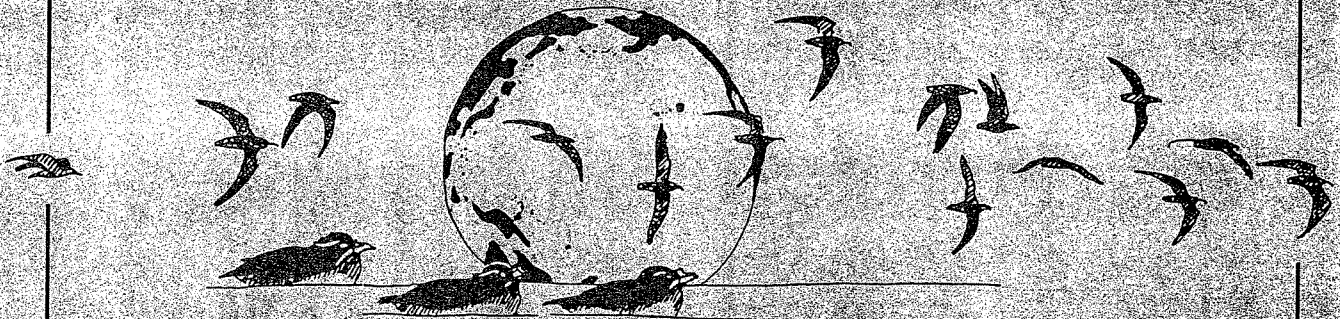


Pacific Seabirds



A Publication of the Pacific Seabird Group

Volume 21 Number 1

1994

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 seabirds and the marine environment. Group meetings are held annually and the PSG publication, *Pacific Seabirds*, is issued biannually. Current activities include involvement in seabird sanctuaries, coastal surveys, seabird/fisheries interactions, and legislation. 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. Annual dues for membership are \$20 (individual and family); \$13 (student, undergraduate and graduate); and \$450 (Life Membership, payable in five \$90 installments). Dues are payable to the Treasurer, whose address is on the back cover.

Pacific Seabirds

The *Pacific Seabirds* (ISSN 0740-3371) is published twice a year, in the spring and fall, and contains news of interest to PSG members, including regional seabird research and conservation news and abstracts of papers presented at the annual meeting. *Pacific Seabirds* is not an outlet for the results of scientific research; however, articles and shorter items on seabird conservation, seabird research activities, and other topics related to the objectives of PSG are welcome. All materials should be submitted to the Editor or the Chair of the Publications Committee. Back issues of the *Bulletin* or *Pacific Seabirds* may be ordered from the Treasurer: please remit \$2.50 each for issues of Vols. 1-8 (1974-1981) and \$5.00 each for issues of Vol. 9 and later.

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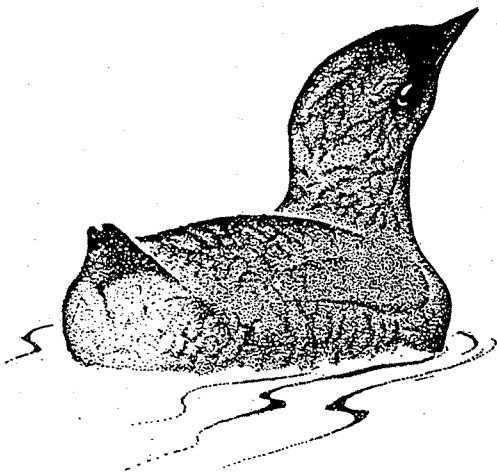


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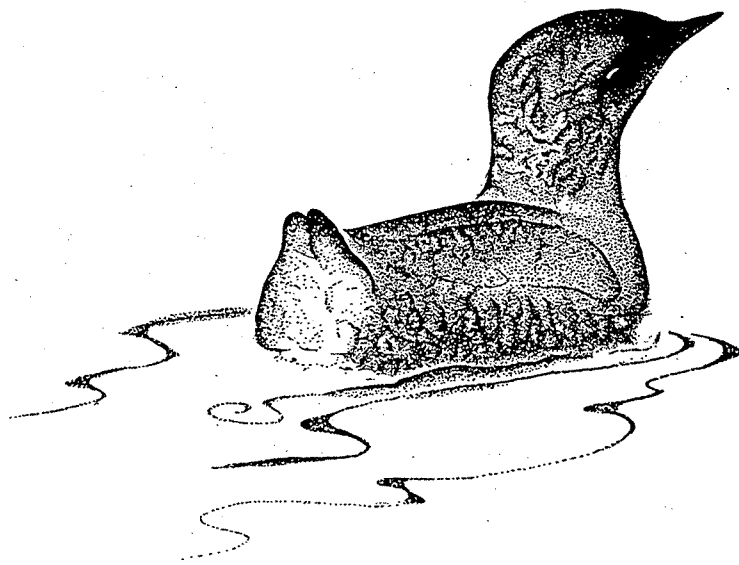
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Forum

Hard Knocks for the Pribilof Fox

Paula A. White, 2547 Crescent Ave., Santa Barbara, CA 93105

Several times in the past few years I have been approached as a member of PSG and asked what seabird research I am involved in. To each inquiry I have replied the same, "I study foxes on the Pribilof Islands." Because the Pribilofs are famous for their seabird colonies, it is often assumed that my research in some way directly relates to birds. Although this is not the case, current events on the Pribilof Islands are casting foxes in a role more important than ever to the seabirds. Fox diet on the Pribilofs includes seabirds. Viable populations of birds and foxes have persisted on the Pribilofs for centuries, including the past 200 years of human habitation on the islands. Now, development of the Pribilofs as a commercial fishing center presents a dire threat to seabird colonies in the form of rat introduction. Development threatens the foxes in different ways. However, the destinies of foxes and birds remain linked.

Arctic foxes are indigenous to the Pribilof Islands, having immigrated during sporadically occurring ice conditions over the last several centuries. The earliest Russians to visit the Pribilof Islands found large numbers of arctic foxes which they harvested along with the northern fur seals. Infrequent fox immigration over the ice probably still occurs, although changing climatic conditions have decreased the likelihood of such movements. The isolation period has been sufficient to alter morphology to the extent that Pribilof foxes are currently considered a distinct subspecies (*Alopex lagopus pribilofensis*). In 1981, when the taxonomic status of arctic foxes occupying Bering Sea islands was re-examined, the Pribilof foxes were the only populations found to represent a legitimate subspecies. By contrast, arctic foxes on St. Matthew, Hall, and St. Lawrence islands move freely across pack ice each year, and showed no significant differences from mainland populations.

While the status of arctic foxes as native to the Pribilofs is well documented (see "Alaska's Alien Animals" *PSG Bulletin*

Vol. 20 No. 2), public opinion of Pribilof foxes is undeservedly low. Since the beginning of my research in 1988, appreciation for this population has remained unfavorable or has in fact deteriorated due to the increased attention given to the declining populations of many of Alaska's seabirds and newly revitalized efforts to eradicate non-native predators from important seabird nesting areas.

The largest single threat to the foxes is the tumultuous change accompanying the economic restructuring of the islands. The development of the St. Paul and St. George harbors as commercial fishing centers is an issue that will affect all wildlife species on the Pribilofs.

The accompanying potential for rat introduction is grave. Averting this disaster and the resulting permanent, detrimental effects on the seabirds is of the utmost concern for the USFWS, who already have rat prevention measures in place in the harbors. In addition, work continues on a "First Strike" emergency response strategy to deal with rat-infested shipwrecks. However, the USFWS and the Pribilovians are counting on the foxes to provide an additional line of defense should rats slip through the harbor safeguards. Outside of the harbors, foxes represent the only immediate response against rat introduction from shipwreck at this time. Although foxes are not capable of eradicating established rat populations, they do control rodent numbers and could possibly prevent rats from becoming established by killing initial escapees.

Accelerated development of the islands threatens the foxes in a number of ways. Due to the long isolation of the Pribilof foxes, disease exposure and therefore resistance is likely very minimal. Although it is possible that diseases could naturally reach the islands from infected foxes crossing the ice, the biggest disease threat to island foxes is contact with non-native species.

Although dogs are not allowed on the Pribilofs, they are not uncommon aboard fishing vessels in the Bering Sea and have been known to jump ashore from vessels at dock. The new breakwaters allow docking of more and larger vessels. Additional problems stem from the transient fishing fleet and human behavior on the docks. Foxes growing up on the breakwaters quickly grow used to human contact, and in some instances become dependent on human food. Even with new, tougher restrictions on dogs

coming ashore, some foxes readily board docked vessels looking for handouts of food. House cats are kept as pets on both St. Paul and St. George Islands and are also present on ships. It was not until the 1990s that vaccinations were required for cats brought to the Pribilofs. Requiring proof of vaccination for pets aboard visiting vessels is unrealistic. While contact between foxes and domestic animals is worrisome, rats may represent a more serious disease threat than dogs or cats. The consequences of introduced disease could be catastrophic to the fox population.

There are other, more insidious threats as well. Indiscriminate shooting and unlimited trapping threaten populations that are genetically isolated. Ironically, much of the Pribilof fox mortality occurs at the hands of people unaware of the population's origins, who believe they are helping to restore the island ecosystem by killing foxes. While canid populations are usually capable of withstanding some harvesting, arctic foxes may respond to high levels of mortality in unanticipated ways. The arctic fox population throughout Fennoscandia (Finland, Norway, Sweden) was historically numerous and sustained commercial harvesting for several centuries. However, in the 1920s the population crashed due to overharvesting. Since then, despite sixty years of complete protection, fox numbers have remained so low that the population is currently threatened with extinction. Other factors, including changing climatic conditions and shifts in species composition (fewer wolves, more red foxes), may have contributed to the decline. However, despite experimental manipulations aimed at increasing the arctic fox population, numbers remain critically low.

Eradication of introduced arctic and red foxes from the Aleutians and other islands throughout Alaska should be strongly supported as one of the most effective and comprehensive approaches to seabird conservation available. However, it is essential that visitors to the Pribilofs (armchair travelers included) recognize Pribilof foxes not only as an indigenous species, but as an endemic subspecies as well—a unique feature of the Pribilof Islands.

Arctic foxes are efficient predators and opportunistic scavengers. Their diet on the Pribilof Islands includes seal carrion, seabirds and their eggs, fish, invertebrates, land birds, and the St. George Island lem-

ming. While seabird enthusiasts may flinch at the sight of an auklet or murre egg in a fox's jaws, it should be remembered that arctic foxes constitute a natural part of the Pribilof ecosystem. This small, genetically isolated fox population is vulnerable to overharvesting and disease. Regulatory agencies responsible for managing this population must address these legitimate threats to the Pribilof foxes and instigate necessary conservation measures. Education of Pribilof residents and island visitors is essential to helping foster an appreciation for the native foxes. In turn, foxes might help to protect these precious islands from rat infestation. Hopefully, through such concerted effort and commitment, we will ensure the survival of the Pribilof fox.

Pacific Seabirds Marks a Change in Style

John Piatt, Chair

Members of PSG will note many changes in the style of this edition of the "bulletin." First is a name change from *Pacific Seabird Group Bulletin* to *Pacific Seabirds*. This marks a change not only in title but also in the content of the publication and reflects the evolution of the Pacific Seabird Group itself. The *Bulletin* served for many years as a way for members to keep in touch with each other, describing their current work (Regional Reports), various PSG activities, and short news items of note. All these functions continue, but in recent years we have included more technical notes and papers that report on current research of interest to members. In this volume we are beginning to formalize this trend with new section titles and a format we hope to use consistently in the foreseeable future. *Pacific Seabirds* (PS) is not becoming a full-fledged journal, although we are adopting a journal style to some degree. All articles and other contributions to PS will be reviewed by one or more members of the PS Editorial Committee (Steve Speich, Martha Springer, George Divoky, John Piatt, Scott Hatch), and, if necessary, sent out to other PSG members for additional review. We want to improve the caliber of articles in PS, but we don't want to slow the procedure down too much by an extensive review process. Members are encouraged to send submissions to the

technical editor at any time. *Pacific Seabirds* is NOT a venue for publishing data you could not publish anywhere else, items likely to have a narrow audience, or dated research results (e.g., "Diets of Seabirds at My Study Site, 1979-1983"). We WOULD like to receive short items relating to research and conservation. Submissions should be about timely issues (e.g., die-offs, breeding failures) that will alert members to recent events in the seabird world; short review articles that would be of wide interest to PSG members; recent conservation or research news; useful techniques for seabird research; comments and opinions on recent issues; humorous notes; publication reviews; and announcements. We would also appreciate new graphics, especially line drawings of seabirds. We look

forward to seeing more submissions from PSG members. Please let any one of us on the Editorial Committee know how you feel about the changes or if you are interested in being more involved in helping produce *Pacific Seabirds*.

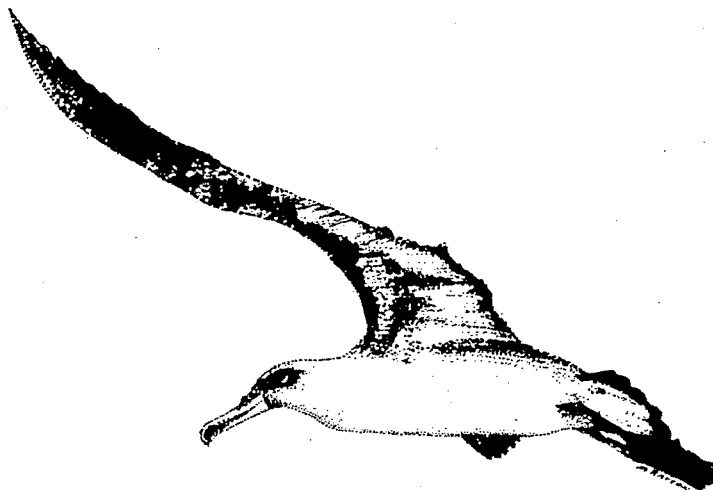
P.S. Look for an "Instructions to Authors" page in the fall issue of *Pacific Seabirds*.

PSG Apologizes for Omission

PSG inadvertently left out the following table from Lance Tickell's *Albatross Atlas*, published in the Fall 1993 issue of the *Bulletin*. The editorial staff apologizes to Dr. Tickell for the omission.

- | | |
|----------------------------------|--------------------------------------|
| 1 Prince Edward Island | 11 Campbell Island |
| 2 Crozet Islands | 12 Antipodes Islands |
| 3 Amsterdam & St Paul Islands | 13 Bounty Islands |
| 4 Kerguelen Islands | 14 Chatham Islands |
| 5 Heard & McDonald Islands | 15 Diego de Almagro Island |
| 6 Macquarie Island | 16 Diego Ramirez & Ildefonso Islands |
| 7 Tasmanian offshore islands | 17 Falkland Islands |
| 8 New Zealand & offshore islands | 18 South Georgia |
| 9 Sanres & Solander Islands | 19 Tristan da Cunha |
| 10 Auckland Islands | 20 Gough Island |

Table 1. Breeding locations of southern hemisphere albatrosses.



BANDING THICK-BILLED MURRE CHICKS

Tony Gaston, Canadian Wildlife Service, 100 Gamelin Blvd., Hull, Quebec, K1A 0H3 and Garry Donaldson Dept. of Biology, University of Ottawa, Ottawa Ontario, K1N 6N5

Over the past 15 years, the Canadian Wildlife Service has banded approximately 40 000 Thick-billed Murre chicks in the eastern Canadian Arctic. During the course of this work, we have gained a lot of experience on when and how to do it. Obviously, as most Thick-billed Murres breed on steep cliffs, the banding usually involves the use of ropes and other safety devices. We do not want to pose as experts in that area and we strongly recommend that anyone attempting to band Thick-billed Murres employ experienced climbers. No amount of advice will replace experience in that department. This article deals only with the non-safety aspects of the work. We hope that other murre banders can benefit from our experiences.

The first thing that must be recognised about banding Thick-billed Murres is that, if it involves climbing within the colony, some egg or chick mortality will occur. This is something that has to be very seriously considered in any banding project, especially if the intention is to band hundreds, or thousands of chicks. The possible benefit of the information obtained must be weighed against the cost. Our strategy has been to minimize losses and to shift them as far as possible towards late-laid eggs, as these tend to have a lower chance of surviving than those laid earlier. In the best-run operations under ideal conditions one can achieve losses of only a few percent of eggs and chicks. If the timing or the weather is wrong, losses can be much higher. We regard 5% as the upper limit of acceptability.

Problems arise in banding murre chicks from the following sources: (1) eggs and chicks may become chilled during the course of banding; (2) they may be knocked off ledges; and (3) chicks may panic and initiate premature "fledging". The latter phenomenon can be the most harmful to the banding effort, as it involves the largest chicks and hence those most likely otherwise to survive to leave the colony. The loss of chicks after they have been banded affects any subsequent analyses that involve rates of recovery.

Premature fledging behaviour gener-

ally only occurs once chicks are 15 days or older. Chicks at younger ages tend to scuttle into cracks, or press themselves against the cliff with their necks tucked in, once their parent has left. Only a minority of chicks, even at more than 15 days, exhibit premature fledging behaviour, but once it begins, other chicks tend to be stimulated to follow suit and a mass jump-off can occur. Several chicks fledging prematurely within a short time is a clear signal that the operation must be abandoned.

A premature fledger will not face the cliff, but instead wanders about the ledge with its neck extended, looking alertly from side to side. It begins to give the typical "pee-pee-pee" fledging call and may then launch itself from the cliff within a few minutes. Once a chick has formed this determination to depart, it is extremely difficult to prevent it from doing so unless its parent returns. Hence, avoiding triggering this syndrome is a very important strategy in containing losses during banding.

Another class of chicks we call "panickers". Like the premature fledgers, these chicks will not huddle down once their parents have left, but run away from the bander, sometimes giving a scream of alarm when handled. These chicks do not attempt to jump from the ledge, but frequently fall off accidentally when fleeing in panic. They seem to form a relatively fixed proportion of chicks and their example is not followed by others to the same extent as that of the premature fledgers. Nevertheless, it is useful to keep them quiet if possible. Gently holding the mandibles closed while banding can help.

To combat the various problems posed in banding Thick-billed Murre chicks we have the following suggestions:

Rule #1: Get the timing right

We consider that the ideal "banding window" is only open for about 7 days. It begins when the first-hatched chicks are about 14 days old, which means that the chicks in the peak 80% of laying are roughly 2-12 days old, becoming 9-19 days old by the end of the window. If banding begins

earlier than this, there will be many unhatched eggs present and some will be knocked off in the panic departures that inevitably result from a climber appearing on the ledges. If banding continues any later, some chicks will have begun to fledge naturally and the initiation of natural fledging seems to trigger the onset of premature fledging on a large scale.

The type of triangular bands that we use, from Lambournes of U.K., will stay on any chick other than one that is newly hatched. However, the standard U.S. Fish and Wildlife Service bands will have to be compressed to an oval shape to stay on chicks less than about 6 days old. The British style of "seabird pliers" are good for this.

We recommend starting to band as early as possible and accepting some losses of eggs if it ensures avoidance of premature fledging. If you do not start early and if rain or strong winds hold up banding for several days then you may be forced to choose between overrunning the window, or reducing the number of chicks banded. In our view, it is better not to band at all than to accept heavy losses. Apart from the ethical considerations, the interpretation of recovery rates or apparent survival rates are much complicated by significant losses during banding.

If you have a good knowledge of breeding schedules at the colony involved, it may be possible to take advantages of differences in timing of breeding among different parts of the colony. At Coats Island, we have found that one area is consistently later than other parts of the colony and we always leave this part until last. In any case, it is wise to determine chick ages in several areas before committing to large scale banding. A small sample of birds, especially close to the edge of the colony, may give an unrealistic impression of overall timing, causing banding to be delayed beyond the optimum date.

Rule #2: Don't waste time

The longer you spend on the cliff, the longer birds are kept away, the longer it will take them to return after your departure, and the more likely it is that chicks will chill or fall off. Be well organized, so that you do not spend a lot of time fiddling with your gear once on the cliff. Don't hang about taking photographs or admiring the view. Multi-pocket "fishermen's vests" are very effective in keeping your bands and tools in order.

Chilling can be reduced by avoiding banding on cold days, and by timing the banding period so that the sun is on the cliffs. This is especially important in the High Arctic, where air temperatures rarely exceeded 10° C. Except when in the process of hatching, murre eggs seem fairly resistant to chilling for periods of up to an hour, although this will depend on air temperature. Never band when it is raining; chicks get chilled easily when wet. However, they frequently crowd together in huddles which keep them much warmer than they would be separately. Very young chicks, and especially those that have just hatched, are not mobile enough to join huddles and do not orient well. It is best to put them in a pocket, or inside your jacket and replace them just before leaving the ledge. If there are several very young chicks on the ledge then you probably should not be banding there yet.

