, Dan Yule, and Clayton Derby** (Univ. of Wyoming and Wyoming Game & Fish Department) have completed an analysis of the relative vulnerability to Double-crested Cormorant predation of cutthroat and rainbow trout stocked as fingerlings into the North Platte River. This study was based on coded-wire tags found in cormorants collected on the river, and in pellets regurgitated by adult cormorants at a nearby colony. After stocking, electrofishing showed a decline of cutthroat relative to rainbow fingerlings in the river over the summer, while the fraction of cutthroats among tagged fingerlings eaten by cormorants increased over the summer. Cutthroat trout fingerlings appeared more vulnerable to cormorant predation than rainbow trout of similar size that were stocked simultaneously. Cutthroat trout in this study were of the Snake River (Yellowstone) subspecies, which is being considered for listing as Threatened under the U.S. Endangered Species Act. This study suggests that cormorant predation should be considered in efforts to restore these trout. Yet another study of cormorant predation on sport fish is beginning in eastern Washington by students of **Rod Saylor** at Washington State University.

Several members of Congress are considering legislation to require federal agencies to develop a plan to deal with effects of increasing Double-crested Cormorant populations on the aquaculture industry and on sport and commercial fisheries. Ornithological Council (OC) Chairman **David Blockstein**, OC Executive Director **Ellen Paul**, and Association of Field Ornithologists Representative **Betty Ann Schreiber** recently participated in a conference to discuss the draft bill with Mark Tobin (Project Leader for

the Bird-Aquaculture Research Project of USDA/APHIS/Wildlife Services), Hugh Warren (Executive Vice-President, Catfish Farmers of America), and legislative aides to Reps. John McHugh (R-NY) and Collin Peterson (D-MN).

**John Takekawa** (USGS-BRD), **Keith Miles** (USGS-BRD), and **Jim Lovvorn** (Univ. of Wyoming) are beginning a study of the cross-seasonal effects of contaminants on Canvasbacks that winter in Chesapeake Bay and nest in Ruby Lake, Nevada. Sixty female Canvasbacks radiotagged at Ruby Lake in August 1998 will be followed throughout winter in San Francisco Bay, and (assuming they nest) their eggs will be examined for contaminants after their return to Ruby Lake.

The Wader Study Group has published *Conservation and Management of Shorebirds in the Western Great Basin of North America* (edited by J. M. Reed, N. Warnock, and L. W. Oring, 1997, International Wader Studies 9). This collection of papers deals with a variety of population and habitat issues for shorebirds in this region, and includes contributions from PSG members **Chris Elphick** on "Experimental approaches to shorebird habitat management," and from **Margaret Rubega** and Julie Robinson on "Water salinization and shorebirds: emerging issues." Margaret and Chris have moved from the University of Nevada—Reno to the University of Connecticut.

### PACIFIC RIM

Summarized by *Elizabeth Flint*  
Honolulu, Hawaii

**Emir Rodriguez Ayala** of the Museo de Zoologia at UNAM hopes to complete his Masters degree this year. His thesis is entitled "Distribution and abundance of Seabirds in the Gulf of California, Mexico, with a Geographic Information System." Since 1993, when he started his Bachelors thesis there, he has been visiting Marietas Island, Banderas Bay, Nayarit-Jalisco each year. He studies the reproductive biology of the Bridled Tern and monitors population size of the other species of the area including Blue-footed Booby, Brown Booby, Red-billed Tropicbird, Magnificent Frigatebird, Heerman's Gull, and Brown Noddy. He worked with **Dr. Hugh Drummond** on siblicide in Blue-footed Boobies at Isabel



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Island in 1994 and in 1996 collaborated with **Dr. Enriqueta Velarde** on her studies of Royal and Elegant Terns and Heerman's Gulls at Isla Rasa.

**Monica Herzig Zürcher** has been away from fieldwork for 2 years due to health challenges but hopes to resume her studies in 1999.

**Sandy Bartle** of the Museum of New Zealand has completed his work with the fisheries observer program monitoring seabird mortality on New Zealand and foreign vessels 1989-1990. The Department of Conservation is now undertaking this work, thus freeing Sandy to complete analysis of population and breeding data from his Westland Petrel field study 1970-1991 for publication over the next two years, as well as for more traditional museum tasks. His collaborative project with **Jean-Claude Stahl**, also based at the museum, on relationships between foraging and fisheries in Buller's Albatross, has been funded for a further 6 years.

**Lindsey Hayes** (USFWS) and volunteers continued their efforts of monitoring 14 species of tropical seabird on the four islands of Johnston Atoll. The BASH (Bird Aircraft Strike Hazard) reduction project on Johnston Island has resulted in the loss of considerable nesting habitat on Johnston Island, but mitigation efforts will involve the transplanting of native vegetation and the construction of a green house and artificial nest shelters for displaced tropicbirds. Recent public meetings with fishermen to explore means of reducing the incidental take of Brown Booby fledglings during recreational fishing trips were productive; the fishermen have been cooperative and several of their suggestions show considerable promise. On 30 September 1998, **Donna O'Daniel** returned to Johnston Atoll as refuge wildlife biologist after five years of working and travelling all over the globe.

**Cathleen Hodges** (Haleakala National Park) led efforts to monitor populations of Dark-rumped Petrels nesting in the Park again this year. She and her associates also maintained their active predator control program in the colonies. Cathleen successfully organized a Seabird Biology Workshop sponsored by the Hawaii Chapter of the Wildlife Society. The well-attended gathering of practically everyone in Hawaii who works with seabirds included paper presentations and workshops on population monitoring, identification, banding and handling. The field component of the meeting was held

in Kilauea Point National Wildlife Refuge.

**Dave Smith** (Hawaii Department of Land and Natural Resources) continued his work of monitoring and managing seabird populations and nesting habitat on Oahu and at Kure Atoll in the Northwestern Hawaiian Islands. Increased predator control at Kaena Point has resulted in successful fledging of Laysan Albatross chicks and a growing Wedge-tailed Shearwater colony there. He served as an instructor at the Wildlife Society Seabird Workshop in September and assisted in Natural Resource Damage Assessment in the Oahu colonies for the recent Tesoro Hawaii Hose Oil Spill that occurred in August of 1998.

**David Duffy** was a welcome addition to the seabird biology community in Hawaii as he assumed his new position with the Cooperative Parks Study Unit at the University of Hawaii. He has already initiated a plan to survey the seabirds of the National Park in American Samoa and is seeking a rugged graduate student who may wish to work on forest-nesting petrels of the mountaintops of Samoa. He was the keynote speaker at the Seabird Workshop held recently on Kauai.

**Bob Pyle** continued his work on the Occurrence and Status of Birds in Hawaii project at Bishop Museum, including adding data to the SIGHTINGS database. In the past year staff have added observation reports for 1995, 1996, and much of 1997. SIGHTINGS now contains about 60,000 records of bird reports in the Hawaiian Islands, dating back into the 19th century. Among these are about 640 records of albatross, 1500 records of procellariids and hydrobatids, 2300 records of Pelecaniformes, and 350 records of Gray-backed and Sooty Terns. An updated compilation of 51 sighting reports of Short-tailed Albatross in Hawaii was prepared for the Black-footed Albatross Population Biology workshop sponsored by the Western Pacific Regional Fishery Management Council in October. A large project in the Bishop Museum bird collection is underway to enter all data from old labels into the specimen database, clean the specimens, arrange all in one phylogenetic sequence, and install them in new cabinets. Work is proceeding slowly, but is now complete through albatross, petrels, and into the shearwaters.

**Sheila Conant** (UH Manoa) in collaboration with **Marie Morin**, recently finished a restoration plan for Laysan Island that lays out a framework and meth-

odology for restoring the Laysan Island ecosystem to its condition before the major human perturbations of the 1890's through 1923.

**Greg Spencer** (UH Hilo) is continuing his analyses of spatial distribution of pelagic seabirds in relation to oceanographic features at the North Pacific Subtropical Frontal Zone. This summer he participated in studies of Black-legged Kittiwake reproductive performance and foraging ecology in Prince William Sound, Alaska, as a component of the Alaska Predator Ecosystem Experiment (APEX) with the Office of Migratory Bird Management, USFWS. He attended the Wildlife Society workshop in Kauai focussed on the conservation and management of Hawaiian seabird populations.

**Anthony Viggiano** served as Refuge Manager at Tern Island, French Frigate Shoals in the Hawaiian Islands National Wildlife Refuge and supervised seabird monitoring activities by numerous dedicated volunteers there until July when he left that position to pursue a graduate degree at the University of Washington studying with **John Marzluff**. He plans to investigate the influence of age and experience on reproductive success and the effects of mate loss on productivity in Black-footed Albatrosses. He is currently using data from several years of saturation banding and intensive band reading to estimate demographic parameters and build a life table for this albatross species.

Seabird issues both on and off the refuge have kept **Beth Flint** (Pacific Remote Islands National Wildlife Refuge Complex, USFWS) busy this year. She visited Christmas Island in the Republic of Kiribati in October of 1997 in order to make sound recordings of the Phoenix Petrel. These will be used to attempt to attract this species to Howland, Baker, and Jarvis islands now that cats have been removed from them. She visited Palmyra Atoll twice this year as part of the FWS's project to acquire this important seabird colony as a National Wildlife Refuge and made monitoring visits to Jarvis Island and Rose Atoll. **Beth and Cindy Rehkemper** kept up their work standardizing the collection of population monitoring data in the refuges and entering data from the files and the field into the Pacific Seabird Monitoring Database. **Kevin Foster** and **Beth Flint** continued their work on the problem of albatross mortality in the Hawaii Pelagic Longline Fishery. **Beth** served on the Seabird Technical Working Group of the FAO

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and attended the meeting of that group in Tokyo, Japan in March of 1998. She also participated in a population-modeling workshop sponsored by the Western Pacific Fishery Management Council in October 1998 during which the potential effects of north Pacific longline fisheries on Black-footed Albatross were evaluated. Kevin and Beth also worked on response and Natural Resource Damage Assessment on the Tesoro Hawaii Hose Oil Spill that occurred in August of 1998. **Michael Lusk** (Ecological Services, USFWS, Honolulu) has submitted a manuscript detailing results from a survey trip to one of the most diverse seabird colonies in the Northern Marianas, Farallon de Medinilla. This island is also used as a bombing target by the U.S. Navy. He also continues to summarize monitoring data from the Red-footed Booby colony on Saipan with **Dave Worthington**.