Heat can also be a problem in certain circumstances. Older chicks become very active when it is warm (this is true even without disturbance). If you anticipate that most of the chicks that you will be banding will be more than 10 days old, it may be preferable to band when the sun is not on the cliff. At that age, chicks can easily withstand temperatures down to 0° C. When it is cold they are much more inclined to form a huddle once the adults have left. Panickers can sometimes be contained in these circumstances by placing them in the middle of the huddle. The presence of other, non-panicking chicks helps to calm them.

Rule #3: keep the chicks together

When chicks can huddle together they seem to be most quiescent. They frequently do this of their own accord, piling on top of one another up to half a dozen deep. On colonies where the ledges are large, so that there are many chicks to a ledge, we adopt the following tactics. We carry with us 2 large (c. 30L) canvas bags (canvas day-packs are also good, but beware waterproof cordura). On arrival at the ledge we collect up all of the chicks and place them in one bag. As each chick is banded, it is transferred to the other bag. Once all are banded, we release them onto the ledge, piling them into a corner on top of one another, all facing the cliff. Then we leave the ledge at the opposite end from the chicks. We have not had any cases of chicks suffocating in the bags. The bags must be breathable, as

otherwise the chicks' respiration condenses the inside and the chicks quickly get wet. It is amazing how swiftly the chicks sort themselves out once the adults return.

Rule #4: Watch out for well-meaning adults

Although many birds fly off when you arrive at a ledge, a few usually remain. Some of these may be exceptionally motivated brooders that remain on their site even when you sit right beside them. Others teeter at the edge of the ledge, hoping to return to their site, but ready to flee instantly. The chicks, once their own parent has left, actively seek out other adults in the hope of being brooded. It is not uncommon to see one motivated brooder vainly attempting to shelter a dozen or more chicks. Where the adults have remained at their site they can be useful in holding the chicks on the ledge; such birds should not be disturbed. However, the adults at the edge of the ledge can pose a hazard, as their presence lures chicks away from the cliff. If the ledge slopes away at the seaward edge, chicks approaching adults at the lip may be unable to retain their grip and end up sliding off. Also, in this area, many adults are constantly landing and taking off and these birds can easily knock chicks off the ledge. A good strategy is for the bander to get in position between the adults and the chicks, so that the chicks cannot see the adults. A chick hearing its parent will respond by trying to approach it, but other chicks appear to respond only to the sight of an adult.

Rule #5: Do everything steadily, without sudden movements

The murre is alarmed by things that move and especially by things that are moving above them. A bander approaching from below usually causes less disturbance than one coming from above. In particular, throwing down a coil of rope causes what seems like an inordinate panic. Ropes should be lowered down gradually, or carried in a bag and paid out en route. Rappelling by means of spectacular leaps would probably have an even worse effect, so it is necessary to deny oneself the fun (fast rappelling is also bad for the rope). Inch down gradually, keeping firmly balanced so that no large jerks occur. If there is a good, broad ledge where you can rest somewhat away from the birds, give them time to settle on their chicks again before commencing banding.

If the colony is accessible from below, a good plan of attack would be to lower a rope from above, then begin from the bottom and climb up. If that is not possible, climb to the bottom of the intended pitch and then band up from below. This has the advantage that, if you do not complete the section, you will not have to descend past banded birds the next day to finish it off.

Rule #6: Broad ledges are not necessarily better than narrow ones

At first sight, a big ledge with 50 or 100 chicks, seems like a perfect banding site. However, big ledges suffer from several disadvantages. If they are uneven, they may retain puddles of water. These become puddles of liquid excrement and if the chicks run into them they can get hideously mired. Those who have climbed on murre cliffs know this to be the most tragic of all sights. Also, the chicks have a lot of space in which to run about and this, along with the social facilitation, tends to promote panic behaviour. On a large ledge many adults will return and call to the chicks from the edge of the ledge, making it hard for the bander to control the situation. On a small ledge, the bander can hang in his or her harness, facing the ledge, blocking it from the adults, and facing the chicks so that any attempting to jump can be intercepted.

Rule #7: Be hard-hearted

If a chick falls or jumps, for whatever reason, there is an immediate desire to remedy the situation. This is a natural impulse, but such action needs to be carefully considered. If the chick has fallen accidentally and if the retrieval will not involve disturbing many other birds, it should be done as quickly as possible. If the chick has clearly panicked and if it continues to show this behaviour, retrieval is probably pointless, as the chick will run off the ledge again as soon as replaced. Likewise, a chick that has exhibited premature fledging behaviour and deliberately launched itself will rarely settle down. It appears that once the fledging behaviour is "switched on" only reunion with the parent will turn it off. Some of these chicks may eventually find their parents on the sea.

If you decide to climb down to fetch a chick, you may find it hard to identify once you get there, unless it is banded. Also, it may have been taken by a gull before you reach it, making the disturbance you caused

Were G. N. Lawrence's "Californian" Seabirds Collected During the Gold Rush?

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in the process pointless. If you are climbing down to the lower ledge in any case, it is better to finish the ledge you are on, then climb down and gently lob the chick back to where it originated. This technique has frequently worked. By the time you reach the lower ledge, sufficient adults may have returned to the first ledge to keep the chick in place.

Sometimes you arrive at a ledge to find that one of the chicks is already banded. Such chicks probably fell from above without being observed. We carry a slip of waterproof paper and a pencil stub and keep rough notes of the band numbers used on each ledge, so that chicks can be returned to the right ledges.

Regrettably, saving fallen chicks with an immediate mercy dash is rarely the right policy, because it may make things worse, rather than better. It is worth bearing in mind that some chicks displaced accidentally are adopted by failed breeders (we have had several examples), so a chick not retrieved is not necessarily doomed. Also, chicks or eggs taken by gulls during the disturbance caused by banding may be compensated by lower predation on other sites. Glaucous Gull chicks are not insatiable and parents only forage when they have to.

Conclusions

Banding Thick-billed Murres is not for the faint of heart. The smell, the noise, the anxiety caused by wayward chicks and the physical exertion involved, combine to make it a less than relaxing experience. However, you do learn things about the birds that you can never appreciate at a distance and this can make it rewarding even before the recoveries begin to arrive.

It really pays to know your colony, so that you know where to go first, which area to leave to last, what the best approach routes are and when the sun is on different areas. Tactics appropriate at one colony may be less so at others and a lot will depend on the temperature and the relative tameness of the breeders. Overall, identifying and using the "banding window" is probably the most vital ingredient of a successful banding campaign.

One last piece of advice. If a loud "pop" signals the explosion of a last-season's egg, stop breathing and move away as quickly as possible. Military mustard gas is tame in comparison with a year-old murre egg at close range.

In a recent contribution to the *Auk* Dave Lee (1993) summarizes the information available about specimens of the Cape Petrel *Daption capense*, Grey Petrel *Procellaria cinerea*, Brown Skua *Catbaracta (skua) lonnbergi* and moulting Arctic Tern *Sterna paradisaea* reported by Lawrence (1851, 1853) from California "in the cabinet" of Nicolas Pike, and suggests that they may have been collected in the Indo-Pacific subantarctic islands instead. While I have also speculated in the past that the two petrels and specimens of *Fregatta grallaria* also said by Lawrence (1851-53) to come from Florida probably originated in the southern hemisphere (Bourne 1964, 1967), I was unable to suggest why they were attributed to Monterey. It is now possible after more personal experience of procedures on ships to suggest some other possibilities.

While some or all of these birds could indeed have come from the subantarctic islands, this seems rather unlikely. Although at the beginning of the last century many sealers visited them (Richards 1984), the seals soon became severely reduced, and did not increase again to the extent that led to more visits by sealers including the collector George Comer until later in the century (Verrill 1895). While the islands were subsequently also visited by American whalers up to the United States Civil War, these normally came from New England, and like the warships and exploring expeditions of several nations active at that time, and the growing number of ships trading between the northern hemisphere and Australia which called there for fresh food and water, seem unlikely to have brought any birds collected back to California.

On the other hand, there was also another, much larger, group of ships regularly plying between California, where the birds were said to originate, through their normal range to New York, where they were reported, at this time, carrying the "forty-

niners" from the east coast of the United States around Cape Horn to join the Californian gold rush. Judging by recent experience off South America many seabirds are likely to have struck the rigging of these ships or come to their lights at night, while bored seamen and passengers were then also accustomed to "fish" for birds, or put a boat down and shoot them, when the ship became becalmed. The naturalists on Cook's expeditions (Lysaght 1959) and John Gould (1844) among others obtained scores of similar birds in such ways. Unfortunately, the collectors of those days seem to have been remarkably casual about labelling their specimens, until for example it caused serious problems for Charles Darwin in the Galapagos (Sulloway 1982).

The most likely sequence of events to explain why birds from the Southern Ocean should have been said to originate "off Monterey" therefore appears to be as follows. Lawrence may have asked Pike who was leaving for California, or Pike may have asked some correspondent who was going there, to collect some birds. Whoever collected the birds preserved some stray specimens at unrecorded places during the passage around South America, and then packed them up off Monterey shortly before the ship arrived in California where they were likely to be busy, and left them on board to be brought back on the return voyage with a hasty covering note headed "off Monterey." In consequence, as with the *F. grallaria* said to come from Florida, Lawrence assumed that they must actually have been collected off Monterey.

A similar sequence of events may also explain a number of other old records of seabirds from unlikely places, including the similar attribution to Monterey of the type of the Swallow-tailed Gull *Creagrus furcatus* collected on a vessel coming from the Galapagos (Nébox 1840), the Yellow-nosed *Diomedea chlororhynchos* and Sooty *Phoebetria fusca* Albatrosses, Giant Petrel

Macronectes sp. and Southern Fulmar *Fulmarus glacialis* all said by Audubon to have been collected by J.K. Townsend off the mouth of the Columbia River (Stone 1930), and a considerable number of other equally unlikely seabirds reported near ports elsewhere and also included for at least a time on many other national lists all around the world (Bourne 1967, 1992).

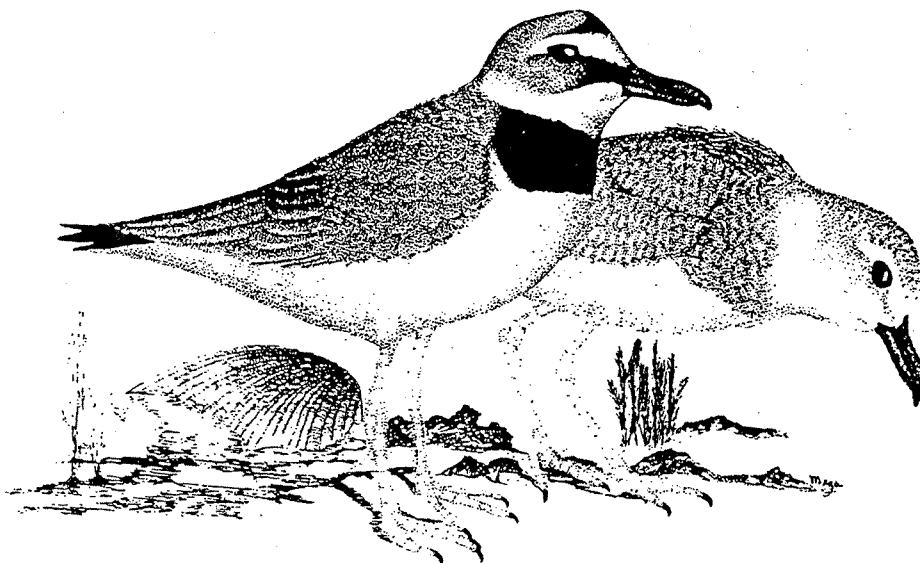
I am indebted to Dave Lee for helpful comments on this note.

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Policy for PSG Correspondence and Papers

As PSG expands and becomes more active in seabird conservation, the organization and its members will be increasingly subjected to legal scrutiny. For this reason it is essential that all materials produced as "PSG documents" (letterhead correspondence, papers, reports) be held to the highest standards possible. Other than symposia proceedings, which go through normal scientific review process, reports and lengthy papers for general distribution will now be reviewed and processed by the Technical Editor of *Pacific Seabirds* (currently Steve Speich) and members of the Executive Council. All such lengthy material should be forwarded to the Editor for consideration and technical review. The PSG Chair and Executive Council will have final control over the release of such material. Members of the Pacific Seabird Group often provide comments to agencies or the public on issues of regional, national, and international significance to seabird conservation. Most of these comments are relatively brief (less than a few pages) and, if appropriate, may go out as PSG letterhead correspondence. General PSG members are **strongly encouraged** to prepare correspondence for distribution by PSG and provide this (as hard copy or, better yet, on disk or email) to your Regional Representative, Committee Chair or Council Member for review and signature. They will then send out the material under PSG letterhead. All such PSG correspondence and any correspondence prepared originally by Regional Representative, Committee Chairs, or Council Members should be made available (by mail, fax, or email) for review by the Chair of PSG or, in his/her absence, by another member of the Executive Council. Usually, this requires only a 1-2 day lead-time for short documents. In most cases, and for virtually all well-prepared documents, no comments or changes are necessary, and this process will not delay PSG correspondence (which is often done at the last hour!). In any case, this procedure ensures that the Chair and members of the Executive Council at least are kept apprised of all outgoing PSG correspondence and educated about issues of regional concern. The Executive Council thanks you for your cooperation.



21st Annual Meeting—Interesting, Informative, and Entertaining

The 21st PSG Annual Meeting was held in Sacramento, California, on January 26-29, 1994. The meeting was well-attended and included a wonderful variety of presentations, conservation meetings, and social occasions. PSG would like to thank profusely the Local Committee (Dan Anderson, Ken Briggs, Harry Carter, Frank Gress, Deborah Jory, Paul Kelly, Leopoldo Moreno, and Nils Warnock) for their outstanding efforts and for facilitating a successful and enjoyable meeting. The Scientific Program Committee (John Piatt, Harry Carter, Gus van Vliet, and Nancy Naslund) are likewise to be applauded for organizing an interesting program. PSG is grateful to all our co-sponsors for logistic and financial support: California Fish and Game, U. S. National Biological Survey, University of California at Davis, and Sacramento State University.

PSG is pleased that colleagues from Japan, Russia, Great Britain, eastern Canada, and Iceland could participate in

the meetings, thereby greatly increasing the geographic scope of presentations on seabird biology and conservation beyond the usual U. S./Canadian west coasts and Hawaii. We were particularly pleased to welcome three Japanese seabird biologists—participants from this Pacific Rim country have been notably absent from most previous meetings. We hope the increasing trend for international attendance at PSG meetings continues well into the future.

Highlights of the scientific program included a "Symposium on Behavior, Ecology, and Status of the Rare Alcids" (see Abstracts), which included general overviews and detailed papers on the biology of seven rare alcid species from around the Pacific Rim. The first day of the meeting also included several large-screen video presentations of seabird research, and, by all accounts, these "video papers" were a popular addition to the usual presentation media. Other session topics included

Marbled Murrelets, population dynamics, breeding biology, feeding ecology, biogeography, and conservation biology. Judging by the high attendance throughout the meetings (and up to the very last paper!), presentations were of high caliber and interest. Committee meetings on a variety of issues (Marbled Murrelets, Xantus' Murrelets, seabird restoration, seabird monitoring, conservation, Baja seabirds) were also well-attended and marked by active discussion and debate. The PSG banquet on the last evening was highlighted by a Lifetime Achievement Award presented to Dr. Miklos Udvardy for his contributions to the study of seabirds. The evening ended with an unusual (but lucrative) "bow-tie and t-shirt" auction, with some members literally giving the shirts off their backs to the PSG cause. In summary, the 21st Annual PSG Meeting was lively, interesting, and entertaining. We all look forward to the next meeting in San Diego!

Minutes of the 1994 Pacific Seabird Group Executive Council Meeting

The following is a summary of the proposed minutes of the Executive Council Meetings held on 25 and 27 January, 1994 in Sacramento, California. Anyone interested in a complete transcript of the meeting should contact secretary Vivian Mendenhall. A quorum was present at both sessions. The minutes of the previous meeting were approved.

Executive Council Matters

The new bylaws were presented and will go into effect at the end of the 1994 meeting. The council voted to disband the PSG 2000 Committee.

Treasurer's Report

Ken Warheit reported on financial matters of the group. He pointed out that even though we had more income than

expenses, very little money is available for use because much of it goes to the endowment fund. He recommended raising dues by \$5.00 and discussion of the pros and cons ensued. Tasker encouraged the group to raise dues in order to maintain a cushion of funds for emergencies. Coulter suggested 2 times the standard operating expenses as a good cushion. The council passed a motion to raise annual dues to \$20.00 with a rate of \$13.00 per year for students subject to approval by the general membership. Other methods of increasing income suggested included higher fees for meetings. Piatt called for suggestions on ways in which to allocate PSG funds for support of conservation projects.

Our exchange relationships with other groups were discussed and Bill Everett suggested that the Western Foundation be

the official repository for journals that we get.

We had over 450 members last year. This year 283 people paid their dues before notices were sent out. There are 49 life members and all but 4 are paid up. It was proposed to have a display and brochures to put out at meetings of other societies in order to attract new members. Rauzon and Sharpe were assigned to make a poster and brochures.

The group discussed the status of the endowment fund and how we are going to raise and spend money. Piatt proposed that we consult with a professional fundraiser to aid in generating enough money so we can start doing more for conservation and supporting students. The group was willing to spend some money to hopefully generate more money and will act on any proposals

to accomplish this. Members experienced in fundraising suggested that we would need to prepare a prospectus which would i) demonstrate what PSG has done historically, ii) outline plans for future projects, and iii) provide a financial statement to potential donors.

Divoky expressed the concern of some members that all the life memberships are going into a fund that can't be used for several years more. He suggested capping the endowment fund at \$50,000 instead of twice that. He also suggested allowing life members an option to put their money into a fund other than the endowment.

The group discussed the mechanisms and policy for spending money. Forsell moved that we follow the guidelines of letting the chair consult one other person on the council before spending \$500 or less, have a vote of all the officers if the amount falls between \$500 and \$1000, and have a vote of the entire council before spending over \$1000. The motion passed.

Beth Flint gave the secretary's report and suggested that if the officers all had electronic mail capability, more of the load on the treasurer could be shifted over to the secretary.

Meetings

Dan Anderson reported that 125 people had pre-registered so far and that they were expecting 175 by tomorrow. California Fish and Game subsidized the printing costs for the meeting. There was discussion about the costs of meetings and the advantages of less formal venues. Divoky called for someone to track meeting costs and keep files of former meetings for each local committee to use for those who need ideas and structure. Forsell mentioned that academicians fine late January a difficult time because it is the beginning of the term. Scott Hatch objected to having the meeting earlier because it would be too close to the Christmas holidays.

Bill Everett reported on plans for a meeting in San Diego in 1995. He said that the room costs would be high there but that it is less expensive to fly there than many other locations. He described the four finalist choices for a site and the group expressed a preference for the Catamaran Hotel on Mission Bay. The motion passed that we hold the meeting in San Diego next year; the dates of the meeting will be January 10-13. Suggestions for the year after

next include Vancouver, B.C.; Guaymas, Sonora; and Humboldt State, California.

Conservation Committee

Craig Harrison noted that the Conservation Committee report was available. He asked that the regional representatives start taking a more active role in conservation issues. The request from the Danish Ornithological Society for funding to save the last seabirds in the Philippines was discussed and the council voted to provide \$1000 to the project.

Publications

Steve Speich described his ideas for changes in the group's publication. Divoky asked that interests agree they could express themselves in the new forum section of *Pacific Seabirds*. Piatt thought that the conservation chair should at least run things by the chair and by all the officers for letters to people like the Secretary of Interior.

Standing Committees

The Marbled Murrelet Technical Committee made the White Paper on the Status of Marbled Murrelets available to the council. Steve Speich suggested we publish it as a Technical Paper. Malcolm Coulter moved that we thank Kim Nelson for all that she has done on behalf of the committee and the murrelet. The motion passed.

Divoky appointed Bill Everett as head of the Xantus' Murrelet Committee. The Xantus' committee recommended that we petition the US Fish and Wildlife Service to list the Xantus' Murrelet. The committee will prepare the petition.

Scott Hatch reported that the monitoring committee meeting had been well-attended. The next project that people committed to was to build a data set. The first species done will be the Common Murre with a focus on populations, productivity, and phenology. It was suggested that we attempt to develop a Memorandum of Understanding with the National Biological Survey to acquire some funding.

The Baja committee was not able to meet this year.