**Thierry Work** (USGS-BRD) continues to provide diagnostic services for seabird workers throughout the Pacific from his Honolulu office of the National Wildlife Health Research Center.

The issue of oil spill impacts on seabirds continues to occupy many in the environmental community in Japan. This year, in March, The Nippon Foundation published the Proceedings for last year's Japan-U.S. Symposium on Oil Spills and the Protection of Wildlife (in Japanese only). Member of Parliament, Akiko Domoto, who has taken a keen interest in this issue ever since the Nakhodka spill (2 January 1997), took Japan three important steps forward this past year: she succeeded in getting money appropriated for construction of an Oiled Seabird Rehabilitation Center (unofficial name) to be built near Tokyo; she presented an Action Plan for approval at the annual plenary session of GLOBE (Global Legislators Organization for a Better Environment), urging member nations to work to improve monitoring of seabird populations; and she also visited California State Oil Spill Prevention and Response (OSPR) headquarters in Sacramento and the OSPR Oiled Wildlife Care Facility in Santa Cruz, bringing back valuable information and insight to be used to improve the response system for seabirds in Japan.

Also this year, restoration activities (not oil pollution related) have been conducted by **Yoshihiro Kataoka** and others, who are trying to re-colonize Hokkaido's Kenbokki-kojima Islet, a breeding sight for the locally endangered (in Japan) Tufted Puffin. This colony has been re-

duced to just a few individuals. They are using both on-land and on-water decoys as well as recorded vocalizations acquired from Cornell University through the cooperation of **Steve Kress**, **Harry Carter**, and **Andrea Priori**. These recordings were paid for with PSG's Japanese Seabird Conservation Committee funds earned through the sale of seabird pins (made by Wm Spear Design, Inc.) at the Hokkaido Seabird Center.

**Haruo Ogi** has been conducting studies on Black-Tailed Gulls this year and has also been involved in an investigation of the effects of EDC's (endocrine disrupting chemicals) on seabird populations. EDC's have quickly become an area of great concern in Japan, and the government recently set aside a large chunk of money to study their impacts on wildlife.

**Yutaka Watanuki** and his students at the Teuri Field Station for Seabird Research (a name first coined by Tony Gaston on his visit to the island in 1996) completed a full slate of fieldwork this summer. Areas of study included body temperature regulation of incubating seabirds and changes in their body composition (**Yasuaki Niizuma**), foraging patterns of Japanese Cormorants and changes in diet between years (**Koji Ishikawa**), an attempt to get ECG readings of hand-reared Japanese Cormorants using data loggers (**Maki Kuroki**), measuring diving behavior of Rhinoceros Auklets using very small data loggers (**Akiko Kato**), and Rhinoceros Auklet food provisioning and chick response (**Akinori Takahashi**). This food provisioning study examined the seasonal changes in diet and breeding performance. Warmer SST's around the island this year may have lead to earlier anchovy appearance in the diets and higher reproductive success in the auklets. **Akinori Takahashi** has recently moved from Hokkaido University, Sapporo, Japan, to The Graduate University for Advanced Studies (National Institute of Polar Research), Tokyo, Japan and plans to investigate foraging and parental behavior of Adelle Penguins using micro data-loggers at a colony near Syowa Station, Antarctica as a Ph.D. project.

A few miles away from Teuri, on Rishiri Island, **Michiyo Chochi**, **Koji Ono**, and **Mihoko Sato** conducted surveys on the Black-Tailed Gull population there to try to determine why it has seen such a dramatic increase in recent years.

## WASHINGTON AND OREGON

Summarized by **Roy Lowe**  
Newport, Oregon

### Washington

For a third year, **Brian Cooper**, of ABR, Inc., collaborated with **Martin Raphael** and **Diane Evans** of the USDA Forest Service, Pacific Northwest Research Station, on a study investigating the feasibility of using a radar as an inventory and monitoring tool for Marbled Murrelets in the Olympic Peninsula. The study documented both annual and seasonal variability in radar counts, and compared concurrent terrestrial and adjacent at-sea counts. **Brian Cooper** and **Richard Blaha** (ABR) conducted the second year of a study for the Olympic Natural Resources Center that used radar techniques to help evaluate the current survey protocol for Marbled Murrelets. With the concurrent radar and audio-visual observations, they were able to measure the proportion of birds that are double-counted, missed, or that are detected and continue to fly to another area during a standard terrestrial survey.

**Terry Wahl** of Westport Seabirds has continued to acquire seabird data during trips offshore from Westport, Washington. Last scheduled trip is 17 October. For the year and the fall season so far it appears that ocean productivity continues low as it has during the 1990s. Many species also continue to decline in numbers, with phalaropes, jaegers and especially regionally breeding alcids noted in relatively very small numbers. As in the past few years in particular, species attracted to fishing vessels appear to be relatively better off.

**David Nysewander**, **Joe Evenson**, **Bryan Murphie**, and **Tom Cyra**, all with the Washington Department of Fish and Wildlife, continued the series of summer and winter aerial surveys of marine birds in greater Puget Sound associated with the marine bird and mammal component of the Puget Sound Ambient Monitoring Program. The state agency struggled with numerous budget reductions this year, but a decision was made to continue some core activities. Monitoring of wintering diving ducks was determined to be one of these in light of the fact that species like scoters and scaup have declined over the last 18 years by at least 40% and 75%,

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respectively in the marine waters of Puget Sound. Most all of the other surveys and monitoring have been discontinued until further funding is allocated.

**Lee Robinson** and **Mary Mahaffy** continued the Pigeon Guillemot Nest Box Project on Protection Island National Wildlife Refuge in 1998. A total of 41 Pigeon Guillemot nest boxes were placed in the driftwood or buried in the bank at Protection Island NWR. Guillemots laid eggs in 68% of the boxes. However, productivity was low, with guillemots producing young in only 32% of the 28 boxes used. Fifteen young were fledged. A number of the eggs disappeared from the boxes and eggs were cracked or abandoned. A small carnivore (based on teeth marks on one of the eggs) was the likely cause. This is the first year, since the project started in 1994, that predators have been a problem. Addled eggs were removed for contaminant analysis.

**Deborah Jaques** is working with the USFWS, Willapa NWR, to evaluate Brown Pelican night roost selection, responses to disturbance, and seasonal abundance at Willapa Bay. The study is part of a long-term agreement with the Washington Dept. of Transportation to monitor the impacts of a major erosion control project under construction near the mouth of the bay.

**Martin G. Raphael** and **Diane Evans** of the US Forest Service, Pacific Northwest Research Station in Olympia, WA, continued several collaborative studies on Marbled Murrelets in Puget Sound and Hood Canal. A primary focus of at-sea work was to test several at-sea survey methods to help identify which of the different techniques currently being used would be most appropriate for a standardized at-sea survey protocol. This protocol is slated to be developed jointly by the marine survey community in early 1999. Techniques tested were the use of one vs. two observers, observer variability in distance estimation and age class identification and how to compensate for it, differences in densities based on estimates of radial or perpendicular distances, and the overall accuracy of densities estimated from perpendicular or radial methods.

As part of ongoing murrelet research, at-sea surveys were conducted around the San Juan Island archipelago for the fourth consecutive summer. The objective of these systematic surveys, which cover 170 km every 10 days during May-August and bi-monthly throughout the rest of the year, are to investigate within-season and an-

nual changes in distributions and densities of murrelets. From these baseline data on the numbers of adults and juveniles, **Martin** and **Diane** also are assessing different productivity estimators (ratios vs density-based estimates) that are likely to be used for long-term population monitoring and demographic modeling. Preliminary results from the 1997 breeding season suggested that a density-based ratio of juveniles to a pre-season density of adults might be the most reliable of the three estimators tested due to immigration of birds. Monthly surveys also were conducted along 288 km within and north of Hood Canal during May-August. These surveys are one component of a three-part study that correlates at-sea densities with inland flights as detected by radar, and the distribution of potentially suitable nesting habitat in watersheds adjacent to the Hood Canal shore. This study is in collaboration with **Brian Cooper** of ABR, Inc, who conducts the radar sampling. The correlation of radar counts and at-sea densities was expanded geographically to include sections of the Oregon and Washington coasts, in collaboration with **Craig Strong** of Crescent Coastal Research and **Chris Thompson** of the Washington Department of Fish and Wildlife, who contributed boat survey data. Additionally with ABR, Inc., **Martin** and **Diane** completed the third year of an assessment of radar as a long-term monitoring tool by measuring seasonal and annual variability in inland radar counts at three drainages on the eastern side of the Olympic Peninsula. Daily variability from radar counts was lower than that observed from a study of inland audio-visual surveys in Oregon, and was at levels that could detect a 10% change in population numbers with 90% confidence in 5 years if sites were visited 2-3 times/year.

Two inland habitat studies were continued during 1998. In collaboration with **Stacy Lemieux** and **Scott Schreiber** of the Olympic NF, they conducted a spatial analysis of landscape characteristics within watersheds with differing levels of murrelet activity on the Quilcene District of the Olympic NF. The proportion of sites surveyed that yielded occupied detections was most strongly correlated with the amount of late seral habitat present in a subwatershed, and not with an overall fragmentation index based on the combined effects of edge density and the diversity and distribution of all seral classes present nor the size and distribution of

late seral habitat patches. **Diane** and **Martin** have initiated a study of the efficacy of vegetation classified from satellite imagery as an indicator of murrelet habitat in Washington. The intent of this work is to develop a baseline map of potential habitat and ultimately to monitor trend in amount and distribution of habitat. With **John Marzluff** of the University of Washington, they continued for the fourth year a study of the effects of landscape and stand features on the predation risk of artificial murrelet nests on the western Olympic Peninsula. Washington Department of Natural Resources (WDNR), Rayonier Timber Co., USFWS, and NCASI also fund this study. Results suggest that stand structure and proximity to human activity influence predation on nests to a greater extent than landscape fragmentation.

**Bill Ritchie** and others with Washington Department of Fish and Wildlife (WDFW) continued to coordinate and conduct Marbled Murrelet survey training and liaison with other survey projects throughout the state, in addition to assisting private landowners in identifying and delineating suitable Marbled Murrelet nesting habitat. They also conducted inland forest surveys for Marbled Murrelets with a goal toward conservation. Data will also be used to test the new state forest practice rules and validate an inventory based habitat model developed by WDFW and the timber industry as part of the rule package. Survey assistance was contributed by: **Shelly Ament**, **Janet Anthony**, **Tom Cyra**, **Mike Davison**, **Anita McMillan**, **Warren Michaelis**, and **Brian Murphie**. Also, **Bill** and others investigated reports of potential nesting activities, discoveries of eggshell fragments and stranded adult and juvenile murrelets. No active nests were located in Washington this past year, however an interesting observation of an adult revisiting a previously successful nest was documented. The group completed the WDFW Priority Species and Habitats Management Recommendations for the Marbled Murrelet for inclusion in the revised PHS bird chapter to be published this year. A project to monitor the condition and detectability of documented murrelet nests in Washington was initiated in 1998. A similar study by **Alan Burger** and **Kevin Jordan** is currently underway in British Columbia.

Proposed activities for 1999 by **Bill Ritchie** and other WDFW employees include continuation of conservation ori-

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ented inland forest surveys and data collection for monitoring state forest practice rule effectiveness, monitoring the condition and detectability of documented murrelet nests, and the collection of habitat conditions in Marbled Murrelet nesting stands. A new proposal under development with the USFWS will investigate noise disturbance from human activities in and adjacent to forested habitats.

**Shelley Hall** of Olympic National Park initiated a two-year investigation of levels of Marbled Murrelet activity in pristine forested habitats versus developed areas within the park.

**Ann Edwards**, graduate student at the University of Washington, has begun a study of Glaucous-winged/Western Hybrid Gulls nesting on sand islands in Grays Harbor, Washington. The study aims to assess the effects of nesting habitat and eagle predation on parental investment in gulls. Corticosterone levels will be measured to determine relative degrees of parental investment under different environmental conditions. Indicators of immune status (differential white blood cell counts) and diet (stable isotope analysis) will be used as potential preliminary indicators of the costs associated with nesting in different habitats and under different intensities of eagle predation.

**Jean Takekawa** and **Nanette Seto** (USFWS - Nisqually National Wildlife Refuge Complex) conducted annual seabird surveys by boat and air in the San Juan Islands during the summer. **Ulrich Wilson** (USFWS - Coastal Refuge Office) continued to conduct long-term monitoring of seabirds, Bald Eagles, Peregrine Falcons and Brown Pelicans.

**John K. Jansen** and **Robert W. Russell** of the NOAA/NMFS Polar Ecosystems Program are continuing with their write-up of a 9-year study of krill-eating penguins at Seal Island, Antarctica. They have completed a paper dealing with day/night foraging modes of Chinstrap Penguins, which appeared in *Marine Ecology Progress Series* in May 1998. They have also submitted a paper describing intra-seasonal changes in the timing and frequency of Chinstrap Penguin foraging in the context of measured prey density. It appears Chinstrap Penguins at Seal Island respond predictably to increases in offspring demands, but show less relation to concurrent changes in offshore prey availability. Because of the highly productive food resources around Seal Island, factors affecting adult survival may be less constraining on fitness

than factors affecting the survival of current offspring. Birds in more productive areas may thus have a greater energetic buffer with which to respond to the requirements of offspring. Other papers we hope to see in print soon are: "Advective control of krill-based food webs", "Allo-feeding by Chinstrap Penguin parents during chick rearing: pair bonding or provisioning?" and "Food-load variability in provisioning penguins: optimal foraging".

**Hamer Environmental** in collaboration with **Dr. Steven Beissinger** of the Division of Ecosystem Sciences at the University of California have initiated a research and monitoring study focused on Marbled Murrelets that examines the terrestrial and marine factors affecting murrelet density, productivity and population trends in California, Oregon, and Washington with the help of cooperators in each state. The goal of the project is to determine the relative importance of forest landscape conditions and marine influences on the productivity and population dynamics of the Marbled Murrelet. They will then determine how these factors relate to measures of terrestrial and marine habitat quality. Initial cooperators in the endeavor include the USFWS Technical Support Office (Portland), USFWS North Pacific Coast Ecoregion (Olympia), **Chris Thompson** of WDFW, ODFW with **Craig Strong** of Crescent Coastal Research, Washington Department of Natural Resources, and the University of California, Berkeley. Others cooperators are being sought.

The objectives of Phase I of the first two years of a seven-year program are to: (1) Define the target populations to be studied and monitored; (2) Conduct a distance sampling marine workshop to standardize methodology and train observers; (3) Assess the application of distance sampling by testing two important assumptions of this method; (4) Refine the marine survey protocols for sampling murrelet population density, population trends and productivity (i.e. adult/juvenile ratio and juvenile density) within each sampling unit and; (5) Develop a sampling protocol for large scale monitoring. Funding was obtained to complete Phase I of the project. Objectives 1 and 2 have been completed. Data has been collected and analysis is underway to complete objectives 3-5 this winter.

Hamer Environmental completed the second year of a three-year research program studying Marbled Murrelet nest density and nest success in relation to

habitat characteristics in Washington. This is a companion study to a similar project being conducted by **Kim Nelson** (OSU) in Oregon. The study is being funded by the USFWS, Wash. Dept. of Natural Resources, and Rayonier Timber Company. Using professional tree climbers working in occupied stands over 1,000 trees were climbed in 1998. The project has located 30 nests over the last two years using a randomized design. Because of the random design, the study will provide the unbiased descriptions of the range of nest sites used and allow an examination of nest site preference and habitat selection for the species at three different scales. These scales include the forest patch, nest tree, and nest limb. These data will help in characterizing suitable and optimal habitat, developing silvicultural prescriptions for desired future conditions, providing information for recovery, identifying key variables for adaptive forest management, and developing methods to avoid or minimize take. Environmental data (temperature, solar radiation, humidity) was also collected at a sample of nest sites, random platforms, and control sites to determine if nest sites have significantly different environmental conditions than random sites in the forest canopy.

A continuing cooperative study with **Paul Henson** and **Naomi Bentivoglio** of the USFWS, **Thomas Hamer** of Hamer Environmental and **Kim Nelson** of OSU, will be conducted in the spring and summer of 1998 and 1999 to further determine if nesting Marbled Murrelets are negatively affected by human disturbance. Other cooperators may include the USFS, BLM, private industry, and state forestry and wildlife agencies in Washington and Oregon. Four active nests were located in 1997 in Oregon and Washington and monitored. In 1998 and 1999, researchers plan to locate additional active nests, generate artificial disturbances near the nest sites, and record the response of adults and nestlings using infrared video cameras. Researchers hope to observe a larger sample of nests in 1998 and 1999.

A pilot project examining the use of ornithological radar as a tool to determine the likelihood of the presence or absence of Marbled Murrelets at a landscape scale at far inland sites in the North Cascades was conducted by Hamer Environmental in cooperation with Private Industry. Initial monitoring of a sample of sites located >30 miles inland and development of some new techniques for using radar at

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inland sites indicates the technology may be successfully used to screen for the presence or absence of Marbled Murrelets on landscapes where their presence may not be certain.

### Oregon

**Dan Roby, David Craig, Don Lyons, Anne Meckstroth, and Darren Craig** of the Oregon Cooperative Fish and Wildlife Research Unit, with **Ken Collis, Stephanie Adamany, and Bobby Begay** of the Columbia River Inter-Tribal Fish Commission continued their 2-year study of Caspian Tern, Double-crested Cormorant, and gull colonies on the lower Columbia River and estuary. Some of these colonies have become controversial because last years' results indicated that the Caspian Tern colony in the estuary was the largest in North America and consumed 6 - 25 million juvenile salmonids in one breeding season. Results from the 1998 field season are preliminary, but some of the key findings were: The Caspian Tern colony on Rice Island, a dredge material disposal island in the Columbia River estuary, numbered about 10,000 pairs in 1998, a 25% increase over 1997. This colony originated on Rice Island in 1987, and may now represent as much as 30% of the entire North American breeding population of this species. The diet of Rice Island Caspian Terns in 1998 was similar to 1997, with juvenile salmonids predominating (ca. 80% of prey items). The Rice Island Caspian Tern colony had higher nesting success in 1998 than in 1997; nearly 4,000 chicks were fledged compared with only 400 in 1997. Estimates of the number of juvenile salmonids consumed by the Rice Island Caspian Tern colony in 1998 are likely to be as high or higher than in 1997, when tern predation was estimated to be 6 - 25% of the total number of juvenile salmonids that reached the estuary. Cormorants nesting on Rice Island consumed a much higher proportion of juvenile salmonids (ca. 55%) than cormorants nesting on East Sand Island (ca. 10%), near the mouth of the Columbia River. Caspian Terns in the estuary foraged mostly within five miles of the colony at Rice Island, and 90% foraged within 13 miles of the colony. Attempts to attract Caspian Terns to nest at a new site in the estuary (Miller Sands) using decoys and an audio playback system were successful.