The Marine Waterfowl committee has requested that the U.S. Fish and Wildlife Service review the status of Eastern Harlequin Ducks.

International and Organizational Affiliations

Our Japan connection was made stronger with the visit of Harry Carter and Leah DeForest to Japan. The PSG will attempt to write letters supporting the funding of John Fries and Leigh Ochikubo to study in Japan.

Doug Forsell reported on the meeting of the Ornithological Council.

Malcolm Coulter reported on our membership in ICBP (Birdlife International).

*Minutes respectfully submitted by
Beth Flint, secretary*

1993 TREASURER'S REPORT

Included in this report are two annotated tables detailing the financial activities of the Pacific Seabird Group during the 1993 calendar year. These tables summarize the 1993 cash flow activities of the group, as well as our total assets as of 31 December 1993. Additional detailed and additional financial information is discussed below.

Income and Expenses

Our total gross income for 1993 was \$39,840.66, of which \$26,064.08 (65 percent) was generated by the 1993 (\$18,399.08) and 1994 (\$7,665.00) Annual Meetings. Because our annual meetings usually take place in January or February, associated income and expenses for each meeting are spread over a two year period. This meeting related income, and the expenses reported below are those associated with 1993 calendar year only. Complete accounting for the 1993 Annual Meeting was discussed in the 1993 Spring issue of the *Pacific Seabird Group Bulletin* (Vol. 20, Number 1, p. 31); the accounting for the 1994 Annual Meeting is described below. Regular and Life Membership dues accounted for an additional \$7,526.17 (19 percent) of income, while interest and dividend income from three accounts totaled \$3,117.47 (8 percent). Fund-raising income and sales of back issues of the *Bulletin* totaled \$3,132.64 (8 percent).

As with the total income, the majority of our 1993 expenses were associated with the annual meetings (\$18,498.61 or 60 percent). The 1993 Annual Meeting expenses totaled \$17,947.64, which was \$1,596.56

| CATEGORY | AMOUNT |
|---|--------------------|
| Income | |
| Annual Meeting Income (excluding membership dues, donations, and sales) | \$19,417.50 |
| Donations collected during meeting | \$2,048.00 |
| Membership Dues collected during meeting | \$855.00 |
| Sales: | |
| PSG Tote Bags | \$41.00 |
| Wm. Spear Pins | \$1,031.00 |
| PSG T-shirts | \$2,394.00 |
| Total Income | \$25,786.50 |
| Expenses | |
| Annual Meeting Expenses (hotel, catering, field trips, office supplies, etc.) | \$15,356.28 |
| Sales: | |
| Wm. Spear Pins | \$850.50 |
| PSG T-shirts | \$1,420.23 |
| Total Expenses | \$17,627.01 |
| Income over Expenses | |
| Annual Meeting | \$4,061.22 |
| Donations | \$2,048.00 |
| Membership Dues | \$855.00 |
| Sales: | |
| PSG Tote Bags | \$41.00 |
| Wm. Spear Pins | \$180.50 |
| PSG T-shirts | \$973.77 |
| TOTAL | \$8,159.49 |

PACIFIC SEABIRD GROUP BALANCE SHEET
31 December 1993

| Account | 1993 | 1992 |
|---|--------------------|--------------------|
| Assets | | |
| 1993 Local Committee | | \$2,579.85 |
| 1994 Local Committee | \$6,793.80 | |
| Bulletin Account | \$353.08 | \$1,501.73 |
| Checking Account | \$5,560.08 | \$4,493.33 |
| ¹ United Kingdom Savings Account | \$428.06 | \$320.69 |
| Dean Witter—Savings | \$7,058.69 | \$7,347.02 |
| ² Dean Witter—Endowment | \$45,524.91 | \$38,521.85 |
| ³ Total Assets | \$65,718.62 | \$54,764.47 |
| Liabilities & Equity | | |
| ⁴ Liabilities | \$2,500.00 | \$0.00 |
| Equity | \$63,218.62 | \$54,774.33 |
| ³ Total Liabilities & Equity | \$65,718.62 | \$54,774.33 |

¹The United Kingdom account is managed by Mark Tasker and is used for deposits of membership dues paid in pounds. A conversion rate of US\$1.00 = £0.67 was used to calculate amount in dollars. The 1992 and 1993 closing balances equaled £214.86 and £286.80, respectively.

²Total reflects actual dollar amount deposited or interest earned at the time of deposit. Deposits are made by purchasing shares, the dollar value of which fluctuates with the market. On 1 January 1993 we had 4,056.692 shares at \$9.30 per share (\$37,727.23). On 31 December 1993 we had 4,799.782 shares at \$9.31 per share (\$44,685.97).

³Does not include the Pacific Symposium Account. See Pacific Seabird Group Bulletin (1993: Vol. 20, Number 1)

⁴\$2,500.00 allocated to publish the 1993 Marbled Murrelet Symposium

PACIFIC SEABIRD GROUP CASH FLOW REPORT
1 January - 31 December 1993

CASH FLOW REPORT
Footnotes

| Category | Income |
|--|--------------------|
| 1 1993 Annual Meeting (registration, etc.) | \$16,351.08 |
| 1993 Annual Meeting (raffle & auction) | \$2,048.00 |
| 2 1994 Annual Meeting (registration) | \$7,665.00 |
| Fund Raising: T-shirts | \$2,184.00 |
| Fund Raising: Glassware | \$615.94 |
| 3 Fund Raising: Slide-exchange profit | \$322.70 |
| 4 Gross Sales | \$10.00 |
| Interest Earned (checking accounts) | \$102.74 |
| Income Dividend (Dean Witter - Savings) | \$211.67 |
| Income Dividend (D. Witter - Endowment) | \$2,803.06 |
| 5 Membership Dues | \$6,446.47 |
| Life Membership | \$1,080.00 |
| Total Income | \$39,840.66 |
| | |
| Expenses | |
| Bank Charges | \$34.05 |
| Bulletin | \$4,194.08 |
| Ornithological Council Dues | \$250.00 |
| ICBP Dues | \$200.00 |
| Officer's | \$1,830.91 |
| 1 1993 Meeting Expenses | \$17,947.64 |
| 2 1994 Meeting Expenses | \$550.97 |
| 6 Fund Raising: T-shirts | \$3,428.38 |
| Fund Raising: Glassware | \$515.02 |
| 7 Grants | \$1,974.90 |
| Taxes | \$5.00 |
| Total Expenses | \$30,930.95 |
| | |
| Total Income over Expenses | \$8,909.71 |

¹ Includes only the 1993 income and expenses associated with the February 1993 Annual Meeting. See *Pacific Seabird Group Bulletin* (1993: Vol. 20, Number 1) for complete financial information about the 1993 Annual Meeting. Income excludes membership dues, donations, or fund raising moneys. Expenses excludes all fund raising expenses.

² Includes only the 1993 income and expenses associated with the January 1994 Annual Meeting. See discussion of annual meeting above for complete financial information about the 1994 Annual Meeting. Income excludes membership dues, donations, or fund raising moneys. Expenses excludes all fund raising expenses.

³ See *Pacific Seabird Group Bulletin* (1993: Vol. 20, Number 1) for complete accounting for slide-exchange income.

⁴ Sales from back issues of bulletin

⁵ 1993 and 1994 membership dues collected during 1993 (includes dues collected as part of 1993 annual meeting registration - number estimated because accounting did not distinguish between 1992 and 1993 payments).

⁶ \$1,420.23 of the \$3,428.38 T-shirts expenses are associated with the 1994 Annual Meeting

⁷ Japanese Murrelet initiative. See *Pacific Seabird Group Bulletin* (1993: Vol. 20, Number 2) for details.

more than the 1993 Annual Meeting non-donation/raffle income (e.g., money from registration). Fund raising activities also ran a deficit in 1993, with expenses totaling \$810.76 more than income. However, because fund-raising expenses usually involve the production of goods such as T-shirts, the expenses should be spread over the years in which the goods are sold. For example, \$1,420.33 of the \$3,428.38 fund-raising expenses were due to the 1993 production of T-shirts sold during the 1994 Annual Meeting; \$1,420.33 in expenses in 1993 produced \$2,394.00 in income in 1994 (see discussion of 1994 Annual Meeting below). Pacific Seabird Group's standard operations also ran a deficit in 1993. Standard operating expenses, including the production of the Bulletin, Officer's expenses, bank charges, taxes, and organizational membership dues (e.g., ICBP) totaled \$6,514.04, which was \$67.57 more than the income generated from membership dues. Additional income generated from the raffle and auction during the 1993 Annual Meeting and interest and dividends earned from our checking and savings accounts offset this deficit, and enabled PSG to fund the Japanese Murrelet Initiative (see *Pacific Seabird Group Bulletin* (Vol. 20, Number 2)). If the income and expenses associated with the 1994 Annual Meeting are subtracted from the respective totals (see Cash Flow Table below), the Total Income over Expenses in 1993 was \$1,795.68.

Membership

Year-end calculations of membership totals are somewhat misleading in that membership for any given year is paid over a two year period. In other words, 1993 members paid their dues over a period from late 1992 (when dues notices were first mailed) to fall 1993. Likewise, 1994 members paid their dues from December 1993 through Spring 1994 (and payments are still trickling in). Therefore, the membership dues presented in the 1993 cash flow report reflect both 1993 and 1994 memberships. As of 9 May 1994 our total paid membership was 444, of which 45 are Life Members paid in full, 4 are Life Members not paid in full, 314 are Individual Members, 41 are Student Members, and 40 are Family Members (20 families). Of these 316 Individual and 39 Student Members, 32 and 21, respectively, joined during the 1994 Annual Meeting in Sacramento. Of the 81 members in arrears

as of 9 May 1994, 47 or 58 percent joined in 1993. Finally, 54 institutions worldwide receive the *PSG Bulletin*, of which 25 are paid subscriptions, 19 are journal exchanges, and 10 are goodwill gifts.

Annual Meeting

The 1994 Local Committee produced a scholarly, enjoyable, and remarkably profitable meeting in Sacramento. Frank Gress provided an exceptionally organized and detailed accounting of the income and expenses associated with this meeting, and I thank him for saving me hours of work. A detailed look at the income and expenses resulting from the 1994 annual meeting is as follows (income and expenses for this meeting occurred during fiscal years 1993 and 1994, and therefore will be reflected in both this and next year's Treasurer's report):

Endowment Fund

On 31 December 1993 PSG owned 4,799.782 shares in the Dean Witter U.S. Government Securities Fund. At \$9.31 per share, our year-end 1993 Endowment Fund principle equaled \$44,685.97. This is an increase of \$6,958.73 over year-end 1992 (\$37,727.23: 4,056.692 shares at \$9.30 per share). \$2,803.06 of the \$6,958.73 increase was income dividend, giving us a yield of 7.43 percent on our investment. Unfortunately, because our endowment is invested in a bond-associated mutual fund, its total value will fluctuate with the bond market, which has declined over the past several months. On 6 May 1994 Dean Witter U.S. Government Securities Fund was valued at \$8.64 per share. The same 4,799.782 shares worth \$44,685.97 on 31 December 1993 is now worth \$41,470.12 - a decline of \$3,215.85 or over 7 percent of the total value of the endowment. Perhaps PSG should consider diversifying its endowment portfolio.

Ken Warheit, Treasurer

Report of the Xantus' Murrelet Technical Committee

Xantus' Murrelets *Synthliboramphus hypoleucus* are small (average 167 grams) black and white alcid that breed on a few islands off the coast of Southern California and most of the islands off of the west coast of Baja California. They nest in crevices or

under bushes, lay a typical clutch of two eggs and produce precocial young that go to sea within several days of hatching. During the non-breeding season, Xantus' Murrelets typically range as far north as Northern California and at least as far south as Cabo San Lucas, Baja California.

Although the species is frequently encountered at sea, surprisingly little is known about its natural history or ecology. Most of the data on breeding biology comes from studies done at Santa Barbara Island, one of the smallest of the Southern California Channel Islands. Up to 95% of the Xantus' Murrelets known to breed in U.S. territory do so on Santa Barbara Island, which is controlled by the National Park Service and is part of the Channel Islands National Park.

At the 1992 PSG meeting in Oregon the question was raised regarding the status of the species. Indeed, the U.S. Fish and Wildlife Service has included the northernmost of the two races of Xantus' Murrelet (*S.h. scrippsi*) as a candidate (Category 2) for the endangered species list. This category includes species for which listing as endangered or threatened may be appropriate, but information on biological vulnerability is not currently available to support endangered listing status. The overwhelming majority of birds breeding on Santa Barbara Island are *scrippsi*, but at least one either nominate race (*S.h. hypoleuca*) or intermediate individual has been recorded there. The taxonomy of the species is complex and dynamic, and not entirely clear.

Since there was a great deal of concern expressed at the 1992 meeting, the PSG Conservation Committee suggested that a group of interested and knowledgeable persons convene to investigate the species' status, consider pertinent issues, and report back with findings and recommendations. Thus the Xantus' Murrelet Technical Committee was born, and has spent much of the last two years collecting data and discussing a wide range of topics and questions.

One of the problems facing the committee was a lack of reliable population status information, especially for the Baja California breeding colonies. Although it is likely that the majority of Xantus' Murrelets breed there, estimates of the population size (10,000 to 20,000 individuals) are guesses at best, and most of the breeding colonies are also inhabited by introduced predators. No studies have been done in

Mexico to assess population trends or impacts of feral animals.

At Santa Barbara Island, Harry Carter estimated a 1992 breeding population of about 1,700 individuals, substantially fewer than the 4,400+ estimated by George Hunt's team in the mid 1970's. In addition, Charles Drost's studies have shown that native mice annually destroy significant numbers (up to 44%) of eggs, and Barn Owls annually take large numbers of Xantus' Murrelet adults (up to 10%) on Santa Barbara Island.

The committee determined that a wide variety of other real or potential threats face Xantus' Murrelets throughout their range, including oil spills, rat introductions, commercial fishing operations, loss of breeding habitat through erosion or vegetation changes, and military sonic or weapons testing (to name a few).

After thorough consideration, the committee concluded that sufficient information was now available to warrant an upgrade of the status of the species to either threatened or endangered. Upon their recommendation at the 1994 meeting, the Executive Council of PSG directed the committee to prepare appropriate documentation (a "listing package") to submit to the U.S. Fish and Wildlife Service in the form of a formal petition to request the change in status.

It is unlikely that the listing of Xantus' Murrelet will cause the level of controversy associated with the Marbled Murrelet issue, and we hope that the net result of listing will be not only much-needed efforts to answer many questions about the species' status, but ultimately a secure future for this rare and unique seabird.

William T. Everett

Report of the Seabird Monitoring Committee

The Seabird Monitoring Committee now has representatives from all the intended regions of the North Pacific. During the year, we were pleased to recruit the cooperation of two colleagues from the Asian side. Representing China is Dr. Lu Jianjian from the Institute of Estuarine and Coastal Research, East China Normal University, Shanghai, and from Japan we have Dr. Yutaka Watanuki, Laboratory of Applied Zoology, Hokkaido University, Sapporo. Dr. Watanuki attended the annual

meeting in Sacramento, so many PSG members have already met him.

The seabird monitoring database is becoming a reality. During this past year, the Alaska contingent developed a prototype version of the database using Foxpro data management software. The system thus far consists of 11 relational files and some basic report generating routines. As a pilot effort, we entered all monitoring data from studies conducted in 18 years (since 1956) on Middleton Island, north-central Gulf of Alaska. The Middleton data probably are fairly typical in terms of quality, complexity, and accessibility, and they present most of the inconsistencies and problems that arise in trying to develop a standardized data entry and retrieval system. Various members and friends of the Seabird Monitoring Committee were able to critique and improve the system during a productive session at the Sacramento meeting.

The group decided to follow up with additions to the database from around the North Pacific during the coming year. To get things rolling, we decided to focus on Common Murres, because of their wide distribution and general interest in their utility as an indicator species. Contributors from California, Oregon, Washington, Alaska, and Russia will collate data on three parameters of murre population biology—numbers, productivity, and breeding chronology. Participants from Hawaii, British Columbia, and Japan have offered to work with data for other species such as Red-tailed Tropicbirds, Ancient Murrelets, or Rhinoceros Auklets.

Through these efforts, the Committee hopes to demonstrate convincingly the value of this approach and, within the next several years, to set the whole process in motion.

Scott A. Hatch

Report of the Marbled Murrelet Technical Committee

As your new coordinator I would like to say "hello" and to remind you that the MMTC's strength lies in the expertise and ideas of its members. I would appreciate hearing from you about tissues that need addressing, directions you would like to see the committee take, how I can best serve you as the coordinator of your committee,

and any other ideas you might have. We are working to make the transition between coordinators as smooth as possible. However, if you feel that you have been lost in the shuffle, please let me know.

In the past, updates on research activities on Marbled Murrelets have been summarized in this section of *Pacific Seabirds*. To avoid duplication, these updates will now appear in "Regional Reports." We will save this space for interesting findings and research results.

Proposed Designation of Critical Habitat for the Marbled Murrelet

The U. S. Fish and Wildlife Service (USFWS) recently requested comments on "Proposed Designation of Critical Habitat for the Marbled Murrelet" (Federal Register, Vol. 59, No. 18, pp. 3811-3824). Comments were submitted on behalf of PSG and the MMTC. A brief summary of these comments follows, and copies of the full response are available upon request.

Our main concerns were that 1) designation of critical habitat was proceeding without full use of available information, 2) there was no attempt to designate critical marine habitat, and 3) breeding areas in federal parks and wilderness areas, and state and private lands were not being designated as critical habitat. We also noted that some of the facts presented under "ecological considerations" were outdated or incorrect.

Publication and Report Updates

The following revised versions of PSG protocols are currently available:

- Methods for surveying for Marbled Murrelets in forests: a protocol for land management and research. C. J. Ralph, S. K. Nelson, M. M. Shaughnessy, S. L. Miller, and T. E. Hamer (compilers).
- Guidelines for collecting data at Marbled Murrelet nest trees or landing trees. T. E. Hamer (compiler).
- Techniques for finding tree nests of the Marbled Murrelet. N. L. Naslund and T. E. Hamer (compilers).

Publications of the proceedings of the 1993 Marbled Murrelet Symposium (S. Kim Nelson and Spencer Sealy, editors) is moving along on schedule. The proceedings will be published in the second issue (1994) of *Northwestern Naturalist*.

Marbled Murrelet Recovery Team

The Marbled Murrelet Recovery Team has been meeting since February 1993. Members of the team include Gary Miller (leader), USFWS; Steve Beissinger, Yale University; Harry Carter, National Biological Survey; Tom Hamer, Hamer Environmental; Dave Perry, Oregon State University; and Blaire Csuti, University of Idaho. The team began by focusing on Critical Habitat designation and its role in the recovery planning process. The draft Critical Habitat proposal was complete by USFWS staff. The team has also established a process for accomplishing the goals and objectives set by the Regional Director, written the recovery goals and objectives, and begun to write the draft Recovery Plan. The final draft plan should be ready for release this summer.

Nancy Naslund, Coordinator

Welcome your New MMTC Coordinator

I resigned as Chair of the MMTC at the PSG Annual Meeting in Sacramento. Nancy Naslund of the USFWS is replacing me as the new MMTC Coordinator (the Chair is now referred to as Coordinator). Nancy has a M. S. degree from the University of California, Davis and has been working with Marbled Murrelets since 1988. She has been a member of PSG since 1981 and active in the MMTC since 1989. Please join me in welcoming Nancy as your new MMTC Coordinator.

S. Kim Nelson

Summary of the 1994 MMTC Meeting

The Marbled Murrelet Technical Committee met on 25 January, 1994. In the morning session the committee discussed the Inland Survey Protocol. A presentation on recommended changes to the protocol was presented by Steve Courtney, Jill Bowling, and Neal Wilkins. In addition, Mike Horton from the USFWS presented the Service's recommendations for protocol modification. A discussion by the group followed. In the afternoon, MMTC subcommittees met to address specific protocols and topics of concern. Subcommittee meetings included the following groups: Inland, Education, Research Priorities, At-Sea Captive Care, and Vocalization.

S. Kim Nelson

Nancy Naslund New Coordinator for MMTC

Kim Nelson stepped down from the chair of the Marbled Murrelet Technical Committee (MMTC) this year, after a period of major growth for one of PSG's most active committees. During the period that saw national attention focus on the Marbled Murrelet, Kim made sure that PSG remained in the forefront of the discussions on the status and conservation of this species.