The Interagency Avian Predation Working Group was formed in May 1998 to try to devise a management plan for

Caspian Terns and other avian predators of juvenile salmonids in order to mitigate mortality to ESA-listed salmonid ESUs. Formation of the Working Group followed calls by National Marine Fisheries Service and other fisheries management agencies to disrupt tern nesting on Rice Island in 1998. The Working Group includes representatives from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, US Corps of Engineers, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife. Attempts to disrupt the Rice Island Caspian Tern colony did not proceed because of opposition from the U.S. Fish and Wildlife Service and several NGOs, including Pacific Seabird Group (also, no NEPA compliance was in place). At the most recent meeting of the Working Group (Sept. 3), it was decided to proceed with plans to attempt to relocate the Rice Island Caspian Tern colony to the former Caspian Tern colony site on East Sand Island, about 13 miles downriver of Rice Island. This would involve a combination of efforts early in the 1999 season to attract the terns to nest on East Sand Island and dissuade them from nesting on Rice Island. The Working Group suspects that translocating the Caspian Tern colony from Rice Island to East Sand Island will significantly reduce smolt losses to terns. The efficacy of the tern translocation is based on the hypothesis that moving the colony to East Sand Island will shift predation pressure toward marine habitats and reduce the reliance of terns on smolts as a food supply, without harming the productivity of the tern population. Diets of cormorants nesting on the two islands and foraging distribution of terns in relation to the Rice Island colony support this working hypothesis. Longer-range plans are to attempt to translocate a portion of the tern population outside the Columbia River estuary, to further reduce the threat to Columbia Basin smolt survival. But any such effort must await preparation of a full EIS and will likely meet stiff opposition from fisheries interests in coastal Washington and Oregon.

**Dr. Jan Hodder** and students at the Oregon Institute of Marine biology monitored the OIMB Pelagic Cormorant colony for the 26th consecutive year. Breeding success was the lowest ever recorded with only 3 chicks fledged from the colony.

**Kim Nelson** (OCWRU-Oregon State University) continued her research on

characterizing Marbled Murrelet habitat on state lands in western Oregon (Astoria, Elliott, and Tillamook State forests). 1998 was the fourth year of a five year project funded by the Oregon Department of Forestry (ODF), Oregon Department of Fish and Wildlife, and U.S. Fish and Wildlife Service. Field assistance was provided by **Kimberly Augenfeld, Alan Bate, Dave Buchholz** (ODF), **Kristin Charleton, Suzy Freeman, Bob Fields** (ODF), **Jeremiah Howe, Ross Hubbard, Scott Hyde, Chris Knauf, Karen Krandler, Nikki Krockner, Dave McCarthy, Ray Rainbolt, Sean Stephens, Joe Tremblay, Steven Williamson, and Mike Wilson** (ODF). Four climbing plots (40 m radius) were randomly located in each of three stands, and six to eight climbing plots were established in clusters around known nest sites in four stands (adaptive cluster sampling). Ten nests (3 active and 7 inactive) were located through tree climbing and dawn surveys, bringing the total number of nests found during this project to 35 (9 active and 26 inactive). Of the three active nests this season, two were successful and one failed (predation). Fledgings at the successful nests were observed; chicks left their nests alone (unattended by adults) within one-half hour of official sunset. Murrelets continue to nest in large trees with large limbs or mistletoe deformations. Data analyses are ongoing to determine tree and habitat preferences, and the forest structural characteristics that provide for successful nesting.

**Kim Nelson** (OCWRU-Oregon State University) is also continuing her research developing models of Marbled Murrelet habitat use in western Oregon using ground data from nests and random sites, landscape data from LANDSAT images, and murrelet at-sea locations from offshore surveys by **Craig Strong** (Crescent Coastal Research). The U.S. Forest Service PNW Research Station in Corvallis and the U.S. Fish and Wildlife Service are funding this project. Preliminary results will be available this fall.

**Kim Nelson** (OCWRU-Oregon State University), with the help of her crew (listed above), conducted surveys for Marbled Murrelets in all State Parks with suitable habitat along the Oregon Coast ( $n = 26$ ). The objective of this project, funded by the Oregon Department of Parks and Recreation, was to determine if murrelets were still present in parks that were surveyed by Nelson 1989 and 1990 ( $n = 10$ ), and to determine if murrelets



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were occupying previously unsurveyed parks. Murrelet detections were recorded in 13 of the parks (50%); nine of these were occupied. Two of the eight (25%) parks with detections in 1989 and 1990 had no detections in 1998. Detections in these eight parks appeared lower than in 1989 and 1990. Anomalous ocean temperatures may have affected prey abundance, which in turn may have affected breeding attempts and inland flights in some areas.

**Brian Cooper** (ABR) worked with **Naomi Bentivoglio** of the USFWS and **Craig Strong** (Crescent Coastal Research) on a study using radar to collect information for long-term population monitoring of Marbled Murrelets along the Oregon coast, and to examine the relationship between terrestrial and at-sea densities of murrelets.

**Roy Lowe** and **David Pitkin** (USFWS, Oregon Coastal Refuges Office) continued seabird monitoring projects during the summer of 1998. Aerial photographic surveys were conducted of all Common Murre and Brandt's Cormorant colonies and most Double-crested Cormorant colonies along the Oregon coast. Due to poor conditions associated with El Niño, colony abandonment by murrelets had already begun when the aerial surveys were conducted on June 8 & 9. Colony counting from slides will be conducted later. Production by murrelets along the southern Oregon coast was likely near zero with limited production occurring at select colonies along the north coast. This is opposite of what has occurred in recent years. Other fieldwork included monitoring Pelagic Cormorant nesting attempts at 17 colonies near Newport. Pelagic Cormorants were also adversely affected by the El Niño episode. Previous to 1998 the 10-year mean number of Pelagic Cormorant nests at these 17 colonies was 782. This year they recorded a record low of 117 nests and most of these nests had no eggs or young present when surveyed. For the 12th consecutive year a beached bird mortality study was conducted on 7.1 km of beach located between Seal Rock and Alsea Bay in Lincoln County, Oregon. This study is conducted from June through September. Mortality this year was low following two years of record mortality of adult murrelets. In late August, **David Pitkin** and **Eric Nelson**, (USFWS) conducted an aerial survey of Brown Pelicans along the Oregon. Aleutian Canada Goose use of Oregon coastal rocks and islands also continued this year.

**Bob** and **Shirley Loeffel** and **Don** and **Sara Brown** continued to conduct their long term beached bird mortality transects near Newport, Oregon. Their study is conducted on 7.4 km of beach just south of Newport, Lincoln County, Oregon. This is the 21st consecutive year of this study. The number of dead adult Common Murres found on their beach during April and May was above normal but was below normal in June, July and August. Only 8 murre chicks were found during the summer months which is another indicator of the low of production of young due to El Niño conditions this year due.

**Craig Strong** completed the 7th year of at-sea surveys on the Oregon coast to assess distribution and productivity of Marbled Murrelets and other seabirds. As in 1997, surveys were focussed on 3 areas 100 km in length which sampled the north, central, and south regions of the state. Murrelet distribution and abundance were similar to 1997, with no obvious effects of El Niño conditions. Productivity of murrelets, as indicated by numbers of fledglings at-sea or ratios of fledglings to older birds, was at a low level and comparable to other years. Common Murre productivity, by contrast, was lower than other years, particularly in southern Oregon, where no fledglings were seen. Quantitative summaries will be available by January in a report available through Oregon Dept. of Fish & Wildlife, Portland Wildlife Division.

### NORTHERN CALIFORNIA

Summarized by **Craig Strong**  
Crescent City, California

**David Ainley** of H.T. Harvey Associates is continuing to monitor seabirds at sea in central California, under a contract from U.S. Army Corps of Engineers. The project is designed to determine whether or not the dumping of major amounts of dredged materials is affecting marine life in the disposal site adjacent to the Gulf of the Farallones National Marine Sanctuary. The ocean remains warm in the area, with large numbers of Least & Black Storm-petrels about.

**Lisa Ballance** heads a project conducting seabird censuses for NMFS in the eastern Pacific, as part of an assessment of the present status of porpoise populations. David leads continuing research on the dynamics of several colonies of Ade-

lie Penguins, with all colonies within one metapopulation. The aim is to determine why numbers of this species have been increasing in the Ross Sea, and why the smallest colonies show more variability (increase faster) than the large ("mother"?) colony. Included are use of radio telemetry to determine overlap of foraging among each colony, banding to determine demographic and emigration/immigration processes, and a computerized scale that gathers information on foraging effort (meal size, feeding frequency) at each colony. Results were recently presented (3 papers) at VII International Symposium on Antarctic Biology (Christchurch, NZ).

**David Ainley** also is participating in APEX project in Prince William Sound, with **Glen Ford**. They are modeling the interactions between seabirds and prey to address the question: Can prey availability be limiting recovery of certain seabird populations depressed by mortality from the *Exxon Valdez* oil spill? They have found good correlation between seabirds and visually-spotted prey schools, but not with prey identified hydroacoustically. Biologists with H.T.H. Associates are also involved in the restoration of several major salt-marsh wetlands around San Francisco Bay, e.g. Hamilton Field (former Air Force base), Corte Madera Marsh, and New Marsh (Alviso).

**Esther Burkett** reported on the second year of the cooperative telemetry study of Marbled Murrelets in the Santa Cruz Mountains area of central California. The USFWS and California Department of Fish and Game provide funding for this effort. In addition to these funding entities, cooperators include **Harry Carter** (USGS-BRD), **Scott Newman**, who recently completed his Ph.D. Dissertation (UC Davis Wildlife Health Center), **Dr. Rick Golightly** (Humboldt State University), and **John Takekawa** (USGS-BRD). Additionally, **Dr. Steve Beissinger** and **Ben Becker** of UC Berkeley assisted with capture efforts and collected feather samples for isotope analysis. Special thanks go to **Gary Strachan** at Ano Nuevo State Reserve for support of field activities. One murrelet was captured and radio marked in April, and eighteen murrelets were captured and radio marked in late May. All birds had brood patches (83% in 1997), however, in contrast to 1997, no birds exhibited the 24-hour incubation shift behavior, and no nests were found. Morning flight period monitoring of radio marked birds revealed that very few indi-

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viduals ever left the water and flew inland. We monitored birds both at sea and inland during the morning flight periods. In contrast to 1997, many murrelets used the nearshore kelp beds in the Santa Cruz area rather than the emphasis on Ano Nuevo Bay, and few birds were ever detected north of Ano Nuevo Bay. It is unknown what specific prey conditions contributed to this marked difference between years. Two birds made long distance movements over 180km south to Cambria and San Simeon. One individual subsequently returned to Santa Cruz for 5-7 days, and then moved south for a second time, settling into a kelp bed area just north of Pt. Piedras Blancas where one radio marked murrelet was also documented in 1997. Eleven other Marbled Murrelets were seen with this radio marked bird in 1998 at Pt. Piedras Blancas. Also of interest, we recaptured a murrelet which we had radio marked in 1997. There was no evidence of the radio; we identified the bird by band only. We radio marked it again May 23, 1998. This bird was last detected north of Ano Nuevo Bay at Pescadero Creek mouth where our field assistant, **Laura Patterson**, observed the bird remove the radio during a preening session (August 8, 1998). Five mortalities of radio marked birds occurred this year (see **Scott Newman's** report), in stark contrast to only two mortalities out of 28 birds in 1997. The major 1997/1998 El Niño event appeared to play an important role in the behavioral differences we observed between years.

**Laird Henkel** (at Moss Landing Marine Labs) is studying the abundance and distribution of nearshore marine birds wintering in Monterey Bay, and also studying foraging ecology of wintering surf scoters. During summer 1998, Laird, **Jeff Davis** and **Bryan Mori** participated in inland MAMU surveys in the Santa Cruz Mountains for **David Suddjian**.

During the 1998 field season, **John Hunter** (FWS-Arcata), **Kristin Schmidt** (Six Rivers NF), **Howard Stauffer** (Humboldt State), **Sherri Miller** (USFS-Redwood Sciences Lab), **CJ Ralph** (USFS-Redwood Sciences Lab) and **Lynn Roberts** (FWS-Arcata) completed the first of two years of Marbled Murrelet surveys in northern Zone 2 in California as part of the Six Rivers National Forest Marbled Murrelet Range and Distribution Project. No Marbled Murrelets were detected during 704 surveys. Spot surveys at other far-inland murrelet sites sug-

gested that inland detection levels were "normal" in northwestern California. There are plans to finish the second year of surveys in 1999. Please note John's new email address is:  
[John E Hunter@fws.gov](mailto:John.E.Hunter@fws.gov).

**Deborah Jaques** worked in conjunction with CDFG-OSPR to assess the impacts of two California oil spills on Brown Pelicans. Field observations included documenting numbers of free-ranging oiled pelicans at roosts. Deborah and **Craig Strong** also conducted a fall statewide aerial survey of Brown Pelicans in California. The survey was supported by the CDFG and coordinated with USFWS pelican surveys in Oregon and Washington. This was the first year that pelican distribution was assessed in all three states at approximately the same time; these data will contribute to documentation of ENSO effects on the Pacific coast. Deborah and Craig monitored breeding seabirds at Castle Rock NWR for the USFWS (**Kim Forrest**, Humboldt Bay NWR). ENSO effects resulted in reduced breeding effort by most seabirds and complete breeding failure by Common Murres. Craig and Deborah continued studies on seabird and pinniped use of the St. George Reef Lighthouse, 7 miles offshore from Crescent City. Research will continue on impacts of helicopter visits during lighthouse restoration through the fall and winter. Pelagic Cormorants did not nest at their usual sites on the lighthouse this year, presumably due to ENSO. For the second consecutive year, Deborah monitored breeding water birds at Lake Earl, one of the largest coastal lagoons in northern California, for the CDFG (Lake Earl Wildlife Area).

**Scott Newman** analyzed Marbled Murrelets in conjunction with the Santa Cruz telemetry project (See Burkett). Blood samples were collected from 41 murrelets in 1997 and 19 in 1998 from Ano Nuevo Bay, CA. Blood was analyzed for hematological and serum biochemical parameters to establish reference ranges for California Marbled Murrelets and inter-annual variation is being assessed to examine potential impacts of El Niño on health parameters of murrelets. Blood was also collected from Alaskan murrelets (see Kim Nelson in Alaska report) and comparisons between Alaska and California blood health parameters will be performed. In addition, necropsies were performed on several Marbled Murrelets that died from the 1998 capture cohort. Although more analyses are being

performed to try to identify a specific diagnosis, it is likely that multiple factors contributed to mortality. While prey for Marbled Murrelets are not well known, the 1998 El Niño conditions may have affected prey abundance and distribution during the winter and spring, possibly leading to poor body condition. Less visitation of nesting areas may have reflected below average feeding conditions, poor over-winter condition, and possible other factors (e. g. oil spills). Concurrent with some MAMU mortalities, domoic acid was identified as the etiology of morbidity and mortality of sea lions in CA. Unfortunately, little research has been done on domoic acid's effects on seabirds so threshold levels which could cause mortality in murrelets is unknown. Overall, it appears that a combination of these factors, possibly in conjunction with the stresses of being captured, handled and radiomarked likely resulted in the mortality. Once mortality was noted, we ceased additional radio attachments in order to prevent any possible further impacts. Mortality of Alaskan Marbled Murrelets was not a problem, though similar handling and radio attachment techniques were used, thus supporting that the attachment methods alone are not resulting in mortality to murrelets.

A collaborative project with **Rick Golithly** and **Harry Carter** (Humboldt State University and U.S Geological Survey) and **Jonna Mazet** (Oiled Wildlife Care Network, UC Davis) on post release survival of western gulls is currently underway. Oiled and rehabilitated birds survived for the lifespan of the radio transmitter (8 months or more). Further analyses on behavior, movements and home ranges are ongoing.

**Mark Rauzon** participated in biological assessments of seabirds and predators on Palmyra, Howland and Baker Islands in the Central Pacific for USFWS in March, 1998. In July, to complete the "grand slam" of U.S. tropical Pacific islands, he and **Bill Everett** visited Wake Atoll to begin predator eradication. Rauzon is also investigating the use of biological warfare agents in these areas in the 1960s.

**Steve Singer** of the Santa Cruz Mountains Murrelet Group completed his 10<sup>th</sup> consecutive season of Marbled Murrelet observations in the Santa Cruz Mountains, with this year's focus being on the location and characterization of Marbled Murrelet nesting habitat. The work, supported by the Sempervirens Fund, the

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Apex Houston Trustee's Council, and the Santa Cruz City Museum of Natural History, resulted in the discovery of two new breeding areas. Steve also collaborated with **Tom Hamer** of Hamer Environmental to demonstrate that murrelet radar survey techniques can be used successfully in the rugged terrain of the Santa Cruz Mountains. Monitoring using radar technology in this region was a great success and they hope that in the future radar will be used to accurately quantify the number of murrelets using different watersheds as funding becomes available. More intensive sampling at these sites is planned for 1999. A pilot project examining the use of ornithological radar as a tool to determine the likelihood of the presence or absence of Marbled Murrelets at a landscape scale at far inland sites was conducted by Hamer Environmental in cooperation with the Six Rivers and Klamath National Forests. Initial monitoring of a sample of sites located >20 miles inland and development of some new techniques for using radar at inland sites indicates the technology may be successfully used to screen for the presence or absence of Marbled Murrelets on landscapes where their presence may not be certain.

**Sarah Allen** (NPS) reports that **Mike Parker** (USFWS) and the National Park Service are still working to conduct surveys of seabirds at Point Reyes as part of the Apex Houston restoration study. This last year resulted in reduced seabird presence at some sites at Point Reyes because of a large influx of immature California Sea Lions that hauled out on the rookeries.

The National Park Service (**Daphne Hatch** and **Sarah Allen**) is working with PRBO (**Gary Page** and **John Kelly** of Audubon Canyon Ranch) to conduct an inventory of waterbirds and shorebirds this winter at Golden Gate NRA and Point Reyes National Seashore - at Abbott's Lagoon, Tomales Bay, Bolinas Lagoon, Rodeo Lagoon and Drakes Estero. Point Reyes National Seashore is also continuing to conduct long-term monitoring of snowy plovers with PRBO under the direction of **Gary Page**. New NPS projects this year include 1) a study of Common Ravens with PRBO to study raven distribution and abundance at Point Reyes. This study was initiated in order to assess impacts of ravens on nesting seabirds and snowy plovers 2) designing a new snowy plover predator enclosure - the current enclosure is difficult and costly to erect.

They are working with FWS, PRBO and an inventor to design a new enclosure. The National Park Service is continuing to conduct surveys of Ashy Storm-petrels at Point Reyes Headland. A settlement was completed on the Cape Mohican Oil spill that occurred in San Francisco Bay in 1996 and restoration projects are being developed; some ideas include habitat restoration for seabirds on Alcatraz and sand dune restoration (for Brown Pelicans and Snowy Plovers) at Point Reyes. The NPS has proposed 4 marine refugia sites be established in the nearshore waters of Point Reyes to the California Fish and Game Commission. These would be no-fishing sites at the Areas of Special Biological Significance (Point Reyes Headland, Bird Rock, Double Point and Limantour Estero). These sites represent around 11% of the coastal waters of Point Reyes (2000 acres of water). A primary reason for seeking this designation was protection of seabird colonies.

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### SOUTHERN CALIFORNIA

Summarized by **Pat Baird**  
Long Beach, California

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**Pat Baird** is continuing research on tern foraging, California Least Tern behavior to disturbance, and nutrient cycling in wetlands at California State Long Beach. She just completed a two-year study on the effects of the ESPN X Games on a least tern colony in San Diego, and found no disturbance from activity or noise in this urban species of tern. She and one of her graduate students (**Scot Hink**) are working on developing a new generation of long-lasting dyes that would last throughout the field season in order to mark seabirds at their breeding sites. Likewise, she and another student (**Dan Robinette**) are finalizing two Least Tern foraging papers which they hope will elucidate some of the controversy over what this species actually eats. Finally, she is developing a monitoring system at a salt marsh used by seabirds and shorebirds that will help determine the energy and nutrient cycling by these species.

**Dan Robinette** is a graduate student under Pat Baird, working on a horizontal and vertical study of foraging differences in the California Least Tern and in three other species of terns in Southern California. He will be investigating food eaten, food rejected, and trophic levels at which

these birds eat, tying all of this into a more general theme of resource partitioning and foraging flexibility of various species.