Nancy Naslund has been selected to replace Kim as the new coordinator of the MMTC; she brings to the position a diverse background in conservation and seabird research. Nancy began working on seabirds as an undergraduate at UC Santa Cruz (UCSC) where she conducted a study on the reproductive biology of Least Terns in San Francisco Bay and assisted with censusing of other waterbird colonies. Throughout the early 1980s her main interest was in raptors. She was an active member of the Predatory Bird Research Group at UCSC; conducting extensive studies on Peregrine Falcons in the wild and assisting with the care of captive falcons. Among other duties, she wrote assessments for reintroduction of the Bald Eagle in northern and central California and summarized habitat characteristics of the California Condor for the California Condor Recovery Team and the Peregrine Fund. Her experience with captive birds expanded with her involvement with Native Animal Rescue, and Nancy has personally cared for many hundreds of abandoned chicks, as well as injured and oiled birds comprising dozens of different species. Throughout the 1980s, Nancy assisted with an on-going bird banding study at Younger Lagoon, mist-netting and banding land birds, among other things. For this project, she developed and conducted a study on multi-seasonal associations between land birds

and habitat characteristics.

Nancy's focus on seabirds returned in 1988, when she spent part of a season on Midway Island assisting with a study on the reproductive biology and behavior of Red-tailed Tropicbirds. Returning to California, she spent the summer studying Marbled Murrelets at inland forest sites for the US Forest Service. From 1989 to 1991, Nancy designed and conducted a graduate research study on the breeding biology and at-sea distribution of Marbled Murrelets in central California. This culminated in the completion of her M.Sc. thesis in the Department of Marine Biology, UCSC, in 1993. In 1991, Nancy moved to Alaska and worked for the U.S. Fish and Wildlife Service on studies of Marbled Murrelets on Naked Island, Prince William Sound. These studies included inland and at-sea surveys and documenting nest stand and nest-tree characteristics. Other alcid studies she has participated in include field research on Cassin's Auklets and Murres on the Farallon Islands (1990), Tufted and Horned Puffins in the Aleutian islands (1991-1992), Xantus Murrelet on the Channel Islands (1992), and Kittlitz's Murrelets in Alaska (1993).

Nancy has been an active member of the Pacific Seabird Group since 1982, and was local chair for the 1991 PSG Annual Meeting in Monterey, California. Nancy has been an active member of the Marbled Murrelet Technical Committee (MMTC) since 1988, where she has been particularly involved with developing MMTC guidelines for nest-searching and protocols for captive care. She currently serves as a Science Team member for the Washington Department of Natural Resources Habitat Conservation Plan.

Elections Committee Report

Congratulations to the following newly elected officers and regional representatives. Thanks to all who were willing to run for an office and donate their time to the Pacific Seabird Group.

Officers

Chair-elect: Mark Rauzon
Secretary: Vivian Mendenhall

Regional Representatives

| | |
|---------------------|---------------|
| Alaska and Russia | Dave Irons |
| Canada | Tony Gaston |
| Washington/Oregon | Roy Lowe |
| Northern California | Jean Takekawa |
| Southern California | Pat Baird |
| Non-Pacific | |
| United States | James Lovvorn |
| Pacific Rim | Ken McDermond |
| Old World | Mark Tasker |

Mark Rauzon, Chair-elect of PSG's Executive Council, will be program chair for the San Diego meeting in January 1995 and will assume the duties of Chair at the end of that meeting. Mark has been a PSG member since 1975 and has conducted research at widely scattered locations over the past two decades. He was initiated into seabird research in 1975 in Alaska as part of the federal government's OCSEAP exercise. In the early 1980s Mark worked on the Hawaiian Islands as an assistant refuge manager for the Hawaiian and Pacific Islands National Wildlife Refuge where, in addition to many other duties, he studied the reproductive biology of tropical seabirds. His master's degree was obtained from the University of Hawaii with his thesis addressing the effects and eradication of feral cats on Jarvis Island. In the late 1980s he returned to the mainland where, as an environmental consultant, he has studied cormorants breeding on bridges and the status and trends of wildlife in the San Francisco estuary. His continued involvement with Pacific Island seabirds includes research on the Hawaiian Stilt and the problems of feral cats. In addition to his research and management activities Mark is an artist whose work has frequently appeared in *PSG Bulletins* and in the eleven popular books he has written on natural history.

1995 Annual Meeting to be held in San Diego

The 22nd Annual Meeting of the Pacific Seabird Group will be held in San Diego, California on January 10-13, 1995. The meeting will include general papers and a symposium on Island Restoration and Seabird Enhancement.

Symposium papers are invited for the following topics:

- Population Assessment
- Predator Control
- Vegetation Management
- Legal Perspectives
- Resource Protection/Oil Spill Prevention Planning
- Oiled Bird Cleanup/Cost Effectiveness
- Habitat Rehabilitation
- Recolonization/Attraction Studies
- Genetic Studies
- Captive Breeding

This symposium will address methods and strategies for restoring/reviving threatened seabird populations throughout the world, especially in Mexico, Alaska, Japan, and New Zealand. Speakers will be invited to attend from these regions. If PSG receives a grant from the United States Fish and Wildlife Service to host twenty-five Mexican professionals and students, we will attempt to make training monies available to a few invited participants recognized as experts in their fields of "restoration."

The meeting will be held at the Catamaran Resort Hotel situated on Mission Bay in north San Diego. The beach is one block away and rooms have beach or bay views. Discount room rates were negotiated for the period of 9-13 January, 1995. Rates are \$89 per night for a single, \$99 for a double, and \$15 per extra person. Almost half of the rooms come equipped with a kitchenette. Food is available at the hotel and other inexpensive eateries in the immediate vicinity.

Airfare to San Diego is relatively inexpensive—add the delicious and inexpensive South of the Border cuisine and you have a working vacation that features ocean, sun, and balmy weather.

Field trips to the Anza Borrego Desert, the Salton Sea, and the Coronados Islands will make this a memorable PSG meeting. A complete announcement and call for papers will be mailed in late summer. For more details about the program, contact the program chair, **Mark Rauzon, 510-531-3887**. For information concerning logistics or volunteering, contact **William Everett, chair of the local committee, 619-589-0480**.

Nominations Sought for 1995-1996 Officers

Due to the reorganization of the regions and subsequent election of all the regional representatives last year, nominations are being sought for only three offices to serve for 1995-96 terms. These offices are Chair-Elect, Vice-chair for Conservation, and Treasurer.

If you are interested in becoming an officer of PSG please nominate yourself. If you would like to nominate a PSG member

for one of the positions send the name and phone number of the nominee to **Doug Forsell, PSG Elections Committee, 6 Arlie Dr., Annapolis, MD 21401**, or phone Doug at 410-224-2732 during the day or 410-626-8486 evenings. All nominations, must be received by 30 July.

Karl W. Kenyon Receives Lifetime Achievement Award

The Inaugural Lifetime Achievement Award, presented at the 1993 Annual Meeting of the Pacific Seabird Group, went to Karl W. Kenyon for his pioneering work on Aleutian and Hawaiian avifauna. Kenyon's contribution to Pacific seabirds spans seven decades and greatly advanced the understanding of the ecology of Pacific seabirds.

Karl Walton Kenyon was born in 1918 in La Jolla, California. As a youth he roamed San Diego County. He and a friend had a small boat and they caught and sold seafood to the neighbors. His friend went on to become the famous oceanographer Townsend Cromwell. Karl and another friend collected bird eggs. He once climbed a tall eucalyptus tree to get Great Blue Heron eggs. When he was halfway up, the land owner pulled up in a fancy car and called him down. The land owner was Bing Crosby.

Kenyon attended Pomona College from 1936 to 1940. He then entered Cornell University where he earned a master's degree studying Baltimore Oriole nest site selection.

Drafted in WWII, he served as a Navy fighter pilot. Karl strafed and bombed in the Pacific theatre, supporting landings in the Marshall and Gilbert Islands, as well as in New Guinea, Saipan, Guam, Rota, and Leate, Philippines where he was shot down and rescued at sea in 1944. In total, he flew 97 combat flights.

Two events during Kenyon's youth were particularly important to him. While in school, Karl visited Peru by steamer in 1938 with his professor, who got sick and was unable to accompany Karl on his tour. Left to his own devices, he visited the seabird colonies and climbed a volcano, which nearly cost him his life. After the war, Karl bought a sailboat and sailed down the Baja coast with his friend, a feat not casually repeated even today. These two experiences set a pattern for his life's work. Both were risky and both provided new and important data. Karl published several important papers from his experiences and his impeccable field notes are invaluable today.

Bing Crosby had another impact on Karl's life when he mentioned on the radio

that the Navy was killing albatross on Midway Island. Kenyon, who was working for Vic Scheffer with the Bureau of Sport Fisheries and Wildlife, was immediately dispatched to the island to address the problem of birds flying into aircraft. When he arrived on Midway Island, the Commanding Officer asked "When do we start the kill, Karl?" The CO of the base thought Karl's presence was a tacit go-ahead to kill the nuisance birds. To teach a lesson to the CO, Karl allowed a small kill on a triangle where the runways met. As birds were killed others kept coming in to replace them. Dead bodies were dumped at sea but floated ashore and had to be picked up from the beach. Karl then recommended moving the dunes 300 feet back from the runway in order to place the soaring birds out of harm's way. The albatross would lose altitude over dunes instead of over the runway. The work cost millions of dollars but it worked.

Kenyon was one of the first biologists to document the aircraft/bird hazard situation. Other examples of his pioneering efforts include one of the first beached bird surveys in San Diego County, published in the *Condor* 1943 (K. W. Kenyon. 1943. Birds found dead on beach. *Condor* 45 (2), 76.) and the first observation of plastics

impacting the marine environment. He published an article in the *Auk* in 1959 indicating that Laysan Albatrosses swallow indigestible material (K. W. Kenyon and G. Kridler. 1969. Laysan Albatross swallow indigestible matter. *Auk* 86(2), 339-343.). But his most famous paper concerns the homing ability in Laysan Albatrosses. This paper, published in 1958 (K. W. Kenyon and D. Rice. 1958. Homing ability of Laysan Albatross. *Condor* 60(1), 3-6.), describes an experiment in which albatross were flown to Pacific Rim air stations and released. The short amount of time that it took the birds to return to their nests on Midway is an oft-repeated fact in popular literature on bird movements. With Dale Rice, Kenyon co-authored the seminal work on the breeding, distribution, and life history and population of the North Pacific albatrosses and the breeding cycle and behavior of Laysan and Black-footed Albatrosses (K. W. Kenyon and D. Rice. 1962. Breeding distribution and life history and population of the North Pacific albatrosses. *Auk* 79(3), 365-386.).

Kenyon was also the first to do major work on Steller's sea lions, northern fur seals, and other ice seals and walrus, Alaskan sea otters, and Hawaiian monk seals. In 1972, his paper, "Man Verses the Monk Seal," alerted the world to the plight of the monk seals (K. W. Kenyon. 1972. Man versus the monk seal. *Journal of Mammalogy* 53(4), 687-696.). He pronounced the Caribbean monk seal extinct in 1977, based



on extensive surveys (K. W. Kenyon. 1977. Caribbean monk seal extinct. *Journal of Mammalogy* 58(1), 97-98.).

Kenyon had three offers to move to Washington, DC but choose not to. He retired in 1973, a year after the Marine Mammal Protection Act was enacted, citing too much paper work needed "yesterday." Today he pursues conservation work and world travel. As an environmentalist, Kenyon is trying to stop the bombing of Sea Lion Rocks in Washington, a target he himself bombed during his "top gun" years. His photographs grace many books and his sea otter photos are particularly well known. His Red-legged Kittiwake photo is the sole photo in the bird skin collections at the Smithsonian Museum of Natural History. He is also an accomplished watercolorist and oil painter.

Kenyon's contributions have been acknowledged in various ways. Bogoslov Island features Kenyon's Dome, a prominence named by G. Vern Byrd (G. V. Byrd et al. Changes in bird and mammal populations on an active volcano in Alaska. *Murrelet* 6, 50-62.). A subspecies of northern sea otter (*Enhydra lutris kenyoni*) was named after him in 1991 by Don Wilson. Perhaps the greatest honor was bestowed by Doug Siegel-Causey. A species was named in honor of Karl because of a complete skeleton he collected in 1959 (D. Siegel-Causey. 1991. Systematics and biogeography of North Pacific shags, with a description of a new species. *Univ. Kansas Mus. Nat. Hist. Occas. Pap.* 140, 1-17.). The skeleton was thought to be a Pelagic Cormorant, but morphometric measurements found it to be smaller than all other cormorants and, thus, a new species—Kenyon's Shag (*Stictocarbo kenyoni*), described in 1991.

The Inaugural Lifetime Achievement Award was presented to Karl at the banquet by his first boss, Vic Scheffer, whose long and productive career as a marine mammalogist includes pioneer work throughout the Aleutians in the Thirties and authoring the critically acclaimed *Year of the Whale* and *Year of the Seal*. Bill Everett and Mark Rauzon also provided background and commentary. Few have as rich and varied credentials as Kenyon, so it is fitting we inaugurate this award with him.

Mark Rauzon

PACIFIC SEABIRD GROUP GOES TO JAPAN: PART 2 (IZU ISLANDS)

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(This account of two PSG biologists' trip to Japan to help develop better PSG ties with Japanese biologists and to initiate joint efforts for the study and conservation of the very rare Japanese Murrelet is continued from PSG Bulletin 20(2):14-17.)

23 April 1993

The renewed rumbling of the ferry indicated that we were again underway after stopping at Oshima Island. Quiet rustlings of passengers getting up to disembark had woken me earlier. Now, it was 06:00 hours and it must be light outside. Time to see the famed Izu Islands, home of the Japanese Murrelet. I skulked past sleeping bodies and slipped up the stairway. But the cold coffee dispensers and rice crackers beckoned before I could make it onto the deck. The dome shape of Oshima Island lay behind us and Niijima Island lay ahead. These were large, forested islands with little apparent nesting habitat for seabirds, save for large cliffs along shore. I found Ueta conducting a bird survey from the upper deck. He had awakened earlier. Streaked Shearwaters were passing by constantly but that was it. By 08:00 hours, we were joined by Leah and Hasegawa who looked as tired as I felt. We passed by two smaller, rocky, unpopulated islands (Toshima and Udone) which looked more promising for nesting seabirds. Japanese Murrelets may nest there but had not been properly documented yet, we were told. They appeared to be somewhat accessible by boat although portions were very steep. As we approached Niijima Island, Ueta pointed out that murrelets had been found nesting at Cape Neuki (the northern tip of

Niijima). This point looked very steep and difficult to access. We entered a small harbor on the east side and tied up to a long wharf to unload. Like Oshima, Niijima was a large island with a substantial human population. Several people, including surfers with boards, and pallets of materials were off loaded. Off the harbor, there were a few small islands which probably used to host nesting seabirds but no longer did due to human disturbance. I wondered how long ago these islands had been occupied. Japanese and Pelagic cormorants roosted on the pier and fed nearshore. We headed a short distance south off the east side of Niijima to Shikine Island where murrelets historically bred but could no longer be found in the early 1970's. Shikine had also been extensively developed, including a large and well-protected harbor. Murrelets would have nested on mainland bluffs here since there were no offshore rocks. A Black Kite soared over the harbor. After a short stop, we continued south towards Kozushima (or Kozu Island). Off the south end of Niijima, we saw Hanshima Island, a known murrelet nesting island. This island looked like a cake with very steep sides and a more level top which looked difficult to land on. In the distance ahead, we could see Kozushima, with Tadanae Island (the murrelet colony we planned to visit) off the west side and Onbase Reef off the east side. Gus van Vliet had sent me some old notes of Jack Moyer's (sent to Bob Storer along with collected specimens for the University of Michigan) where Moyer had found nesting murrelets on Onbase Reef in the 1950's. Ueta was not aware that murrelets ever nested there. Streaked Shearwaters still passed by constantly, flying to the southeast.

We landed at the harbor on the west side of Kozushima at 09:30 hours. We lugged our gear off the ferry and all hopped into a very, small truck driven by a spry older man who owned the Japanese inn (or "minshuku") where we would stay called Minshuku Mansaku-maru, after the name of the fishing boat they also operated. Kozu is well known for recreational fishing. Many fishermen from all walks of life come here

to fish. They are dropped off from fishing boats onto remote peninsulae or offshore rocks where they fish with rod and reel all day. They are then picked up and returned to the minshuku for overnight. A pretty nice package deal! We wound our way up the almost empty, narrow streets until we were above the town. We were welcomed warmly by the owner's wife at the door. Hasegawa had been coming here for years and they were old friends. We took our gear upstairs to the two small rooms we would share, covered in straw mats with mattresses in the closet to be pulled out for sleeping. I opened the window to an incredible view of Onbase Reef through a maze of cherry blossoms. Shortly, we were ushered downstairs to breakfast. In the common eating room, there was a long table already set with wonderful array of food: saba (mackerel) fish, miso soup with limpets, pickled cabbage salad, rice with raw egg and soy sauce, carrots, dried mushrooms, deep-fried tofu and tea. We were served by the owner's wife who we were instructed to refer to as "obasan" (or aunt). The owner or "ojisan" (uncle) mended his twine nets in the next room. These were used for catching flying fish.

Full and refreshed, we set out spend the rest of the day exploring Koze Island. By now, it was very windy and we would try to travel to Tadanae in the morning. Hasegawa left to conduct snake work while the three of us were driven to the base of the highest hill on the island. We started up an incredibly steep path through light brush. Soon, we were into a recently burnt-over area as we found ourselves climbing into the fog which obliterated our amazing view of the island, town and Onbase Reef. We pushed on to the top even though the strong wind and fog prevented birdwatching. We hiked to Sendai Pond and then decided to walk down to the east side of the island. Partway down, we entered forest but few birds were seen. Overall for the day, we saw Varied Tit, Brown-eared Bulbul, Siberian Meadow Bunting, Ijima's Willow Warbler (heard only), Jungle Crow and White-rumped Swift. We ended up at the harbor on the east side and had a closer look at Tadanae. On our way back to the main town, we passed by some ancient ruins hidden in the deep forest. Mr. Ueta translated some inscriptions which told something of how a samurai lost a captive bull. Suddenly, I realized that the path we walked

on had been used for many, many centuries.

On our return, we went to a store to shop for food to take with us for camping on Tadanae. Both Japanese and California oranges were bought (for comparison), ramen noodles, sauce for rice and fish wieners. Passed by some caged birds (Great Tits and Bush Warblers) as we walked through the streets. For dinner at the minshuku, we had cold marinated white fish, clear soup with fish pieces, sashimi ("katsuo") and various side dishes (or "okazu"). (Excuse my fascination with Japanese food but I enjoyed it so much that it made a great impression on me). We relaxed for a short while before being rounded up and taken down through town and out to the Japanese bath and hot springs or "onsen". The men and women separated. We first washed up, followed by soaking in three different pools and trying several different shower-spray devices. By the end of this, I was red jello. I went back to get dressed but was motioned to come outside to more cement pools beside the ocean and under the stars. There, Leah languished under a small waterfall. We were both feeling like the world could not be better. I couldn't resist a quick swim in the ocean, in true nordic tradition. Ueta joined me. Afterwards, Hasegawa called to us to join him in the small pool, built on top of a the large rock. We were all unable to move, like macaques. A Streaked Shearwater cruised by in the lights.