**Kathy Keane** served a second year as Statewide Coordinator for the California Least Tern program under a contract from California Department of Fish and Game through California State University Long Beach Foundation. She coordinated monitoring at 38 nesting sites throughout the state, compiled data from all sites and prepared annual reports. Kathy also monitored a 400-acre newly-constructed dredge fill in the Los Angeles Harbor in 1998, which supported 218 Least Tern nests, 108 Caspian Tern nests, 3,662 Elegant Terns nests, 17 Royal Tern nests and ten Black Skimmer nests. Teaching, and her consulting business, restricts her efforts to prepare papers for publication. For example, in addition to six other reports on bird monitoring projects, she is now preparing the bird section of an Environmental Impact Statement for an ambitious wetland restoration project (Bolsa Chica) in Orange County, researching and compiling information on over 20 years of bird studies. Finally, rather than working on ornithological publications, she has begun a creative writing project, a book on her experiences in bird research and monitoring, and has written over 8600 words. "When PSG's internal politics change, I will approach the board once again regarding advocacy for a rational predator management policy for the California Least Tern."

**Kathy Molina** continues long-term population studies (eighth season) of Salton Sea breeding larids that include Gull-billed and Caspian terns, Black Skimmers and California Gulls. She is completing a M.S. degree at California State University Northridge examining the parental behavior of terns and skimmers nesting in a hot environment.

**Mike Horn** and his students (California State Fullerton) monitored the prey items of terns and skimmers nesting at the Bolsa Chica Ecological Reserve and the San Diego Salt Works again in 1998. The identifications and analyses are in progress. Elegant Terns failed to nest at the Salt Works, the same as in 1997. They also failed this year at Bolsa Chica, after a several years of a few thousand nesting pairs. They were surprised and have no explanation for their failure. They were also surprised, however, to find that a few thousand Elegant Terns nested at the Los Angeles Harbor fill. They visited the site



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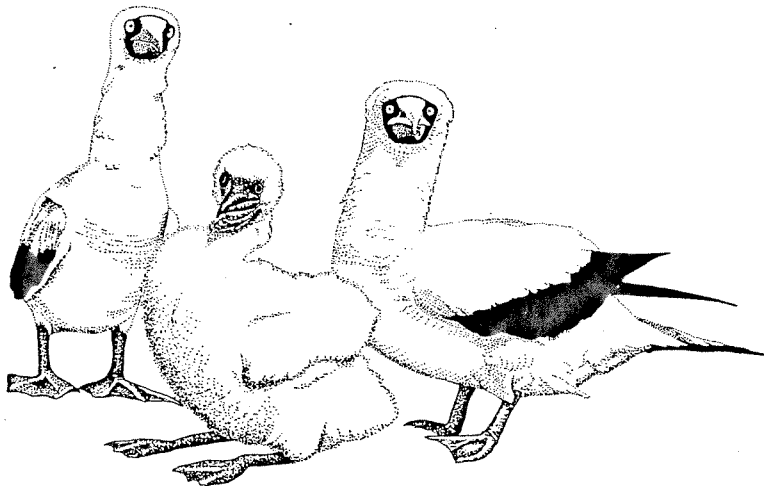
once and collected some dropped fish, but no other observations were made during the season. Perhaps these were birds that otherwise would have nested at Bolsa Chica. Graduate student **Wasila Dahdul** plans to undertake her thesis research on energy allocation in Elegant Tern or Caspian Tern chicks fed fish diets differing in energy and lipid content. They are working on manuscripts stemming from our research on the foraging ecology of terns and skimmer nesting in southern California and intend to submit them as a set of papers for possible publication in *Studies in Avian Biology*.

At Channel Islands National Park **Paige Martin** and her co-workers published (in-house) the 1991-1992 and 1993-1996 Seabird Monitoring Reports. They also contributed data to the PSG Seabird Monitoring Database. They continue to monitor pelicans, cormorants, gulls, murrelets and guillemots at Santa Barbara Island, gulls at East Anacapa Island and auklets and cormorants at San

Miguel Island. Outside researchers conducted monitoring of Pelecaniformes at Anacapa Island (**Frank Gress**) and aerial surveys of cormorants Park-wide (**USGS-BRD, Dixon Field Station**). In addition, **USGS-BRD** and **NPS** personnel continued monitoring of Ashy Storm-Petrels at Santa Cruz Island. **PRBO** personnel and an **SCA** volunteer collected the majority of data at Santa Barbara Island. **PRBO** personnel also resided at San Miguel Island in order to complete Cassin's Auklet monitoring on Prince Island. This venture in itself was the single largest success we experienced this year. For the first time in the 12-year history of monitoring auklets at San Miguel they were able to visit the nest boxes on Prince Island on a regular schedule and obtain the best data possible. **Paige** and her colleagues at **NPS** are working to include historic/archived data (read "old original field notes") into their own and into the **PSG** databases. They are also developing GIS maps of colony locations and monitoring sites.

**Bob Pitman** and **Lisa Ballance** of **NMFS**, Southwest Fisheries Science Center continue to conduct research on tropical seabird pelagic ecology. This year they are spending four months in the eastern tropical Pacific, repeating a large spatial scale survey that was conducted in the late 1980s. The survey will be repeated again during the next two years. They also spent one month in the Maldives, mostly conducting a cetacean survey in coastal waters. In January, Bob is scheduled to travel to Antarctica for a fifth year, spending two months at sea for a Minke Whale survey. And they hope that plans for a survey in the Timor Sea, 1999, will materialize.

**Charlie Collins** is taking a final sabbatical, traveling and visiting colleagues throughout Africa and Europe until April 1999. He still is overseeing a variety of least tern and snowy plover research projects at Cal State Long Beach.



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# REPORT OF THE TREASURER – 1998

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## REPORT OF THE TREASURER OCTOBER 1, 1997 TO SEPTEMBER 30, 1998

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### Income and Expenses

The gross income for the year was \$102,826.09 of which \$59,573.41 (58%) was income from the Monterey annual meeting. A profit of \$15,524.91 from this meeting was transferred to the endowment account. Regular membership dues accounted for \$8,374.45 (8%), life members contributed \$840 which was deposited in the endowment fund, and library subscriptions to *Pacific Seabirds* garnered \$650. Interest and dividend income, and capital gains on the endowment account totaled \$11,988.23 (12%). Income from publication sales was \$681. Fundraising activities (auction and raffle) at the Monterey meeting brought in \$2,129.00.

At the end of the 1997-98 fiscal year we have \$19,946.91 in our savings and checking accounts, approximately two years operating expenses for PSG.

Expenses totaled \$61,527.39 with the annual meeting expenses of \$30,457.58 (50%). Fund raising expenses at this meeting were \$675.09 and as a result a balance of \$1,453.91 was transferred to the PSG endowment account. We have loaned the Washington meeting's local committee \$6,000 to cover hotel deposits and production of the meeting announcement. The Seabird Monitoring Database project spent \$13,650 (22%). Partial

printing costs for PSG Technical Report Number 1., Exxon Valdez Oil Spill Seabird Restoration Workshop were covered by \$1,082.11 from the EVOS project. Final costs will come in next years budget. The cost of purchasing publications for future sales was \$643.44.

The cost of running PSG was \$10,101.28 (16%) with the biggest expense being the production of two issues of *Pacific Seabirds*, \$7,049.67. Officer and committee expenses were \$910.08. Other expenses involved in running PSG were \$1,050 for director's insurance, dues totaling \$877.97 for the Ornithological Council, the International Union for the Conservation of Nature, and Bird Conservation Alliance, student wages totaling \$35, and \$114.75 for bank charges and the tax filing fee. If we omit the annual meeting and special projects such as EVOS and the monitoring data base, the organizational expenses for running PSG this year (\$10,205.80) exceeded our revenue from membership fees and library subscriptions (\$9,459.45). Interest on our savings account (\$1,426.94) prevented us from operating in a deficit.

### Endowment Account

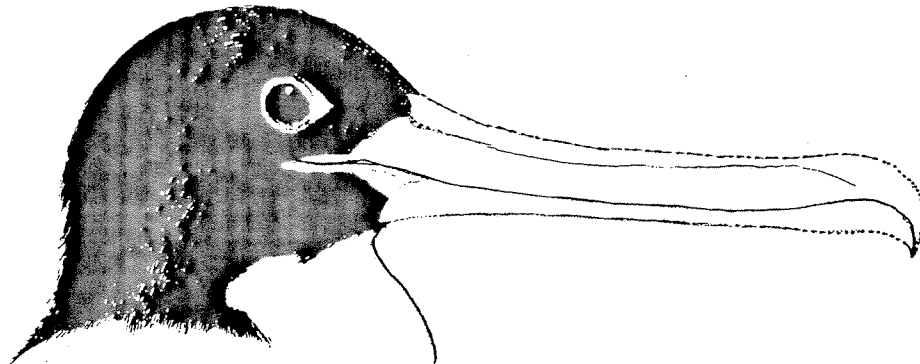
On September 30, 1998 the PSG endowment was worth \$70,426.10. We own

3,283.268 shares in Neuberger & Berman Management Inc.'s Guardian Fund (value on Sept 30, 1998 was \$21.45/share, totaling \$70,426.10). The value of the account has been fluctuating widely in line with the recent volatility of the stock market. I urge PSG members who are interested in the endowment account to check the mutual fund tables in their newspaper for the current value of the shares. Capital gains and dividends from the endowment fund account amounted to \$9,731.96 and were automatically reinvested in the account.

### Membership

Membership in PSG remained stable this year and as of September 30, 1998 totaled 475, of which 58 are life members, 41 are family members and 75 are student members. Ninety-four new members joined PSG this year; 79 joined as a result of attending the Monterey meeting, 7 people used the form from the back page of *Pacific Seabirds*, 8 people used the form from the web page, and one gift membership was given. A total of 92 members did not renew his year. Fifty libraries receive *Pacific Seabirds* of which twenty-four have paid subscriptions.

Submitted by *Jan Hodder*, PSG Treasurer  
October 22, 1998.



## REPORT OF THE TREASURER

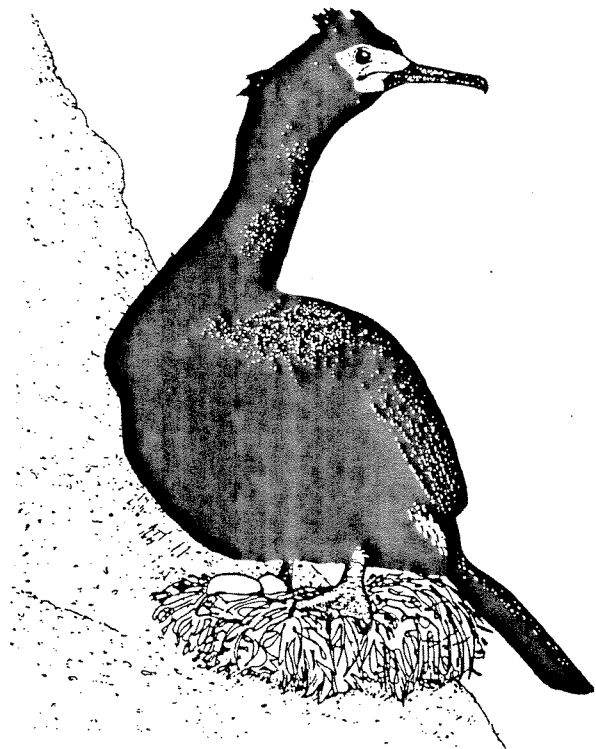
**Table 1. Pacific Seabird Group Balance Sheet, September 30, 1998**

Account	Balance	
	September 30, 1998	September 30, 1997
Annual Meeting - Monterey 1998	---	\$2,000.00
Annual Meeting - Washington 1999	\$6,000.00	---
<b><sup>1</sup>Endowment Accounts</b>		
Dean Witter US Gov. Securities	---	\$9,024.18
Neuberger and Berman Guardian Fund	\$89,030.65	\$55,696.79
Pacific Seabirds Account (S. Speich ed.)	\$5,005.65	\$3,210.16
Savings Account - Dean Witter	\$16,894.07	\$17,603.85
<b>Special Projects Accounts</b>		
EVOS Workshop and Publication	\$15,140.27	\$16,302.94
Treasurer's Checking Account	\$3,052.84	\$3,472.53
<sup>2</sup> United Kingdom Membership Account	\$134.19	\$449.36
<b>Total Assets</b>	<b>\$135,257.67</b>	<b>\$107,759.81</b>
<b>Liabilities and Equity</b>		
<sup>3</sup> Liabilities	\$3,359.89	\$16,302.94
Equity	\$131,897.78	\$91,456.87
<b>Total Liabilities and Equity</b>	<b>\$135,257.67</b>	<b>\$107,759.81</b>

<sup>1</sup> Total reflects actual amount deposited and interest or capital gains earned. Deposits are made by purchasing shares, the dollar amount of which fluctuates with the market. Total value of deposits to Neuberger and Berman's Guardian Fund on September 30, 1998 was \$89,030.65. On September 30, 1998 we had 3,283,268 shares of Neuberger and Berman's Guardian Fund at \$21.45 per share resulting in a total value of shares on September 30, 1998 of \$70,426.10. If assets and equity are calculated using these share prices instead of the dollars deposited, the balance sheet totals for 1997/98 would be \$117,839.75 and \$113,397.75 respectively compared with the October 1 1996 - September 30, 1997 totals of \$117,562.15 and \$101,259.21 respectively.

<sup>2</sup> The United Kingdom account is managed by Mark Tasker and is used for deposits of membership dues paid in pounds sterling. A conversion rate of £1.00 to \$1.61 was used.

<sup>3</sup> \$2,500 for the seabird monitoring contract; funds are in the Dean Witter savings account. \$859.89 for final payment to publish the Exxon Valdez workshop report; funds are in the Pacific Seabirds account.



## REPORT OF THE TREASURER

**Table 2. Pacific Seabird Group Cash Flow Report, 1 October 1997 - 30 September 1998**

<b>Income</b>	
Annual meeting - Monterey	
Registration and banquet fees	\$59,573.41
Fundraising	\$2,129.00
Capital Gains (Endowment account Neuberger & Berman)	\$9,219.53
Grant from the USFWS for the Seabird Monitoring Database project	\$15,000.00
Gifts for the PSG endowment	\$1,155.00
Income dividend (Savings account Dean Witter)	\$1,426.94
Income dividend (Special Projects account EVOS)	\$829.33
Income dividend (Endowment account Neuberger & Berman)	\$512.43
Life membership dues	\$840.00
Loan Repayment from Monterey meeting	\$2,000.00
Membership dues	\$8,374.45
Membership dues from U.K. account - various years	\$435.00
Library Subscriptions	\$650.00
Publication sales	\$681.00
<b>Total Income</b>	<b>\$102,826.09</b>
<b>Expenses</b>	
Annual meeting - Monterey 1998	
Meeting and banquet expenses	\$26,897.58
Loan Repayment to PSG Savings account	\$2,000.00
PSG Memberships	\$1,560.00
Fundraising expenses	\$675.09
Annual meeting - Washington 1999	
Hotel deposit	\$5,000.00
Loan to the local committee	\$1,000.00
Bank charges	\$104.75
Director's Insurance	\$1,050.00
<sup>1</sup> Dues	\$877.97
EVOS Report - PSG Technical Publication Number 1	\$1,082.11
Investment Expense (Endowment account Dean Witter)	\$168.33
Officer and Committee expenses	\$910.08
<i>Pacific Seabirds</i>	\$7,049.67
Publications	\$643.44
Seabird Monitoring Database	\$13,650.00
Student wages	\$35.00
Taxes	\$10.00
<b>Total Expenses</b>	<b>\$62,714.02</b>
<b>Total Income over Expenses</b>	<b>\$40,112.07</b>

<sup>1</sup> Ornithological Council \$500, International Union for the Conservation of Nature \$227.97, Bird Conservation Alliance \$150.

# BOOK REVIEWS

## BOOK REVIEWS AND RECENT LITERATURE

**THE BEHAVIOUR, POPULATION BIOLOGY AND PHYSIOLOGY OF THE PETRELS.** John Warham. 1996. Academic Press, San Diego. 613 pp. ISBN 0-12-735-4158. Hard bound.

This is the second book by John Warham dealing with the petrels of the world. In the first book, *The Petrels: Their Ecology and Breeding Systems* (Academic Press, 1990, ISBN 0-12-735420-4), information is presented organized around the genera of tubenoses followed by sections on breeding biology (pre-egg, egg, incubation and chick stages). The present volume is different, in that information is organized about topic areas in twelve chapters. Topics covered are petrel populations, petrels at sea, feeding and foods, behavior and vocalizations, behavior of albatrosses, behavior of other petrels, physiology and energetics, biochemistry, locomotion, anatomical matters, evolution and radiation, and petrels and man. There are two appendices, I covers named fossil petrels and II is of key references to the parasites of petrels. There are numerous tables and figures, many taken directly from the literature. A measure of the scope and detail of this volume is reflected in the 68 pages of references and five years of work, but the author reminds us that "...the text is quite condensed..."

The petrels are a successful - wide-spread and often abundant - family of sea birds, mainly of high latitudes, especially of southern oceans. Nesting colonies are often spectacularly large, numbering in the millions. Numbers are easier to come by for the surface nesting albatrosses and giant petrels, while numbers of burrow and crevice nesting storm-petrels, diving petrels, shearwaters, fulmars, etc. are often indirectly derived through the counting of burrows. Population and age structure are summarized with specific examples, including information on the role of non-breeders and pre-breeders, age at first breeding, longevity, survival, fecundity and mortality factors on land and at sea (wrecks, predation and disease), although demography as such is not directly discussed. Examples of population changes and regulation are offered. The effects of colonies on soil and plants are

described.

Not surprisingly for the petrels a full sixty pages are devoted to the distribution, dispersion and migration of petrels at sea. Considerable detail is given to physical factors affecting distributions at sea. Fine and coarse scale distributions are touched upon. Well covered are movements at sea, with distinctions made between dispersal and migration, with specific examples of migration details. Little is presented on natal dispersal, philopatry, and colony formation.

Knowledge of the feeding and foods of petrels is of course fundamental to understanding their distributions, survival and reproductive success. Accordingly, chapter three is divided into two parts, feeding behavior and foods. The first includes finding prey, feeding styles, when petrels feed, and feeding flocks, and importantly petrels in seabird communities and feeding competition. The first section is followed by many pages of examples of the prey taken by different species. This chapter, like most of the book is in reality a guide to the literature of the petrels. Many examples are given, but the reader is then directed to pertinent literature references for more information and discussion.

A full 144 pages, in three chapters, are devoted to all aspects of the behavior of the petrels. Indeed, this sections seems most complete and exhaustive. The bulk of behavior is associated with reproductive functions, between adults, parent-offspring, parent-egg, etc. The types of behavior are shown through drawings of behavior sequences and sonograms and the context and functions of the behaviors are described. A whole chapter is devoted to the behavior of albatrosses and another to the Procellariidae. These three chapters are information rich!

The chapter on physiology and energetics includes sections on osmoregulation, thermoregulation, incubation physiology, chemoreception, photoreception, and digestive, excretory, cardiovascular and endocrine systems, metabolic rates, energy budgets, egg contents energy, stomach oils and premigratory fattening. All are well documented.

The chapter on biochemistry consists of two main sections, one on petrel lipids and the other on pollutants in petrels. The

first might be better entitled, everything one could ever want to know about petrel stomach oils, depot fats, preen gland lipids, feather waxes and bone marrow lipids. In the last section organic and inorganic pollutants in petrels are documented and discussed, again with examples, including a section on levels in relation to feeding areas.