24 April 1993

We woke up briefly to find out that it appeared too windy to go to Tadanae. After more sleep, Leah and I talked and talked about Japanese Murrelets, PSG and our Japanese colleagues. We had breakfast after Ueta and Hasegawa returned from their dawn work on Koze. Hasegawa had brought examples of snakes for us to see including the species that preys on murrelet eggs. These ones were about two feet long and much smaller than the ones on Tadanae. At breakfast, we found out that the wind had subsided enough for us to take a boat trip around Tadanae to count birds on the water and possibly attempt to go ashore. We looked at maps and discussed the work to accomplish there: 1) to find and measure snakes; and 2) to find as many Japanese Murrelet nests as possible since only one nest had been found in 1992. We scrambled

to get our gear together and were whisked over to the harbor on the east side of Koze by 09:30 hours. We stepped onto a fishing boat along with ojisan and his son. Most boats in the harbor had the same interesting design with an extended catwalk off the bow. Boats were nestled in close together, tied up with the bow pointing into the pier. People loaded and unloaded from the catwalk. We zoomed out of the harbor at 20 knots, immediately into the swells. First, we went along the mainland shore opposite Tadanae. Large numbers were painted on the rocks to denote fishing locations. At one small rock, eight men were there already and we dropped off one more. Then, we headed to Tadanae which actually consists of two main rocks. The larger rock is nearest shore, very steep-sided, contains a large arch and looks very difficult to climb, yet it had large painted numbers at several spots along shore. It was quite rocky but also covered with low green vegetation. The outer island also was steep-sided but there were decent landing spots. The seas had dropped by the time we had arrived and it was possible for us to land for about two hours! The long catwalk proved to be an excellent platform to hop off of onto the rocks above the slippery intertidal zone. The skipper's skill was great and we merely had to step off, although the end of the catwalk was covered in tires (for more difficult landings). We set up our headlamps to search for nests but only one of ours worked. Climbing up the rocks, we entered the tall grass tussocks that covered most of the island and found ourselves atop a solid maze of burrows. Tadanae is primarily a colony of Streaked Shearwaters and Sooty Storm-petrels which nest over most of the island. Ueta led us to the south side of the rock where he had found only one nest in 1992. As we climbed, I could see Miyakejima Island in the distance to the south of us. And Sanbondake Reef was also visible some distance to the east of Miyake. Japanese Murrelets nesting at Sanbondake had been the subject of a paper by Jack Moyer in the *Auk* in the 1950's, the first literature I ever read about Japanese Murrelets in the mid 1970's. He indicated that these were rare and little-known seabirds that were being impacted by U. S. military bombing practices. I remember reading this article back then and hoping that this species would not go extinct. While Moyer had been successful in his efforts to

were rolling into harbor and slopping over the breakwaters. Boats were being shaken up and nervous fishermen roamed the piers. We wandered through the shops and discovered that, later in the year, Koju is also a mecca for sunbathers and surfers. The beginning of the summer season begins with Golden Week (the largest annual holiday in Japan) which started only a week or so from now. So, the empty streets were a temporary facade. We were fortunate to be seeing these wonderful islands before they became inundated with people. On our return to the minshuku, we found that the regular house bath was set up for us. This bath consisted of a very deep and large tub filled to the brim with hot water. It felt too good. Dinner was excellent: sliced spicy beef, fish, relish, rice, soup, etc. We were joined by Ojisan, his two sons, and two local fishermen. Ojisan was surprised to hear that I liked Nato at breakfast (gooey, fermented beans). Obasan was happy that we enjoyed her food so much. The fishermen told us that Japanese Murrelets can be seen diving at night from the lights of the squid fishing boats near the islands. We asked if any were ever caught in squid nets. They said some were caught in flying fish nets. "How many?" we asked. "Not enough to worry about" they answered. Somehow I doubted this statement. We discussed tomorrow's plans. Hasegawa had to return to Tokyo on the ferry at 1030 hours. Since it looked unlikely that we would be able to land, the three of us would at least try to take a boat trip around Tadanae and Onbase Reef to count any murrelets on the water and to examine habitats at Onbase Reef. We'd have our gear ready to leave at 05:30 hours.

26 April 1993

The wind was down but the swells were up. We waited all morning until conditions improved and went directly to Tadanae. Obasan was not very comfortable about our going to the island under these weather conditions. Once it was clear that we were on our way, she produced a small doll and handed it to Leah. The local tradition was that it was good luck for women to travel in pairs on boats. The goddess of the ocean, being female, would be jealous of a single woman on board. Now fully equipped, we headed out in confidence. This time, we landed more

Leah de Forest near the entrance to a Japanese Murrelet nest on Tadanae Island, Japan, 26 April 1993.

precariously on the southeast side near the camp site so we wouldn't have to carry our gear across the island. The tent was set up, equipment stored and lunch consisted of ramen noodles on a butane stove. First, we searched the main rock outcropping area that we had investigated earlier. All three nests were still attended, much to our relief. Could it be that murrelets only nest in rock crevices? We decided to check other rock outcroppings. I found our fourth nest high up on the exposed southwestern point. Only now could I admit my frustration of not having found a nest in our earlier trip. This nest was located on the leeward side of the rocky peak in a small rock crevice that seemed almost too small to house a nest. The entrance was about 6-7 cm wide and narrowed to about 4-5 cm, a short distance back where the bird sat incubating two eggs. There were many other crevices on the point but no birds were found. Certain sites under large boulders were too deep to be checked. Steep cliffs on the southeast side were not checked. We hiked over to the northeast part of the island to search other rock outcroppings. On the way over the grass tussocks, we discovered a snake which force-regurgitated two murrelet eggs. All we found at these outcroppings were some gull pellets that contained storm-petrel and possible murrelet remains. Perhaps there are only a few nests on Tadanae, we thought. Ueta started searching in a ridge area covered in grass but riddled with rocks and burrows. He found our fifth nest in a crevice formed by several rocks with a tunnel covered partly with grass. The nest chamber, with an adult incubating two eggs, was located under a larger rock. With this knowledge, he then found the sixth nest nearby in a soil burrow within a rocky area. He felt one egg and a bird moved farther inward. These discoveries convinced us that murrelets could be nesting anywhere on the island, including burrows throughout the grass tussock area. It would require a great deal of effort to find all nests on Tadanae.

Satisfied with our nest-finding success, we decided to inspect possible nesting habitats on other parts of the island. We climbed over to the northwest part of the island where we encountered some brush



which did not appear to be used for burrowing. Our daylight was running out so we went to the cliff tops opposite the other island to have a closer look at Japanese Cormorants nesting on the cliffs that we had seen at a distance from the boat. At least three nests were visible although only one appeared to be incubated by an adult and two others were attended but empty. At camp, we were still cooking ramen when we saw our first Streaked Shearwater arrive at 18:42 hours. By 19:15 hours, storm-petrels and shearwaters were abundant and vocal. The first Japanese Murrelet was heard at 19:35 hours. We decided to split up to obtain some idea of the numbers of murrelets vocalizing from 22:00-22:30 hours at different areas on Tadanae at night. Leah remained at the camp area where she estimated about 50+ birds using the bowl behind the tent. Heavy activity occurred from about 20:45-21:15 hours. I went to the main rock outcropping where the first three nests had been found and estimated about 20 birds detected in this area. Seven birds landed nearby but stayed on open rocks. None were heard landing by known nest sites. One was captured by hand and did not have a brood patch. I had high vocal activity early on but then it tapered off. It was difficult to move about at night amidst the tussocks without crushing burrows and stepping on the hoards of adult and fledgling Sooty Storm-petrels that fluttered like large grounded butterflies in front of my feet. These storm-petrels were about as



Mr. Mutsuyuki Ueta points to a Japanese Murrelet nest on Tadanae Island, 26 April 1993

27 April 1993

large but not as dark as Black Storm-petrels I'd handled in southern California. In a large crevice, I found a Streaked Shearwater with a flashlight. What selective value could those exquisite markings have? Meanwhile, Ueta had gone over to the northwest part of the island where he had found nests earlier in the day. He heard about 50 birds and had seen 24 birds on the ground spread over the small valley above the original landing spot. After 22:19 hours, he noticed that birds were no longer calling on the colony and were calling only from the water. We were all amazed to have so much activity. Clearly, there were more murrelets using the island than we had imagined. We rendezvoused at the camp and attempted to catch a bird for photographs. Activity picked up and we heard several birds landing on the slopes of the bowl. We caught 2 birds (without brood patches) and took a few pictures before releasing them.

Trying to sleep that night was impossible. This experience had been so exciting. What an incredible opportunity and a special moment in our lives. Other than Moyer, we were perhaps the only North Americans that had ever seen the nests of and live-handled these rare Japanese treasures. For that matter, not many Japanese have had this chance. Isn't it curious that we tend to better appreciate these mysterious creatures when they become rare and when we can personally experience them? Isn't this one of PSG's missions: to inform the world about these fragile and fantastic wonders of the Pacific so that they will be protected without every human on earth feeling as much for them or being as close to them as we were at this moment?

Up at 06:30 hours. We packed our gear while breakfast (rice soup) was cooking and had everything down by the water at 08:30 hours. Pick up was scheduled for about 10:00-11:00 hours. We hiked back over to where Ueta had seen birds on the slopes to search for more nests. No luck. Perhaps these birds were largely non-breeding? Waiting at the landing, we saw a juvenile Peregrine Falcon pass overhead. About five Black Kites and 10-15 Jungle Crows hovered and flew near the top of the island. The boat arrived as planned and we travelled around the north side of the Tadanae towards Koze. We photographed both of the rocks at Tadanae and mainland cliffs at Koze as we passed by. After throwing a few fish overboard to attract some Black-tailed Gulls, we stopped suddenly. Ojisan poured some sake into the water and threw out more fish parts in a special offering to the sea. The wind was increasing now and our trip to Onbase Reef was canceled. We crawled inside and slogged our way back to the harbor.

After a welcomed tea at the minshuku, we walked into town for lunch, errands and phone calls. We didn't have to ask about the onsen. They just took us there and picked up our completely relaxed bodies a few hours later. We flopped down for a nap before another wonderful meal of sashimi, hamburger, relishes, soups, rice, etc. We relaxed afterwards with sake and beer. We presented Obasan with a PSG totebag which she immediately countered with a towel inscribed with the boat's name. We also examined the fish-shaped kite that her grandson had made for a special upcoming event. Tomorrow we would return to Tokyo. There was only one last chance for a trip to Onbase Reef in the morning.

Japanese Murrelet captured by hand at night on Tadanae Island, 26 April 1993

28 April 1993

Up at 06:00 hours. The wind was down. Grabbed our binoculars and camera and rushed to the boat. It took about 20 minutes from the east harbor to Onbase Reef. The wind was about 5-10 knots with a moderate swell. When we arrived, they told us that it was the wrong tide for landing, even though there were fishermen on the rocks on the far side of the reef. So we cruised around the reef to examine habitats and to count any murrelets on the water. Onbase Reef was composed of two island groups. The southwest group was smaller and had two steep peaks covered in nesting Black-tailed Gulls. The northeast group was larger and had three small scree fields at the bases of small bowls on the northwest side. These scree fields contained some larger boulders. These locations were described in Moyer's detailed notes to Storer in the 1950's as habitats where he found 30-40 Japanese Murrelets nests. We drove around the islands and headed back in.

Our going-away breakfast consisted of salted fish (almost like kippers), rice with raw egg and soy sauce, pickled cabbage and seaweed soup. All packed up, we said our goodbyes to Obasan who seemed like our aunt at this point. We drove to the ferry and headed off back to Tokyo. This time, we departed from the east harbor which took us right past Tadanae for a last look. About 3 km past Tadanae, I spotted our first murrelets on the water. We counted flocks of one, ten, three and one birds, totalling 15 murrelets from the east side of the ferry. They were all located in the same general area. Moyer had described these "feeding

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Conservation News

Craig Harrison, Conservation Editor

The Federal Endangered Species Act and Seabirds

The Endangered Species Act (16 U.S.C. §§ 1531-44) can be a powerful weapon to protect species that the federal government has designated as endangered or threatened. The ESA employs a number of techniques to preserve endangered and threatened species, including land purchase by the government, the implementation of conservation programs by federal agencies, and the prohibition of various government and private actions that harm listed species.

The current list of endangered and threatened species, which is revised annually to account for changes announced in the Federal Register during the preceding year, is to be found in the Code of Federal Regulations, 50 C.F.R. §17.11. It contains fourteen seabirds (Table 1). The U.S. Fish & Wildlife Service can amend the federal list through notice-and-comment rulemaking. A proposed rule to list, de-list or down-list a species must be published in the Federal Register. After considering public comments, FWS publishes its final determination in the Federal Register. FWS

Table 2. Candidate Endangered and Threatened Seabirds¹

| Species | Category |
|-------------------------|----------|
| Harcourt's Storm-Petrel | 2 |
| Harlequin Duck | 2 |
| Xantus' Murrelet | 2 |
| Elegant Tern | 2 |

¹56 Federal Register 58804-12 (November 21, 1991)

also publishes lists of candidate species that it may propose to list as endangered or threatened (Table 2).

The ESA requires all federal agencies, not just those such as FWS whose mandate is conservation, to carry out programs to conserve listed species. Loss of breeding habitat is the root cause of the endangered status of most island-dwelling creatures, and many activities that cause such losses are directly undertaken or indirectly authorized by federal agencies. Such activities fall within the ambit of the statute. The ESA also provides for the designation of critical habitat (areas deemed to be essential to the conservation of a species), and FWS' proposal in January 1994 to designate critical habitat for marbled murrelets will be the first designation for any seabird.

A species is considered endangered if it is in danger of extinction throughout all or

a significant portion of its range. A species is considered threatened if it is likely to become endangered within the foreseeable future. The goal of the ESA is to allow each species to recover to the point that it does not need special protection and can be removed from the list. Recovery plans are intended to describe specific management actions that may be necessary to allow the species to recover. FWS has issued some recovery plans for seabirds, but the Pacific Seabird Group has rarely if ever had an opportunity to comment on a draft plan. A recent review of over 300 recovery plans (Tear et al., *Science* 262:976-77, 1993) criticizes the biological goals in many recovery plans as being insufficient to insure survival.

The statute forbids "taking" endangered species, which is broadly defined to encompass harassment, harm, pursuit, capture, collection, shooting, and killing. Just as important, the regulations define "harm" to include significant modification or degradation of habitat. As the State of Hawaii has twice learned to its chagrin in *Palila v. Hawaii Department of Land and Natural Resources*, the 9th Circuit Court of Appeals (western states) may enjoin state actions that degrade the feeding, roosting, or nesting habitat of an endangered species. The prohibition against significant modification of the habitats of endangered species has been called into question by a March 1994 D.C. Circuit decision in a suit brought by timber interests, *Sweet Home Chapter of Communities for a Great Oregon v. Interior Department*. The D.C. Circuit Court of Appeals ruled that FWS' "harm" regulation is limited to "the direct application of force" against an animal and that, for example, FWS cannot prohibit logging near marbled murrelet nest sites as a "taking" merely because habitat has been modified. The extreme differences between the two circuit courts might persuade the U.S. Supreme Court to review and decide the *Sweet Home* case.

The ESA does allow an endangered or threatened species to be taken pursuant to a permit if the taking is incidental to the carrying out of an otherwise lawful activity such as forestry, clearing land or fishing. However, no incidental take permit may be issued without the submission of a conservation plan, which must include means to mitigate the harm caused by the taking of an endangered species.

Table 1. Endangered (E) and Threatened (T) Seabirds¹

| Species | Status | Range |
|------------------------|--------|---------------------------------|
| Short-tailed Albatross | E | Entire, except USA |
| Abbott's Booby | E | Entire |
| Bermuda Petrel (Cahow) | E | Entire |
| Andrew's Frigatebird | E | Entire |
| Audouin's Gull | E | Entire |
| Relict Gull | E | Entire |
| Marbled Murrelet | T | CA, OR, WA |
| Brown Pelican | E | Pacific coast |
| Galapagos Penguin | E | Entire |
| Dark-rumped Petrel | E | Hawaii |
| Newell's Shearwater | T | Entire |
| California Least Tern | E | Entire |
| Least Tern | E | USA |
| Roseate Tern | E | Atlantic coast of North America |
| | T | Remainder of range |

¹C.F.R. § 17.11 (1993)

The ESA is up for reauthorization in the current Congress and has become increasingly controversial. One proposal would require blind peer scientific review of the listing process and direct FWS to give greater priority to conserving distinct species. It would also, according to its sponsors, "create a mandatory and viable recovery process not present in the current act." The Endangered Species Coalition counters that this approach would deny protection until the species is on the very verge of extinction. Some organizations are mailing reams of paper to solicit funds to strengthen the Act. One brochure depicts a bald eagle, red wolf, Florida panther, peregrine falcon, piping plover, and Guadalupe fur seal in its request for money. The brochure fails to mention that each of those creatures is already listed, biologists and managers are actively working on their recovery, and there is no genuine threat that they will lose the protection of the ESA.

A goal of some organizations is to amend the ESA to list immediately hundreds of invertebrate species. This would accelerate FWS' recent trend to list creatures such as the prairie mole cricket in Oklahoma, the blind cave isopod in Virginia, Hungerford's crawling water beetle in Michigan, and the Delhi sands flower-loving fly in southern California (a subspecies). Those who lobby Congress to bring hundreds if not thousands of invertebrates under the protection of the ESA should depict those creatures on their fund raising appeals and defend their views openly. If the federal government embarks on a massive listing of invertebrates, the ESA will become much more difficult to enforce. Focusing on invertebrates will drain human and financial resources away from what is available for the conservation and management of birds and mammals. Providing insects the same protection as grizzly bears, short-tailed albatrosses, and marbled murrelets fuels the growth of the "wise use" movement because it undermines public confidence in government's ability to set conservation priorities.

Some conservationists espouse egalitarian views and deride setting priorities based on "charismatic megafauna." Virtually no one, however, behaves as if all species are equal. Individuals draw their own lines, but in the continuum of life forms from mammals, birds, and fish through plants, insects, flatworms, fungi,

amoebas, bacteria, viruses, and polypeptides virtually everyone establishes preferences when the time comes to write a check or volunteer for a weekend of work. Recovering the hundreds of birds and mammals already listed will require enormous public and private funds and the focused efforts of biologists and managers for decades to come. Because the global number of species of insects (1-2 million) greatly exceeds the global number of species of mammals (4,000) and birds (9,000), changing the focus of the ESA to include invertebrates has tremendous implications that must be carefully considered and honestly debated.

SEABIRD CONSERVATION 1994

The Pacific Seabird Group worked on the following seabird conservation issues during the past year. Members who have information about issues that may benefit from PSG involvement or who wish to review documents and to assist the Conservation Committee in drafting PSG letters should contact me.

I. Exxon Valdez Oil Spill (EVOS) Restoration

During the past two years, PSG has sent at least ten letters commenting on restoration plans and annual work plans that the EVOS trustee council prepared. The long-delayed draft EVOS restoration plan, which will establish long-term goals and priorities for the billion dollar trust fund, will not be available until late June. A final restoration plan is scheduled to be released during October 1994. Jim King, one of PSG's founders, continues to serve as the conservation member of the EVOS Public Advisory Committee.

The trustee council recently adopted a PSG proposal and funded the removal of foxes from Chernabura and Simeonof islands to restore those seabird colonies. PSG has given the trustee council a list of islands from which rats and foxes should be removed and a list of seabird colonies that should be purchased. We are working with Old Harbor Native Corporation to persuade the trustee council to purchase the corporation's seabird islands near Sitkalidak Strait, Kodiak.

PSG has been concerned that the trustee council has not always used the very best science in making restoration decisions. To improve this situation, we suggested re-

cently that the trustee council consult with PSG to obtain lists of potential peer reviewers of restoration proposals and reports. We are happy to report that the chief scientist has begun to do so.

The 1994 annual work plan seems to limit seabird restoration to common murre, black oystercatchers, harlequin ducks, marbled murrelets and pigeon guillemots. The trustee council is ignoring the damage done to other seabirds such as cormorants, tufted puffins, black-legged kittiwakes and ancient murrelets. Moreover, the trustee council continues to define the oil spill area very narrowly, ignoring the migratory nature of seabirds. PSG has written the trustee council that common murre are probably linked genetically linked throughout their range in the Gulf of Alaska and the Aleutian Islands. We have also noted that banding studies of alcids show that substantial numbers of young birds prospect for breeding sites long distances from their natal colony. Colonies that are beyond the trustee council's definition of the oil spill area include birds that can recolonize damaged colonies. For this reason, PSG will continue to challenge the trustee council's highly questionable assumption that seabirds outside a narrowly defined spill area were not damaged.

II. Threatened and Endangered Seabirds

A. Harlequin Duck

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. We understand that there may be grounds to file a petition to declare the eastern population of the harlequin duck as endangered or threatened.

B. Marbled Murrelet

In January 1994, FWS proposed critical habitat for the threatened marbled murrelet in the Pacific Northwest. The Marbled Murrelet Technical Committee filed comments on this proposal in April.

C. Xantus' Murrelet

At PSG's annual meeting in Sacramento, the Executive Council directed the Xantus' Murrelet Technical Committee to prepare the necessary documentation to file a petition to declare the Xantus' murrelet endangered or threatened. PSG has informed FWS and the California Department of Fish & Game that a petition may be filed later this year, and has scheduled a meeting with

biologists and agency staff to exchange information on the status of this species.

D. Harcourt's Storm-Petrel
(*Oceanodroma castro*)

FWS still has not decided whether to declare the Hawaii population of Harcourt's Storm-Petrel endangered, although a petition was filed five years ago. FWS has conducted surveys of this species in Hawaii, and found a few additional areas where birds can be found. In 1990, the population was estimated to be one hundred pairs (Harrison, Telfer and Sincock, 'Elepaio 50:47-51), but may be larger.

E. Dovekie

In March 1993, an individual petitioned FWS to list the Alaska breeding population of the dovekie as endangered. Because the population of dovekies in the North Atlantic is in the tens of millions, FWS denied the petition (58 Federal Register 37699-701, July 13, 1993).

III. Mexican Seabird Conservation

The interest in seabird conservation in Mexico has increased greatly, in part due to the North American Free Trade Agreement (NAFTA). PSG will sponsor a symposium and workshop on the restoration of island biodiversity in Baja California and the Sea of Cortez at San Diego in January 1995. At that meeting, PSG will form a Committee to address research and conservation issues in Baja California. In February 1994, we applied to FWS for a grant to support travel expenses and accommodations for Mexican biologists, students and wildlife agency officials to attend PSG's symposium and workshop.

PSG has recently asked FWS to establish a program to identify all seabird colonies in western Mexico whose populations are limited by alien predators and to remove those predators by the year 2000. We also wrote the Federal Neotropical Migratory Bird Conservation Committee last summer to volunteer PSG assistance regarding seabirds. We learned that federal funds are available from the U.S.-Mexico Joint Committee for Wildlife Conservation and urged several PSG members to apply. We congratulate Bernie Tershy for receiving a grant to restore seabird colonies on Ascunción and San Roque islands.

We continue to work with the International Council for Bird Preservation (ICBP) to secure funds to remove alien predators from Isla Clarión and North Coronado Island. ICBP asked the House Appropria-

tions Committee again this year to appropriate funds for this work during the coming fiscal year, which would allow Xantus' murrelets, Townsend's shearwaters and ashy storm-petrels to resume normal breeding.

IV. Alien Predators on Seabird Colonies

PSG continues its efforts to persuade FWS to remove predators from seabird colonies throughout the Pacific. In early 1993, we wrote Department of the Interior Secretary Babbitt and asked for his support to remove alien predators from Alaskan seabird islands. As reported in the fall 1993 edition of the *PSG Bulletin*, the Secretary's response was evasive. We recently wrote FWS' Alaska Regional Director and asked the Service to develop a comprehensive plan to remove predators from Alaskan seabird islands. We believe that if FWS had such a plan, the EVOS trustee council might fund its implementation. The regional director's response, however, was lukewarm. PSG may ask the trustee council for funds that would enable PSG to develop a comprehensive plan, which we would provide to FWS and to the trustee council.

PSG reviewed the Alaska Maritime National Wildlife Refuge's environmental assessment entitled "Proposed Emergency Use of Brodifacoum and Bromethalin to Prevent Accidental Introductions of Rats from Shipwrecks on Islands in the Alaska Maritime National Wildlife Refuge." We agreed with FWS that any effects of localized use of those chemicals on non-target species would be very minor compared to the risks that rats might colonize a new island.

V. Amendments to Migratory Bird Treaty Act

PSG has worked with the National Audubon Society in advising a congressional committee on a draft Migratory Bird Conservation Act of 1994. This legislation would fully implement the USA-Japan and USA-Russia migratory bird treaties. It may direct FWS to remove predators from refuge islands and to develop non-game management plans for migratory birds, including seabirds. The bill also may ask FWS and the National Marine Fisheries Service to report to Congress concerning the take of seabirds in commercial fisheries in the U.S. Exclusive Economic Zone (EEZ). The U.S. Department of the Interior may withdraw a solicitor's opinion issued during the Carter administration and declare that Interior will

enforce the Migratory Bird Treaty Act throughout the 200-mile EEZ, not just the 12-mile territorial sea. PSG has written Secretary Babbitt and urged him to withdraw the solicitor's opinion and to declare a new Interior policy regarding the act.

VI. Seabird Conservation in the Philippines

PSG gave the Dansk Ornitologisk Forening (Danish Ornithological Society) a \$1,000 grant in partial support of a project to conserve tropical seabirds in the Sulu Sea. The project is a joint venture among many organizations to attempt to save the last seabird colonies in the Philippines, a nation of some 10,000 islands. Besides PSG, British Petroleum Company, the U.S. Section of the International Council for Bird Preservation, and the Hawaii Audubon Society are supporting part of the project's \$26,000 in costs. The project will begin in June 1994.

The work is taking place in the Tubbataha Marine Park, Sulu Sea. Among the project's many objectives is the training of 15-20 Filipinos in seabird biology and conservation, including employees of universities, foundations, the Department of Environment and Natural Resources and the Philippine Coast Guard. Besides fostering PSG's conservation goals, this project is an opportunity to become known to professional ornithologists in the Philippines. Some project biologists may join PSG and some PSG members may have an opportunity to work on seabirds in the Philippines.

VII. Marine Sanctuary Program

We continue to monitor the National Marine Sanctuary program. A site evaluation list for future marine sanctuaries is long overdue. PSG again wrote NOAA in early 1994 to support a multi-site and multi-resource sanctuary in Hawaii that would provide comprehensive protection for a marine ecosystem, including seabirds. Specifically, PSG supports expanding the proposed Hawaiian Islands National Marine Sanctuary to protect seabirds offshore North Kauai and the Northwestern Hawaiian Islands. NOAA and the State of Hawaii may propose a single-species hump-backed whale sanctuary that would provide little additional protection for whales, which the Marine Mammal Protection Act and the Endangered Species Act already protect. PSG also asked FWS to complete its study on the benefits of a marine sanctuary offshore the Hawaiian Islands National Wild-

life Refuge. The 1984 master plan for this refuge required such an evaluation, but FWS has never begun one.

VIII. Restoration Plan for *Nestucca* Oil Spill, Washington

With the assistance of George Divoky, PSG reviewed and commented on FWS' draft Restoration Plan for the *Nestucca* oil spill in the State of Washington. We said that the plan is a reasonable expenditure of a modest sum (\$50,000/year for ten years) of restoration funds. It includes (1) improving habitat for seabirds on Destruction Island by removing rabbits; (2) educating boaters regarding disturbance to seabird colonies; (3) delineating seabird mortality from net fisheries; and (4) monitoring Common Murre attendance at Washington colonies.

IX. Management of the National Wildlife Refuge System

PSG commented on the draft environmental impact statement for the management of the National Wildlife Refuge System. This plan that affects some of the most important seabird colonies in the USA is being revised for the first time in almost 20 years. PSG stated the plan: (1) placed too much emphasis on master plans (which are easily ignored) and not enough emphasis on refuge-specific regulations (which have the effect of law); (2) over-emphasized building visitor centers; and (3) should allow more public involvement in ranking new refuge land purchases.

SEABIRD CONSERVATION IN MEXICO

During the last few years there has been an increasing interest in the seabird resources of Baja California and the Gulf of California. This is not surprising, considering that the area is vast and harbors many interesting and unusual species. Some of these are abundant and some are relatively rare, but few have received the intense study similar to that directed towards other Pacific coast seabird meccas such as Alaska or the Farallon Islands. Indeed, Baja California is the only region on the west coast of North America for which there has been no concerted effort to inventory seabird colonies and populations.

At the same time, concern is growing regarding the conservation of Baja California seabirds. Many if not most of Baja's

seabird breeding islands have had introductions of non-native animals such as cats, goats, pigs, and dogs. Rats have likely also established footholds at many of these islands. The often devastating results of such introductions are well-known and need not be recounted here.

Fortunately, there has also been a dramatic increase in Mexican seabird biologists in Baja California in the last decade. Energetic and concerned indigenous researchers are currently working out of universities and other institutions throughout the region, including Ensenada, La Paz, Guaymas, and even Mexico City. One of the goals of the 1995 PSG meeting in San Diego will be to draw as many Mexican researchers as possible to a workshop/symposium on seabird population restoration and protection, in hopes that state of the art technologies can be transferred and applied to islands of Baja California that are much in need of such attention.

During the last year PSG has been considering additional ways to assist the Mexicans in research and conservation activities. Funding has always been difficult to obtain, either within Mexico or within the U.S. to do work in Mexico. The impending implementation of the North American Free Trade Agreement (NAFTA) may provide a means to solve this problem. A joint international effort could be the best way to tap this source. At the 1994 PSG meeting in Sacramento an exploratory Baja California Seabird Committee meeting was held to examine the possibilities and perhaps establish a foundation upon which a cooperative program could be built.

One of the goals that was discussed was producing a master plan for the conservation of Baja California seabirds. This international effort, under the auspices of PSG, would seek funds to undertake several tasks. First would be the summary of currently available information on seabird status, distribution, and abundance. Identification of survey and research needs would be the natural outgrowth of such a study. Assessment of threats such as the impacts of introduced predators would also be made. The ultimate product of the project would be a prioritization of conservation needs based on species and colony status, levels of threat, and feasibility. Action plans, budgets, and time lines would then be developed.

A well-researched proposal to carry

out the master plan recommendations, sponsored by PSG and including well-known Mexican and U.S. biologists, would likely be well-received and stand a good chance of being funded by governmental agencies or private conservation organizations. This approach could also serve as a model for similar international cooperative projects. The Pacific Seabird Group has an excellent reputation, and perhaps this is another way we can use and extend our collective expertise to benefit the resource.

We are currently discussing these ideas with our Mexican colleagues, and so far they have been enthusiastically received. By the 1995 meeting we hope to have a working group established and start seeking funding for development of the master plan.

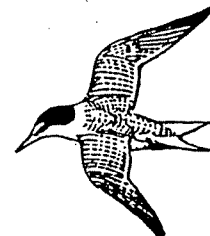
William T. Everett

PSG Goes to Japan

Continued from page 19

areas" near Miyakejima where local concentrations of birds could be found near shore. We repeated our stops returning to Tokyo. Streaked Shearwaters accompanied us all the way. We discussed cooperative research at length. It was evening when we reached the docks, carried our heavy gear through the rain to the subway, passed through the lighted stations and sleepily hiked back to Per's house. Ueta had stopped at an earlier station to switch to another subway line.

(To be continued. A follow up cooperative research trip between PSG and Japanese biologists occurred in early April 1994. Biologists Harry Carter, PSG Chair John Piatt, John Fries and Leigh Ochikubo travelled to several nesting islands of the Japanese Murrelet along with Japanese researchers.)



National Biodiversity Information Center

Work began in March to draft a proposal for a National Biodiversity Information Center. According to Peter Jutro, U.S. Environmental Protection Agency (EPA), the center will promote the use of standardized methods for collecting and managing data on biodiversity. The center will not maintain data on species, but rather will connect those seeking data to appropriate facilities. Other federal agencies involved include the U.S. Department of Agriculture, the U.S. Department of the Interior, the U.S. State Department, the National Ocean and Atmospheric Administration, and the National Science Foundation. The center is intended to complement the National Biological Survey, which was established in October 1993.

NAS Laments Inaction on Scientific Misconduct

The National Academy of Science (NAS) issued a statement in February to remind institutions to hold scientists to the highest ethical standards. Recent rulings in disciplinary cases imply that investigators may pursue only clear-cut cases of outright fraud and plagiarism. In response, NAS states "as members of the professional research community we should strive to develop and uphold standards that are broader than those addressed by the governmental regulatory and legal framework for dealing with misconduct in science." NAS, along with the Institute of Medicine and the National Academy of Engineering, suggested that the federal government establish a board to help define misconduct and other questionable practices in science. A recent extensive survey of scientists on misconduct concluded that instances of misconduct may be more common than previously thought.

Mink Ravage Seabird Colonies in Scotland

The October 1993 Newsletter of Britain's The Seabird Group included an article by J.C.A. Craik entitled "Notes from the War Zone." Craik describes the wholesale destruction of West Scotland's ground-

nesting and cavity-nesting seabirds by mink, including gulls, terns, cormorants, eiders and black guillemots. Unlike many predators that generally kill only what they eat, a mink will hide as many eggs as it can, usually all eggs in a colony if there are less than 100 clutches. Later in the season, a mink will cache as many chicks as it can, as many as 100 in a single colony. Because mink will take up near permanent residence in a colony, they can cause all adults to desert.

Mink are spreading in West Scotland, causing seabird colonies to relocate to mink-free areas. In many instances, this has resulted in the establishment of larger colonies. Whole populations of seabirds can be severely reduced by mink, and Craik increasingly encounters ghost seabird colonies. He concludes "the crucially damaging feature of mink predation, of gulls and terns at least, is that breeding is largely disrupted year after year so that steady mortality of adults from other causes can lead to a decline in numbers."

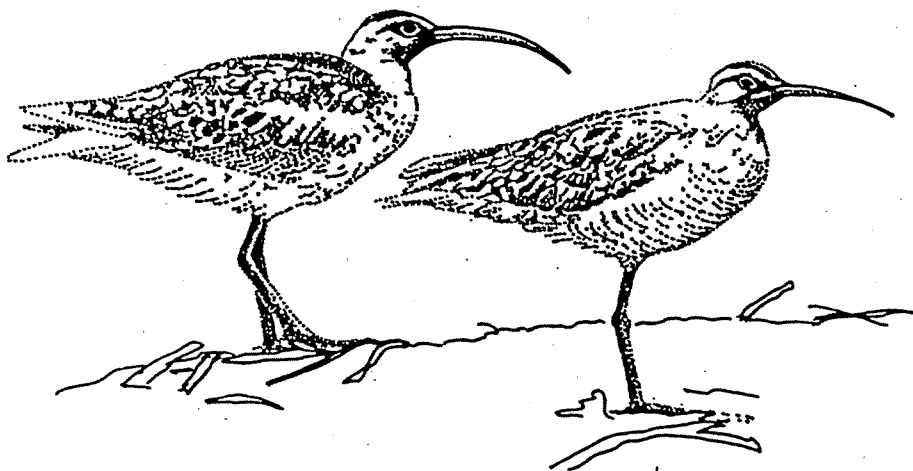
League of Conservation Voters, Environmental Report Card

The League of Conservation Voters (LCV) has assessed the environmental performances of the Clinton administration and Congress. It rated President Clinton with an overall grade of "C+" because he is "not working up to his potential." LCV gave Clinton an "A" for political appointments, a "B" for policy initiatives, a "C-" for delivery of environmental proposals and a "D+" for his environmental budget.

The LCV gave most of the members of Congress a failing grade. Regionally, the LCV rated members of Congress from New England as the most pro-environment and members from the Rocky Mountain region the least.

One should be skeptical of report cards by any organization. It is often difficult to assess objectively governance issues, and LCV's seemingly objective numerical rankings are often gerrymandered by its selection of issues. For example, Clinton's "D+" for his environmental budget reflects a lack of funding for municipal sewage treatment plants. From PSG's perspective, the healthy budgets for the U.S. Fish & Wildlife Service, the National Biological Survey and the National Park Service would warrant a much higher grade. Moreover, the regional disparities in congressional voting records are no surprise. Representatives from Rocky Mountain states, whose economies depend on the use of land will never enthusiastically tighten restrictions on federal lands in their states. Representatives from New England, where the federal government owns little land, have a "free" vote when they restrict land use on the residents of states half a continent away.

The LCV is comprised of the lobbyists from non-profit organizations such as the Natural Resources Defense Council, the Environmental Defense Fund and the Wilderness Society that would lose their tax-exempt status (and much of their budgets) if they endorsed political candidates. LCV can be viewed as a somewhat aggressive means by which some non-profit organizations circumvent the tax laws and participate in electoral politics.



Regional Reports

PSG members are urged to send information on their activities to their regional representatives. Addresses and phone numbers of regional representatives are listed on the back inside cover of each issue of *Pacific Seabirds*.

CANADA

PACIFIC COAST - The Pacific and Yukon Region of the Canadian Wildlife Service, in collaboration with the Natural Sciences and Engineering Research Council of Canada has funded a Wildlife Chair at Simon Fraser University. The appointment of Fred Cooke, previously known mainly for his studies of arctic geese, has produced a flurry of activity on seabirds, with the junior chair, Ian Jones, about to establish a long-term program to study auk population dynamics at Canada's most important seabird colony, Triangle Island. Over the next decade, the Simon Fraser/CWS team hope to study the breeding biology and demography of Cassin's Auklets, Rhinoceros Auklets, Tufted Puffins, and Common Murres. First priority is being given to Cassin's Auklet, which has received relatively little attention in Canada, especially considering that half the world population breeds here (half a million pairs on Triangle Island alone). Ian plans to band several thousand this year, as well as study productivity, chick growth, and food. As part of that program, Yolande Morbey, a graduate student of Ron Ydenberg's, will be carrying out a study of factors affecting age at departure for Cassin's Auklet chicks. A prefabricated research station is being landed on the island and assembled this spring and should provide working and living space for up to six people.

With this major program underway on Cassin's Auklet, both Anne Harfenist of C.W.S. and the Laskeek Bay Conservation Society will be carrying out studies intended to complement the work at Triangle Island. Anne will study breeding and survival at Frederick Island, a colony about one order of magnitude smaller than Tri-

angle Island (90,000 breeding pairs), while the L.B.C.S. will study Cassin's Auklets at Reef Island, another order of magnitude smaller (2000 pairs). Anne will also be helping Gary Kaiser with the scheme to eradicate rats from Langara Island, where the population of Ancient Murrelets has been reduced by more than 90% over the past several decades. Gary will be running a trial eradication on the small Lucy Island, adjacent to Langara Island, this year.

Elsewhere in Haida Gwaii (Queen Charlotte Islands), several agencies are combining to monitor and control raccoon damage on seabird colonies. Parks Canada, the Canadian Wildlife Service, and the B.C. Parks Service will all be monitoring for the presence of raccoons on important colonies within their area of operation. Simultaneously, the B.C. Wildlife Branch will be testing different methods of raccoon control. A general strategy for dealing with the situation in the long term is being developed at present.

Activities relating to Marbled Murrelets continue in British Columbia, with Alan Burger (University of Victoria) carrying out forest and at-sea surveys to determine habitat use, including a collaboration with Parks Canada to monitor Marbled Murrelet use of coastal waters adjacent to the West Coast Trail on Vancouver Island. Alan is also maintaining regular boat surveys of offshore waters on the west coast of Vancouver Island as far as the edge of the continental shelf and continues with his previous studies of diving behaviour in auks. His student, Sharon DeChesne (University of Victoria) is continuing her studies of Marbled Murrelet vocalizations. Andy Derocher, of the B.C. Forest Service and Gary Kaiser (C.W.S.) will be studying Marbled Murrelet habitat use and demography in Theodosius Inlet, a project in which the Simon Fraser team are also involved. Meanwhile, John Kelson, Irene Manley and others involved in the Clayquot Biosphere Programme will continue to study forest and at-sea habitat around Clayquot Sound.

Vicki Friesen and colleagues at the Royal Ontario Museum, in collaboration with John Piatt (National Biological Survey), continue to investigate the phylogenetic relationships among the Alcidae, including the *Brachyramphus* murrelets. They have found that the Long-billed Murrelet (*B. marmoratus perdix*) merits full species

status. They are now investigating the extent of genetic isolation among local populations of Marbled Murrelets.

The Straits of Georgia continue to receive plenty of attention from the Canadian Wildlife Service and Simon Fraser University, with a multidisciplinary project on marine and inter-tidal environments. As part of that programme Rob Butler (C.W.S.) and Colin Clarke (Simon Fraser) are developing a dynamic programming model of shorebird migration on the Pacific coast. Ken Morgan is carrying out surveys of marine birds at sea in the area and Ian Goudie (C.W.S.) is continuing studies of moulting Harlequin Ducks. Terry Sullivan (Univ. British Columbia) is completing a M. Sc. on growth rates of Double-crested Cormorants. Rob Butler and Kees Vermeer (C.W.S.) are jointly producing a report on the estuaries of the Strait of Georgia. Kees is also editing a collection of papers on the marine environments around Haida Gwaii, for which Ken Morgan is writing the account of marine birds. Kees will shortly be retiring, but he will remain in his current position as a "Scientist Emeritus". John Elliot will be running the periodic monitoring programme for contaminants in B.C. seabirds again this year, collecting the eggs of cormorants, petrels and Rhinoceros Auklets.

In Haida Gwaii, the Laskeek Bay Conservation Society will be continuing their studies of Ancient Murrelet demography, and Marbled Murrelet distributions and monitoring seabird numbers in Hecate Strait. Material on the Ancient Murrelet studies to date are being contributed to the P.S.G. Seabird Monitoring Database.

ARCTIC - Data on arctic seabird colonies accumulated by the Canadian Wildlife Service since 1970 is currently being input into the Seabird Colony Registry, prior to the creation of a gazetteer for the area. This project is being coordinated by David Nettleship (C.W.S. Atlantic Region), with contributions from Tony Gaston (C.W.S.-HQ) and Gilles Chapdelaine (S.C.F., Quebec Region). In northern Hudson Bay, Tony Gaston, Christine Eberl (C.W.S.) and Garry Donaldson (University of Ottawa) are continuing studies of Thick-billed Murre population dynamics at the colonies on Coats and Digges islands. Mark Hipfner (Univ. Ottawa) will be studying chick growth and age at departure as part of

the same project.