The locomotion chapter seemingly covers all aspects of standing, walking, running, climbing, burrowing, swimming and flying, with sections on flight mechanics and aerodynamics. There are interesting sections on flight around breeding colonies and alighting and take-off. Figure 9.15 shows the diving petrels falling off the regressions of body-mass-wing area and -wing length: alcids of the southern hemisphere?

The last chapter of, petrels and man, documents the long association between the two. Of particular interest is the section on petrels as food, the variety of means employed to capture different species, and the industrial scale of some programs. The conservation section examples predator control, pollution, and means of enhancement (i.e., artificial burrows, translocation). Finally, fisheries by-catch is considered, a concern now prominent among seabird biologists.

This work and its previous companion are not for those looking for unifying theories or for sweeping generalizations. Demographic models are not considered, although models and theories are considered in the evolution and radiation chapter. This is rather an overall balanced summation of virtually all aspects of the biology and behavior of petrels. The author clearly has a vast and fundamental grasp of the petrel literature, presented in an easy to read and clear form. He has introduced each of the many topics with just enough explanation for understanding and then provides the reader with pertinent references for further reading an appreciated service considering the diverse and vast literature of this group of marine birds. John Warham is a master of understanding these birds and his contributions are an invaluable resource and service to all. His books are the place to begin when dealing with these birds.

By *Steven M. Speich*



## A SYMPOSIUM OF THE PACIFIC SEABIRD GROUP

### BIOLOGY OF MARBLED MURRELETS: INLAND AND AT SEA

S. KIM NELSON AND SPENCER G. SEALY (editors)

in NORTHWESTERN NATURALIST, Volume 76, Number 1, 1995

#### CONTENTS

Introduction by S. K. Nelson and S. G. Sealy

#### *Inland*

Marbled murrelet activity relative to forest characteristics in the Naked Island Area, Prince William Sound, Alaska by K. J. Kuletz, D. K. Marks, N. L. Naslund and M. B. Cody

Tree and habitat characteristics and reproductive success at marbled murrelet tree nests in Alaska by N. L. Naslund, K. J. Kuletz, M. B. Cody and D. K. Marks

Description of two marbled murrelet tree nests in the Walbran Valley, British Columbia by I. A. Manley and J. D. Kelson

Characteristics of three marbled murrelet tree nests, Vancouver Island, British Columbia by K. M. Jordan and S. K. Hughes

Marbled murrelet distribution in the Siskiyou National Forest of southwestern Oregon by C. P. Dillingham, R. C. Miller and L. O. Webb

Two marbled murrelet nest sites on private commercial forest lands in northern California by S. J. Kerns and R. A. Miller

Behavior of marbled murrelets at nine nest sites in Oregon by S. K. Nelson and R. W. Peck

Fledging behavior, flight patterns, and forest characteristics of marbled murrelet tree nests in California by S. W. Singer, D. L. Suddjian and S. A. Singer

Use of boat-based surveys to determine coastal inland habitat associations of marbled murrelets in Prince William Sound, Alaska by D. K. Marks, K. J. Kuletz and N. L. Naslund

Use of radar to study the movements of marbled murrelets at inland sites by T. E. Hamer, B. A. Cooper and C. J. Ralph

#### *At Sea*

Preliminary observations on juvenile:adult ratios of marbled murrelets in Auke Bay, southeast Alaska by H. L. Anderson and S. R. Beissinger

At-sea activity patterns of marbled murrelets adjacent to probable inland nesting areas in the Queen Charlotte Islands, British Columbia by M. S. Rodway, J.-P. L. Savard, D. C. Garner and M. J. F. Lemon

Decline of marbled murrelets in Clayoquot Sound, British Columbia: 1982-1993 by J. D. Kelson, I. A. Manley and H. R. Carter

Distribution of marbled murrelets along the Oregon Coast in 1992 by C. S. Strong

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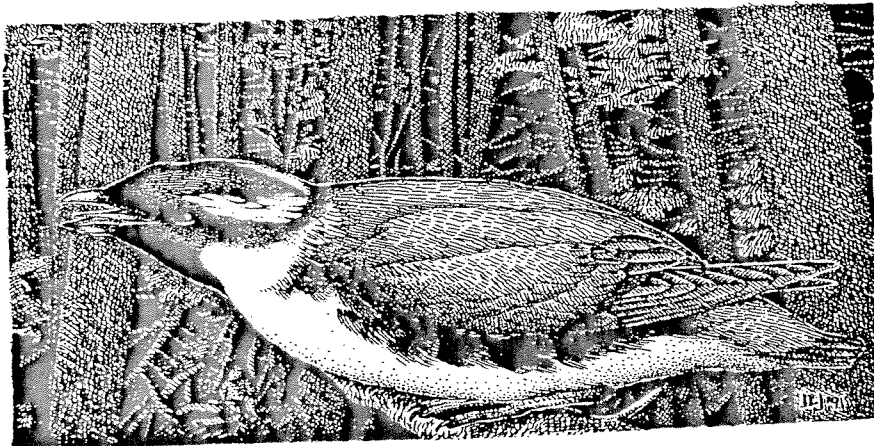
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**SHOREBIRDS IN MARINE ENVIRONMENTS.** Frank A. Pitelka (Editor). Proceedings of an International Symposium of the Pacific Seabird Group. Asilomar, California, January 1977. Published June 1979 in *Studies in Avian Biology*, Number 2. Out of print.

**TROPICAL SEABIRD BIOLOGY.** Ralph W. Schreiber (Editor). Proceedings of an International Symposium of the Pacific Seabird Group, Honolulu, Hawaii, December 1982. Published February 1984 in *Studies in Avian Biology*, Number 8. \$12.00.

**MARINE BIRDS: THEIR FEEDING ECOLOGY AND COMMERCIAL FISHERIES RELATIONSHIPS.** David N. Nettleship, Gerald A. Sanger, and Paul F. Springer (Editors). Proceedings of an International Symposium of the Pacific Seabird Group, Seattle, Washington, January 1982. Published 1984 as Canadian Wildlife Service, Special Publication. Out of print.

**ECOLOGY AND BEHAVIOR OF GULLS.** Judith L. Hand, William E. Southern, and Kees Vermeer (Editors). Proceedings of an International Symposium of the Colonial Waterbird Society and the Pacific Seabird Group, San Francisco, California, December 1985. Published June 1987 in *Studies in Avian Biology*, Number 10. \$18.50.

**AUKS AT SEA.** Spencer G. Sealy (Editor). Proceedings of an International Symposium of the Pacific Seabird Group, Pacific Grove, California, December 1987. Published December 1990 in *Studies in Avian Biology*, Number 14. \$16.00.

**STATUS AND CONSERVATION OF THE MARBLED MURRELET IN NORTH AMERICA.** Harry C. Carter, and Michael L. Morrison (Editors). Proceedings of a Symposium of the Pacific Seabird Group, Pacific Grove, California, December 1987. Published October 1992 in *Proceedings of the Western Foundation of Vertebrate Zoology*, Volume 5, Number 1. \$20.00.

**THE STATUS, ECOLOGY, AND CONSERVATION OF MARINE BIRDS OF THE NORTH PACIFIC.** Kees Vermeer, Kenneth T. Briggs, Ken H. Morgan, and Douglas Siegel-Causey (Editors). Proceedings of a Symposium of the Pacific Seabird Group, Canadian Wildlife Service, and the British Columbia Ministry of Environment, Lands and Parks, Victoria, British Columbia, February 1990. Published 1993 as Canadian Wildlife Service, Special Publication, Ministry of Supply and Services, Canada, Catalog Number CW66-124-1993E. Free. Write: Publications Division, Canadian Wildlife Service, Ottawa, Ontario, K1A 0H3, Canada.

**BIOLOGY OF MARBLED MURRELETS - INLAND AND AT SEA.** S. Kim Nelson and Spencer G. Sealy (Editors). Proceedings of a Symposium of the Pacific Seabird Group, Seattle, Washington, February 1993. Published 1995 in *Northwestern Naturalist*, Volume 76, Number 1. \$12.00.

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Pacific Seabird Group Symposia are initiated by one or more persons with interest in a particular topic area, resulting in a collection of papers usually presented at an annual meeting of the Pacific Seabird Group. Some symposia are further refined and then published as a Symposium of the Pacific Seabird Group. Individuals interested in promoting future symposia must first contact the Coordinator of the Publications Committee, and the appropriate annual meeting scientific program coordinator, prior to initiating the process leading to the actual symposium session and possible publication. The necessary guidelines outlining the steps and responsibilities for obtaining approval, organizing, holding and publishing Pacific Seabird Group Symposia will be provided. This opportunity is available to all members of the Pacific Seabird Group.

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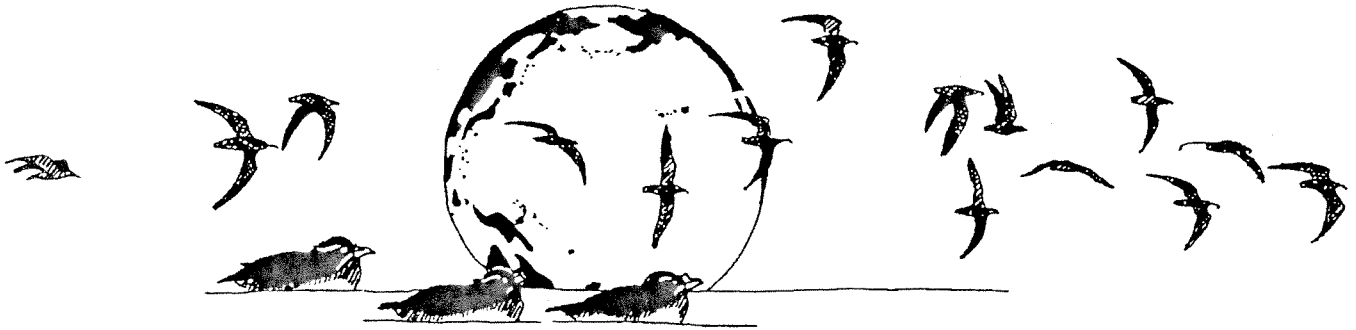
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