In the western Arctic, **Lynne Dickson** (C.W.S., Yellowknife) is continuing surveys of breeding densities of **King Eiders** on Victoria and Banks islands. A program to census seabirds in southern Foxe Basin, organized by **Ilya Storm**, may go ahead if funding is forthcoming.

GREAT LAKES - During 1994 **Hans Blokpoel** and **Gaston Tessier** (C.W.S., Ontario Region) intend to publish two more volumes of their 5-volume series "Atlas of Colonial Waterbirds nesting on the Great Lakes, 1989-1991". Their first volume, dealing with Canadian Lake Superior, was published in 1993. They have submitted projects on the conservation of colonial waterbirds for funding by the Great Lakes Action Plan, but as yet no funding decisions have been made.

ATLANTIC - In Newfoundland, **John Chardine** is continuing studies of the breeding biology and feeding ecology of **Atlantic Puffin**, **Black-legged Kittiwake**, and large gulls at Witless Bay, especially with reference to the breeding failures experienced by surface feeders since 1990. As part of this work, **Jan Neuman** and **Heidi Regehr** are both completing M. Sc. projects on kittiwakes and **Mike Rodway** is doing the same on the puffins. **Vanessa Rodregues** is currently carrying out a project on the turnover rates of seabird corpses on beaches; part of a continuing research and monitoring program on beached birds. John is also monitoring hunter effort in the annual "turr" hunt and modelling the effects of changes in regulations on populations and harvest levels.

Bill Montevecchi (Memorial University) is continuing studies on the trophic relationships and feeding ecologies of NW Atlantic seabirds. Prey harvest of gannets (17th year), **Common Murres** (with **Pierre Ryan**, C.W.S.) and **Atlantic Puffins** (with **Janet Russell**, **Mike Rodway**) at several islands are being compared with fisheries and oceanographic data. Findings indicate delays in the inshore migration of pelagic prey and shifts in pelagic food webs, with more cold-water and fewer warm-water prey since 1990. These changes are associated with recent breeding failures of **Black-legged Kittiwakes** on Great (with **Heidi Regehr**), **Baccalieu** (with **Jill Casey**) and **Funk** islands and at **Cape St. Mary's** (with

Fyzee Shahood). Fish plant closures in Newfoundland have increased pressure on other seabirds from predatory gulls. Together with a change to offshore dumping of offal, these factors have led to a decline in local gull populations that will probably continue.

Tony Gaston

Washington/Oregon

WASHINGTON - **Ulrich Wilson**, U. S. Fish and Wildlife Service (USFWS) Washington Coastal Refuges Office in Sequim, will continue his annual photographic census of breeding cormorants and **Common Murres** on the outer coast and in the strait of Juan de Fuca, including Protection and Smith islands. He also conducted more intensive breeding surveys and studies on land and by boat at Protection and Smith islands, with emphasis on cormorants, **Pigeon Guillemots**, **Rhinoceros Auklets**, and **Tufted Puffins**. Other species surveyed by Ulrich included **Peregrine Falcons** (May-June), **Brown Pelicans** (September), **Brant** (October-May), waterfowl in the Dungeness/Sequim Bay area (October-May).

Louise Vicencio and **Mike McMinn** (USFWS) Nisqually NWRC will continue rudimentary seabird colony surveys by boat in the San Juan Islands during the summer. They will also conduct surveys of **Brown Pelicans** in Grays Harbor (September-October), shorebirds in Grays Harbor (April, August, and November).

Don Williamson (USFWS) Willapa Bay NWR, is conducting **Snowy Plover** surveys during the summer and monthly waterfowl surveys in the fall. Don is also continuing the **Brant** surveys at Willapa Bay.

Julia Parrish, Institute of Environmental Studies at the University of Washington, will continue her colony studies at Tatoosh Island for the 5th year. Her work with **Common Murres**, recently funded by USFWS (Washington Field Office), has concentrated on population levels and productivity as well as interactions with predators.

Mary Mahaffy (USFWS). Puget Sound Estuary Program, and **George Divoky** are continuing to work with **Pigeon Guillemots** in Puget Sound. They will be banding adults and chicks in natural and artificial nests, installing additional nest

boxes, and documenting nesting chronology and success. **Mary Mahaffy** and **Camille Bennett** are continuing their radio telemetry study of **Surf Scoters** as part of a study to evaluate and monitor the relationship between contaminants and scoters near Tacoma.

Dave Nysewander, **Janet Stein**, and **Matt Nixon** (WDW) are continuing their seabird/waterbird study under the auspices of the Puget Sound Ambient Monitoring Project. In addition to boat work, aerial surveys will be flown in July, January and February covering all inland marine waters and shorelines of Washington state. They will also be continuing to document adult/juvenile ratios for **Marbled Murrelets** in the study area.

Bill Ritchie and **John Pierce** (WDW) are coordinating the state program to monitor seabird/fisheries interactions. The study area is the North Puget Sound area from the San Juan Islands to the Canadian border. They will be intensively monitoring the gill net fishery that targets Frazer River Pink and Sockeye Salmon stocks and the Chinook and Chum Salmon fishery. In addition to monitoring incidental take of seabirds in gill nets they will be conducting seabird surveys amid the fishing activity.

Under the Habitat Conservation Planning program the Washington Department of Natural Resources (DNR) has contract with the WDW to conduct **Marbled Murrelet** habitat studies and identification on the outer Olympic Peninsula and in Southwest corner of the state. Project leader **Janet Anthony**, and biologists **Eric Cummins** and **Janet Hardin** (WDW) will be describing habitat quality by looking at forest structure and distance from salt water. The DNR project coordinator is **Lenny Young**.

Terry Wahl and others will continue to gather and analyze data on seabird occurrence off the outer coast of Washington for the 23rd consecutive year. Anyone interested in participating can contact Terry at (206) 733-8255.

Jean Cross will conduct daily observations of **Marbled Murrelets** on a freshwater lake in July repeating her 1993 work.

OREGON - **Jan Hodder** and students at the Oregon Institute of Marine Biology will be continuing their study of the nesting success of **Pelagic Cormorants** at the OIMB colony in Sunset Bay at Cape Arago.

Buffer Zone Established at Three Arch Rocks

Following the advise of the Oregon Ocean Policy Advisory council, The Oregon State Marine Board voted on March 17, 1994 to institute a 500' seasonal buffer zone around Three Arch Rocks National Wildlife Refuge located near Tillamook, Oregon. A cooperative study by ODF&W and USFWS during the spring/summer 1993 documented 167 wildlife disturbances events caused by aircraft and watercraft.

The wildlife disturbance data collected in 1993 was essential to the decision making process. The vessel closure zone, which will occur annually from May 1 to September 15, is the first closure zone to be established in Oregon's marine waters and is one of only a few anywhere on the Pacific coast. Posters, signs and brochures will be distributed to educate the public about the closure. In addition, ODF&W and the USFWS will conduct a follow-up study to monitor the relative successes or failures of the closure. With nearly a quarter of a million nesting Common Murres, this is the largest breeding site for this species south of Alaska and contains the only breeding site for threatened Steller Sea Lions on north coast of Oregon.

This was the 22nd consecutive year that this colony has been studied.

A cooperative study by the Oregon Department of Fish and Wildlife (ODF&W) and the U. S. Fish and Wildlife Service (USFWS) will be conducted again this year at Three Arch Rocks NWR from mid-May to mid-September 1994. Participants in the study will include Susan Riemer and Robin Brown (ODF&W), and Dave Pitkin and Roy Lowe (USFWS). This year's study will be a follow-up investigation to the 1993 study documenting human disturbances to breeding seabirds and Steller Sea Lions using refuge rocks. This year, a 500' buffer zone (closure) is in effect and educational efforts will be conducted to prevent entrance into the closed waters around the refuge.

Roy Lowe and David Pitkin of the USFWS - Oregon Coastal Refuges office will be continuing annual seabird monitoring projects in Oregon in 1994. Activities include aerial photographic surveys of all Common Murre and Brandt's and Double-crested Cormorant colonies on the Oregon coast. Nesting attempts by Pelagic Cormorants at 17 Oregon coast colonies near Newport will be monitored again this year. The beached bird mortality study on 7.1 km of beach located between Seal Rock and Alsea Bay in Lincoln County, Oregon will continue from June through September. This is the ninth consecutive year of this study. The eighth annual aerial survey of Brown Pelicans along the Oregon and Washington coasts is planned for mid-September if funding allows. This survey is a cooperative effort with Roy Lowe, David Pitkin, Nancy Morrissey (OCR), Mary-Jo Hedrick (ODF&W) surveying Oregon, and Ulrich Wilson, Louise Vicencios and Mike McMinn (USFWS-Nisqually NWRC) surveying Washington. Spring and fall aerial surveys of Aleutian Canada Goose use of Oregon coastal rocks is also continuing.

In an effort to develop a more integrated approach to managing natural resources in the State of Oregon, the USFWS Portland Field Office recently reorganized their program into ecoregion teams. One of the new teams formed will address Oregon's coastal ecoregion. Team members bring a variety of experience and expertise to the coastal ecoregion team such as environmental contaminants, endangered species, forest ecosystem management, information and outreach, regional planning, and Federal permits and projects. Over the next few months, the team will be identifying resource priorities in the coastal ecoregion and developing strategies and projects for managing natural resources. The Portland Field Office will likely receive funds in 1995 for restoration projects, some of which could be used in the coastal ecoregion. The Portland Field Office encourages input from PSG members concerning resource problems and needs within the Oregon coastal ecoregion. Please contact Colleen Henson at (503) 231-6179.

Robert Pitman, with the assistance of Oregon Coastal Refuges, is continuing a long term study of the reproductive biology of Leach's Storm-Petrels on Saddle Rock, Oregon. Banding of storm-petrels was

initiated here in 1979 and has continued annually. To date a total of 5,567 birds has been banded, including 2,761 adults and 2,806 chicks, and 145 recaptures have been obtained.

Robert Loeffel and Don and Sara Brown are continuing their long-term, year-round beached bird mortality study on 7.4 km of beach just south of Newport, Lincoln County, Oregon. This study is now in the 17th consecutive year.

In the summer of 1994, the 22 known Marbled Murrelet tree nests in Oregon will be monitored for reuse by S. Kim Nelson's group (Oregon Cooperative Wildlife Research Unit). To locate new nests, they will climb trees in areas where landings are observed or eggshells found. The tree climbing project initiated in 1993 (see abstract from 1993 PSG Annual Meeting, this issue of *Pacific Seabirds*) will be continued on a limited basis.

Roy Lowe

Northern California

A more complete regional report of members' activities will appear in the next issue of *Pacific Seabirds*. An update on some recent conservation issues follows.

Alameda Naval Air Station in the north San Francisco Bay region is one of several naval bases in California slated for closure. This site supports several unique and valuable seabird resources, including the only significant California Least Tern nesting colony north of Santa Barbara. This colony consistently produces six to ten percent of all tern chicks in the state. The island breakwater supports a key roost site for Brown Pelicans. The largest Caspian Tern breeding colony (over 2000 birds) and the second largest Western Gull breeding colony in central and northern California are also found there. There is concern by the local environmental and scientific community about the fate of this site since many options are being discussed about reuse of the site. PSG recently sent a letter to the East Bay Conversion and Reinvestment Committee urging that these seabirds and the habitats that support them be protected as a state or federal wildlife area. A symposium was held in March 1994 describing the biological resources of the site. Speakers included Steve Bailey, Deborah Jaques

Strong, and Barbara Massey, among others.

Significant media and public reaction has surrounded a recent proposal to conduct a study on global warming using sonar in the Point Sur area and Hawaii. Sound generators, located at a depth of 800 m, would emit 195-decibel pulses of low frequency for 20 minutes every 4 hours for several years. Receivers would be located in New Zealand. The study would be conducted by the Scripps Institute. Most concerns have focused on potential impacts to marine mammals, e.g., whales, pinnipeds, and dolphins. The initiation of the study has been delayed so that an environmental assessment can be completed. Public hearings are ongoing in California and Hawaii. The U.S. Fish and Wildlife Service, Ventura Office, has been alerted to the upcoming environmental assessment process.

Sal Chinnici and Ray A. Miller (Scotia Pacific Holding Company) will be surveying for Marbled Murrelets at 34 survey sites, containing approximately 289 stations. They will also be experimenting with a "cluster" survey technique with radio communication between observers in an attempt to track murrelets at potential nest stands. In addition, they will be utilizing ground search techniques for nesting evidence at approximately 26 sites.

Jean Takakawa

Southern California

Pat Baird continues her work on foraging ecology of California Least Terns under a U.S. Navy grant with Tim Burr and Jerry Boggs. Four of her students will be presenting papers on this research at the combined AOU/COS/WOS meetings in Missoula this summer. She also found that the combined forces of the University, USFWS, Calif. Fish and Game, Calif. State Parks and the EPA could not convince the FAA that one-ounce Least Terns from a soon-to-be colony 500 feet below the flight path of jets at L.A. International airport were not a flight hazard. So the colony, decoys, sound system, and nascent sand dunes, et al. were dismantled by the county late in 1993. A search is on for a new site.

Alan Baldrige is continuing long term interests in distribution and abundance of seabirds, both breeding and migrant, in

the Monterey Bay region. He retired from Hopkins Marine Station in 1993 but his interest and commitment there continue.

Robert Brownell is continuing to work on marine mammals and is able to watch seabird migration out his window of the Southwest Fisheries Center in La Jolla.

Slader Buck directs various endangered species projects at Camp Pendleton.

Donna Brewer continues her round-the-world cruise with her husband on their sailboat. Currently she is somewhere in the South Pacific.

Douglas Cheeseman is currently teaching at DeAnza College, but he is taking next fall off while he and wife lead an expedition to Antarctica for 70 people. Seven more spaces are available. It is a 29-day trip from Argentina to the Falklands (Malvinas), South Georgia, the Antarctic Peninsula, and back to Argentina. Cost is \$7500 plus airfare (Nov. 21- Dec 19 1994). Doug continues to give slide talks on rainforest destruction, and he regularly leads trips on ecotourism. His banding station at Saratoga in oak woodland habitat is on hold at present, but he would like to get back to it eventually to continue his population studies on passerines. Wife Gail runs birdathons, is on the environmental action committee of Audubon, is leading two tours to Africa, and is trying to reschedule the Rwanda trip.

Charlie Collins continues to manage various U.S. Navy grants monitoring reproductive success of California Least Terns. He also continues his work on Scrub Jays on Santa Cruz Island.

Mary Beth Decker is working on pelagic distribution at frontal structures around the Pribilofs. She has been working on another project on decadal changes in diet and reproduction of seabirds at the Pribilofs. Her other interests are foraging ecology of auklets in the western Aleutians, and looking for a job (she is finishing her PhD by December 1994 at Univ. Cal at Irvine).

Bill Everett is continuing his work on seabird reproductive success on the Coronado Islands (including Black and Leach's storm petrels and Brown Pelicans) He is helping supervise students for CICESE from Ensenada: one working on a project of Laughing Gulls, Black Skimmers, Gull-billed, Least and Elegant terns nesting at the mouth of Colorado river. Another long-term study on Laysan Albatrosses on Guadalupe Island. Bill is still

spearheading the effort to prepare a package proposing endangered species status for Xantus' Murrelet.

Mike Horn and his students, from California State University Fullerton, are studying the foraging ecology of Black Skimmers at Bolsa Chica.

Lloyd Kiff (Western Foundation for Vertebrate Zoology) is supervising Walter Wehtje (who recently received a Master's from UCLA) for a contract on the cleanup of the Mcgrath Beach oil spill. Walter is monitoring Least Terns and Snowy Plovers for both breeding and nonbreeding seasons at Mcgrath and Ormond beaches. Lloyd was able to reorganize his entire library after the January earthquake that knocked all his bookshelves over.

Judith Latta Hand and Sheila Mahoney are organizing a workshop on Women in Ornithology (Missoula Montana joint AOU/COS/WOS). The workshop is scheduled for 6/21/94 at 1 pm. The introductory paper is by Dr. Marcy Lawton: "Are there gender-based differences in how men and women do science?" A series of panels will explore problems and give potential solutions. Judith continues to write fiction (historical novels) with strong female protagonists.

Kathy Keane continues her work on monitoring Least Terns at the San Pedro colony and Batiquitos Lagoon.

Pete Major continues to monitor migrating seabirds at Palos Verdes.

Barb Massey "keeps threatening to retire" but is still working for Charlie Collins on a U.S. Navy project on banding of California Least Terns.

Pat Mock continues his studies on seabird abundance and distribution in San Diego Bay.

Steve Reilly has been working with Bob Pitman and Lisa Ballance at the Southwest Fisheries Center, studying seabirds in the eastern tropical Pacific. They have been looking at distribution and abundance patterns and how they change with time. Another facet of their research is the flocking dynamics of seabirds that feed over tunas and dolphins. Lisa Ballance is looking into the flight energetics of several tropical species, as well as the physiological correlates of community structure. She and Bob have several papers in the works on feeding ecology of various species Dark-rumped Petrels. They are most interested in how the petrels go about locating and securing

food, but they are also gathering data on foraging associations of seabirds with sub-surface species.

John Warriner is working for PRBO on their **Snowy Plover** project with **Gary Page** and **Lynn Stenzel**.

Paula White has been working with endemic subspecies of arctic foxes on the Pribilofs and is now working on public education regarding them. She has helped develop educational materials for a summer camp for native children and has been successful in placing fox information in the regular curriculum in the public schools there. She has also been educating tourists about the foxes, which were not left over from fur farms in the 1930's as many people used to believe.

Pat Baird

Non-Pacific United States

At the DuBois campus of Pennsylvania State University, **Christopher Haney** has finished two reports on field work conducted at the Pribilof Islands, Alaska, last summer, along with **Alexandre Golovkin** (Institute for Nature Protection and Reserves, Moscow) and **Mikhail Flint** (P. P. Shirshov Institute of Oceanology, Russian Academy of Sciences). One report deals with diel mass fluctuations in auklets during incubation. The other is a brief summary of ecosystem research at the Pribilof Islands, conducted jointly by Russian and American scientists and submitted to the *Circumpolar Seabird Bulletin* edited by **Kent Wohl**. Along with **Sam Wainright**, Rutgers University Institute of Marine and Coastal Sciences, Chris also participated in ongoing stable isotope studies of the structure of terrestrial and marine food webs, including seabirds, in the eastern Bering Sea. Along with **Pat Wainright**, of the same institute at Rutgers, Chris provided samples for studies of population genetics in alcids and kittiwakes. Chris was recently elected Research Associate at the North Carolina State Museum of Natural History, where he and **David S. Lee** are preparing the species account for **Black-capped Petrel** in the *Birds of North America* project. Chris and David are also researching analytical methods that evaluate the efficiency of marine bird surveys. Chris and **Stewart MacDonald**, retired from the Ottawa Natural History Museum, have nearly completed

the **Ivory Gull** account for *Birds of North America*.

At the National Biological Survey, Patuxent Wildlife Research Center, in Laurel, Maryland, **Jeff Spindel** has begun a 5-year study on modeling regional survival, movement, and recruitment rates in declining avian metapopulations. As part of this research, Jeff will continue to coordinate a long-term metapopulation study of **Roseate Terns** nesting in Massachusetts and New York. Jeff and his co-investigators presented earlier results at the symposium "Recent advances in the biology, conservation, and management of Roseate Terns" held at the Colonial Waterbird Society's meeting in France. In 1994, they will begin analyzing data on postfledging survival, natal-site fidelity, dispersal, and regional recruitment in this metapopulation of Roseate Terns. They also hope to get additional data from colonies in the Gulf of Maine.

At the Biosystematic Parasitology Laboratory of the U.S. Department of Agriculture, **Eric Hoberg** is working on projects dealing with systematics, coevolution, and historical biogeography of parasite assemblages among marine birds. Included is an assessment of biodiversity with respect to ecological and phylogenetic diversity, and the use of parasites as ecological indicators. Current studies involve (1) acanthocephalan parasites of shags in the Aleutian Islands, (2) helminths of alcids and larids in the North Pacific Ocean and Sea of Okhotsk, (3) cestodes among murre, and (4) relationships of cestodes among major orders of seabirds.

At the University of Nevada at Reno (UNR), **Margaret Rubega**, in a postdoctoral position with **Lew Oring**, is beginning research on the limits and development of salt-tolerance in chicks of recurvirostrid waders. They will examine the tolerance of fresh to hypersaline water by chicks at different ages, in terms of salt excretion, energy costs, and growth and development under both captive and wild conditions. Their goal is to determine effects of progressive wetland salinization on the reproductive success of waders, and thereby develop water quality standards for reserves and mitigation wetlands, especially those supplied with second-use water. In other inland work at UNR, **Chris Elphick** is studying effects of different management regimes on use of California ricefields by

aquatic birds during winter. Specifically, Chris is determining how different hydroperiods (depth and duration of flooding) affect bird use, foods (invertebrates and grains), and foraging behavior, and how these parameters vary between managed and natural sites. Longer-term goals include studies of local movements and turnover rates of shorebirds using flooded ricefields during winter, and landscape-scale effects of the rapid increase of flooded land in California's Central Valley.

Doug Forsell, with the Chesapeake Bay Estuary Program of the U.S. Fish and Wildlife Service, is in the third year of censusing marine birds in the Bay using aircraft and a Global Positioning System (GPS) to reference each sighting. Results show that Chesapeake Bay is an important wintering area for scoters, **Oldsquaws**, **Red-throated Loons**, and gulls. At the University of Wyoming, **Clayton Derby** and **Jim Lovvorn** continue their research on the impacts of **Double-Crested Cormorants** and **White Pelicans** on trout stocked in the North Platte River. In summer 1993, cormorants ate mainly suckers, longnose dace, and fathead minnows from arrival in spring until trout were stocked in early July, after which they ate mostly trout until migrating south in the fall. Lack of trout in the cormorant diet from arrival until stocking suggests that overwinter mortality of stocked trout might be important in limiting their recruitment to catchable size classes. Diet studies will be extended to pelicans in summer 1994.

Jim Lovvorn

Pacific Rim

A **Laysan Albatross** attraction project was kicked off on Kaohikaipu Island, a state seabird sanctuary off of Oahu's Makapu Peninsula on December 17, 1993. Adult and chick decoys and a sound system were arrayed on the island by principal investigators **Drs. Stephen Kress** and **Richard Podolsky**. Assisting with the field work were project supervisor **Scott Hall**, Hawaii Audubon volunteer coordinator **Steve Carter**, and staff of the U.S. Fish and Wildlife Service. The project goal is to restore an albatross breeding colony near Oahu. Natural recolonization on the main island has met with dismal success due to

hazing at airports; predation from cats, dogs, and mongoose; and disturbance by humans.

Scott Hall and Steve Carter successfully established a volunteer cadre to monitor the project from nearby SeaLife Park on the Oahu coast. For nearly a month no albatross were seen in the vicinity. Eventually, however, a single bird was sighted flying over the island, and within days it landed on the island. Since January there have been regular sightings of Laysans landing on the island. As many as four birds have been seen at one time. The project appears to be successful at attracting sub-adult birds that have been prospecting at various sites around Oahu in recent years.

USDA Animal Damage Control personnel have collected eggs from airfields on Oahu where albatross pose a strike risk to aircraft. Five eggs were successfully incubated by Dr. Causey Whittow. Sea Life Park is raising these chicks to fledging age, when they will be placed on Kaohikaipu Island.

Plans are to continue the project earlier in the breeding season next year in hopes of attracting breeding birds.

The vessel grounding on Rose Atoll National Wildlife Refuge reported in October resulted in the release of the following estimates of pollutants: 100,000 gallons of diesel fuel, 2,500# ammonia gas, and 500 gallons of lubricating oil. No impacts to seabirds have been recorded during three trips to the atoll since the grounding. The Fish and Wildlife Service feels confident that rats have not been reintroduced as a result of the grounding. However, extensive damage was caused to the reef at the atoll.

The proposed rule to list the **Short-tailed Albatross** (*Diomedea albatrus*) as endangered will be revised in response to new information compiled by the Alaska Natural Heritage Program in their report: "Status Report on the Short-tailed Albatross".

Additional information on the status of the **Band-rumped Storm-petrel** was recently submitted to the U.S. Fish and Wildlife Service to bolster the evidence of threats to the population. Recent work from Volcano National Park on Hawaii has shown predation (probably by cats) to be a major source of chick mortality for the endan-

gered **Dark-rumped Petrel** in areas of suspected band-rumped colonies. In addition, recent preliminary results from genetic work on the Dark-rumped Petrel on Maui has shown no apparent interchange between the Hawaiian and Galapagos populations.

The World Wildlife Fund-US EPA directed survey of global contamination by organohalogen compounds (OHCs) began the first of two years of intensive field work and specimen collections for analyses in November, 1993 (FY-94) at Midway Atoll National Wildlife Refuge. The study is being headed by James P. Ludwig, SERE Group, Ltd.

Midway was chosen as a site expected to be the furthest from known point-sources of OHCs in the northern hemisphere, and surrounded by the largest dilution reservoir in the biosphere. Here it was expected that seabirds should have minimal contamination and that albatrosses, with their wide ranging feeding habits, would sample the greatest proportion of the oceanic surface possible. Further, having simultaneous access to many known-age birds of the two species of albatrosses (**Laysan** and **Black-footed**) at different positions in the trophic structure would allow trophic level comparisons, and could hint at the more important pollution pathways in this very large marine ecosystem.

A pilot study in FY-94 has demonstrated the utility of non-destructive sampling protocols that use blood samples gathered from banded known-age birds as a basis to assess contamination exposure in wild seabirds. The contaminant-sensitive biological markers of thyroxine, vitamin A, and inducible P450-1A2 enzymes are being used to measure the effects of contaminant loading on the biochemical responses of individuals which have their contaminant loadings measured in blood sera simultaneously. Contaminants are being measured in adult and chick blood sera, eggs of both species, and a variety of tissues obtained from wing-injured birds that are opportunistically salvaged. Five top-level scientific laboratory groups from New Zealand, Holland, Sweden, US Woods Hole Oceanographic Institution, and Germany have joined with the Michigan State University Pesticide Research Center/John Giesy analytical team to probe the more difficult state of the art techniques of en-

zyme analysis, xeno-estrogenic effects of contaminants and their metabolites, mechanisms of contaminant transport in the birds, the presence/absence of particular enzymes that detoxify contaminants, and very exacting congener-specific OHC analyses.

A few laboratory results have been returned thus far. Dioxin-like contaminants (measured as TCDD-Equivalents) are present in both species, albeit at relatively low levels. Eggs of Laysans are very close to published no-effect levels, but black-foots are more than 2x above known no-effect levels. Albatross chicks have levels of dioxin-like compounds and DDT group compounds equivalent to non-Great Lakes nesting **Bald Eagles**, but adults are 2-5 fold more contaminated than their chicks. Eggs of both species collected in December, 1992 had surprisingly elevated levels of DDT group compounds including 30-35% parent DDT, indicating the continuing high use of these hazardous OHCs worldwide.

Plastics ingestion continues to be a very significant problem for nestling albatrosses, with a sample of dead large chicks found to have mean burdens of 32 grams/bird in 1993, compared to <2 g/bird in 1966. Some population-wide biological effects may be emerging in the eggs as thinning or some other mechanism that compromises shell quality. These observations suggest significant xeno-estrogenic impacts on individuals. Deformed and abnormal chicks have been documented and rates of chick abnormalities are about one-tenth those measured in Great Lakes larids, as are the TCDD EQs. Ecologically, soft-bodied ticks that infest albatrosses are currently having a population explosion at Midway which may complicate interpretation of results.

This research is continuing in the remainder of FY-94, and another field season will follow in FY-95. Detailed work is beginning on the biochemical mechanisms of these contaminants, especially those that may be xeno-estrogens. SERE staff plan to attend the upcoming SETAC meeting in Denver and the 1995 meeting of PSG to present papers detailing the results of the pilot study and first full year of field/laboratory work.

U.S. Fish and Wildlife Service cooperative education student, **Nanette Seto**, will be completing her two-year study examining the effects of rat predation on the

reproductive success of **Bonin Petrels** at Midway Atoll in June. In 1994, after the failure of a fiber-optic scope during her first season, she used a camera system consisting of a small CCD camera with light emitting diodes attached to a small monitor to examine burrow contents. Preliminary results show that rat predation appears to be most prevalent during the egg stage of the nesting petrels. With the exception of one study site, areas baited with rodenticide resulted in higher reproductive success than areas with no control efforts. Seto also estimated the current population of the **Bonin Petrels** at Midway. She conducted two procedures: capture-recapture and direct burrow counts. She will assess the estimates resulting from the two procedures and determine which produces the most accurate estimate, while creating the least disturbance and requiring the minimum amount of labor.

University of Hawaii Doctoral Candidate, **Vanessa Gauger** is continuing her field studies of **Black Noddies** on Laysan Island. Vanessa has studied **Black Noddies** at Tern Island, French Frigate Shoals, and Heron Island, Australia. Vanessa is investigating the significance of successive clutches in the species and the role this may play as a mechanism for exploiting years of favorable weather and food availability. Her prior work at Tern Island revealed that approximately 40% of the pairs raised two successful broods annually. This phenomena is rare in seabirds and she did not find noddies nesting successively in Australia.

Principle Investigators **David Ainley** and **Richard Podolsky** (PRBO International Biological Research) are continuing work on a project entitled: Ecological Aspects of Breeding and Mortality in **Newell's Shearwaters** and Migration of Surprising Numbers of **Dark-rumped Petrels** on the Island of Kauai, Hawaii. The project is funded by the Electric Power Institute with cooperation from the State of Hawaii and the U.S. Fish and Wildlife Service.

Richard Podolsky submits the following summary of the project to date:

Field work commenced in early May 1993 and continued full-time until termination in mid November 1993. Time was invested in three major activities: development of the capacity to investigate demographic parameters of **Newell's Shearwa-**

ter on the island of Kauai (no small task following hurricane Iniki); gathering of data on reproductive success of the **Kalaheo colony**; and gathering of information to evaluate the State of Hawaii's Save our Shearwater Program (SOS).

The reproductive performance of **Newell's Shearwaters** in the **Kalaheo colony** during 1993 was the poorest compared to 5 years of monitoring in the mid 1980's conducted by **T. Telfer**. However, a high proportion of burrows were occupied, mostly by non-breeders. Reasons for the low reproductive success and/or high incidence of non-breeders include effects of the 1992 hurricane (less tree and fern cover leading to increased predation by owls or heat stress of burrow occupants) or effects of a significant ENSO on the food web during 1993. Results in the colony were consistent with the lowest fallout of fledglings yet recorded in the SOS program. Rat predation may also be an important factor affecting the reproductive performance of the shearwaters.

We observed a significant in-shore movement of **Dark-rumped Petrels** each evening into the upper reaches of **Wainiha Valley** along Kauai's north shore (a high of 1055 individual on one evening in May). Assuming that about 1/16 of the breeding population may arrive on a given night during incubation (May) these observations indicate a population much larger than the few heretofore estimated.

We detected at least three "new" colonies of **Newell's Shearwaters** in our search for colony sites at which we could conduct our studies.

A total of nine adult **Newell's Shearwaters** were captured and banded at or in their burrows; none were previously banded, either in SOS or in the work that had been carried out in the colony during the early 1980's.

We observed a significant spring/summer fallout. Between 11 May to 29 July we found 22 dead **Newell's Shearwaters** along the road mostly between Kealia and Waialua. Two were found by unlighted power lines. Some of these were the same as the 27 records compiled by USFWS. On the basis of autopsy, at least 8 of the 27 were breeding adults and the remainder were sub-adults. Three of the 27 had been previously banded in the SOS program. This ratio of banded to unbanded (1 in 10) is unexpectedly high and indicates that a sig-

nificant number of the birds marked (rescued) in SOS may subsequently die as a result of collisions in later years.

During the autumn fallout we set up routes that we drove 2-3 times per night looking for dead and live shearwaters. On 41 circuits, we encountered 69 **Newell's Shearwaters**. Although access to unlighted power lines is limited, we found 4 shearwaters along a 4 km stretch near Poipu. We found that 36% of all birds encountered were dead compared to 9% of birds reported dead each year in the SOS data. We marked all dead birds found; none were turned into SOS indicating a much higher mortality that indicated by SOS (which is not set up to measure mortality).

Recent Publications of Interest

Gales, Rosemary. 1993. Cooperative mechanisms for the conservation of albatross. Australian Nature Conservation Agency. Hobart, Tasmania, Australia. 132pp.

Murray, T.E., Bartle, J.A., Kalish, S.R., and P.R. Taylor. 1993. Incidental capture of seabirds by Japanese southern bluefin tuna longline vessels in New Zealand waters, 1988-1992. *Bird Conserv. Internatn.* 3:181-210.

Ken McDermond



Book Review

Status and Conservation of Seabirds. Sub-titles: *Ecogeography and Mediterranean Action Plan*. Aguilar, J. S., X. Monbailliu, & A. M. Peterson (Eds.). 1993.

Proceedings of the 2nd Mediterranean Seabird Symposium Calvia, 21-26 March 1989. Published by the Spanish Ornithological Society (SEO/Birdlife) in conjunction with MEDMARAVIS, the Mediterranean Seabird Association, and with the Balearic Ornithology Group. 386 pp. ISBN 84-604-6710-4. Price 2,500.00 Pesetas. Available from SEO, Facultad de Biología, 28040 Madrid, Spain. — The MEDMARAVIS association aims to coordinate the work of marine ornithologists interested in the study and conservation of seabirds in the Mediterranean area through its symposia held every fourth year. Calvia, on Majorca of the Balearic Islands (Spain) was the site of this symposium, significantly, because these islands have the impact of thousands of tourists from western and northern Europe swarming there during the winter, endangering the still extant seabird habitats.

The meeting must have been well attended since 32 papers and 12 posters by a total of 73 authors are presented in this volume. The bulk of these came from Italy, Spain and France. The presence of delegates from Greece, Malta, Bulgaria, Ukraine and the Canary Islands, further the presentations of researchers from the British Isles, Germany and Switzerland, reminding us that the Black Sea is but an extension of the Mediterranean Sea, that Mediterranean seabirds range as far as North Atlantic islands off Africa, and that some are winter guests from Northwestern Europe. Most papers are written in good English with Spanish summaries, the few exceptions are in Spanish with English summaries.

In the first chapter 14 papers deal with status and distribution (with good maps) of breeding populations of a petrel, a shearwater, a shag and of 10 species of larids. In case of some endemics, such as Adouin's Gull (*Larus adouinii*), the whole world population is assessed and mapped. Noteworthy are two papers by Ukrainian seabird researchers, I. Chernichko and V. Siokhin, of the Black Sea and its bay, the Sea of Azov. The former reports on population

size and distribution of larids, the latter on factors influencing trophic levels and population structure of the same gulls and terns.

Next, six papers report about post-nuptial distributions. Most interesting for us is W. R. P. Bourne's succinct account of the distribution of birds at sea in the Mediterranean area. Besides his own voyages, he summarizes, with detailed species accounts, the almost half-century of observations by the Royal Naval Bird-Watching Society and by various merchant navies of several nations. His conclusions are worth reading (and following up) by pelagic observers of all seas and oceans. Among other conclusions, he found that in summer the Mediterranean is a poor feeding area for pelagic birds because its water becomes stratified with a warm upper layer. Birds move out or concentrate in turbulent areas with food-rich upwellings. Satellite position-fixing with simultaneous temperature readings enabled the charting of seemingly haphazard pelagic feeding concentrations over such local upwellings, especially along the rim of the continental shelf. Plumes of turbulent fresh water discharged by major estuaries also attract pelagic sea-birds.

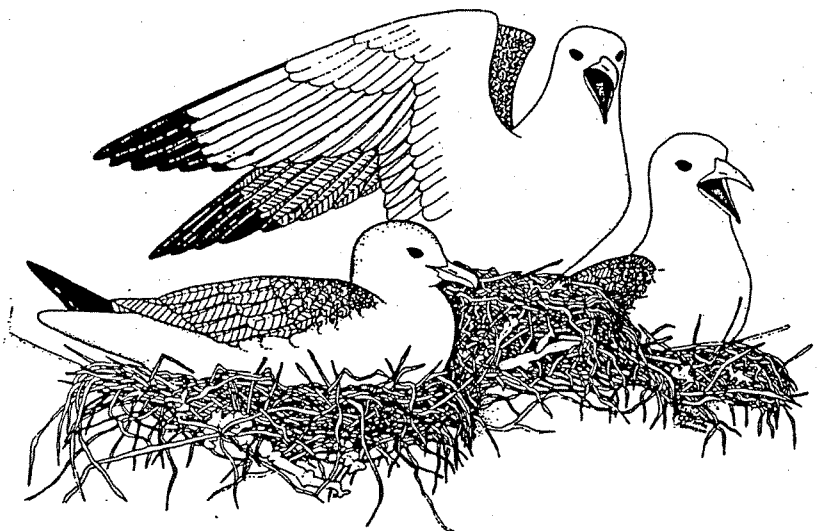
The next seven papers deal with ecological research on certain species. The last chapter, on habitat conservation, includes a summarizing account (by editor X. Monbailliu of France and J. Sultana from Malta) with a list and map of all protected areas (over 80 sites) of the Mediterranean and Black Sea basins, and the 25 most important unprotected localities with colonies of vulnerable or endangered species.

What we usually call resolutions at our plenary meetings this symposium accomplished with an "Action plan." In three languages (Spanish, English and Catalan, each on six pages) all the detailed needs of urgent conservational measures are enumerated with a plea to all countries involved, but commendation is also given to the governments of Italy, Lebanon, Morocco and Spain for their proposals of creating new seabird havens in the form of national parks or nature reserves. We wish to this strong international group success with their undertakings. I recommend this symposium volume as an important source book to all seabird researchers and all coastal and pelagic conservationists. — M.D.F. Udvardy, Department of Biological Sciences, California State University, Sacramento, California 95819, USA.

Books received:

Wetlands in Danger: A World Conservation Atlas by Patrick Dugan. Oxford University Press: October 28, 1993. (\$35.00; 200 pp; illus.; ISBN0-19-520942-7)

A Field Guide to the Birds of Borneo, Sumatra, Java, and Bali by John MacKinnon and Karen Phillipps. Oxford University Press: August 26, 1993. (\$85.00 cloth; 489 pp; color plates; ISBN0-19-854035-3).



Abstracts from the 1994 Annual Meeting

1 POPULATION ESTIMATES OF MARINE BIRDS IN LOWER COOK INLET, ALASKA DURING JUNE 1993.

Beverly A. Agler, Steven J. Kendall, Pamela E. Seiser, and David B. Irons, Migratory Bird Management, U.S. Fish and Wildlife Service, Anchorage, Alaska 99503.

We surveyed marine birds in lower Cook Inlet, Alaska (LCI) during June 1993, using small fast boats to traverse 411 transects. On the randomly-placed 2 nm transects, we recorded 53 bird species. Using a ratio estimator, we counted an estimated 798,042 + 195,555 birds in LCI, approximately twice the population estimate from a July 1993 survey of Prince William Sound (PWS). We stratified the Inlet into 3 strata: shoreline, coastal, and pelagic. We observed an estimated 37,334 + 13,863 birds in the shoreline stratum, 254,976 + 172,127 birds in the coastal stratum, and 505,733 + 99,995 birds in the pelagic stratum. The most common species group seen in LCI was alcids (38.1%), consisting of 55.5% murrelets, 22.0% puffins, 2.9% guillemots, and 19.1% *Brachyramphus* murrelets. The second most common species groups were procellariiformes (20.7%), and gulls (16.2%). The species composition of LCI was very different than that observed during a similar survey of PWS in July 1993. The most common species groups in PWS were murrelets (42.9%) and gulls (31.4%). Some of these differences are due to the oceanographic characteristics of the two areas. Several major species groups appeared to be associated with a large oceanographic gyre.

2 SEABIRD AFFINITIES TO PERSISTENT HABITAT VARIABLES IN CENTRAL CALIFORNIA. *Sarah G. Allen*, Natl. Park Serv., 600 Harrison St., Suite 600, San Francisco, CA 94107; and *David G. Ainley*, Point Reyes Bird Observ., 4990 Shoreline Hwy., Stinson Beach, CA 94970.

Persistent habitat relationships of ma-

rine birds are of interest to resource managers and scientists because of the multitude of critical issues germane to the marine environment, including oil spills and fisheries interactions. A geographic information system (GIS) is a powerful tool for analyzing spatial relationships. Our objectives were to 1) map seabird distribution and abundance in central California based on at-sea surveys, 1985-1992, 2) characterize the ecological relationships between distribution, abundance and environmental variables by a) simple map overlay with GIS and habitat variables such as bathymetry and breeding sites, and, b) multivariate analyses, 3) develop and test species-habitat relationship models with at-sea data collected in 1992, and 4) apply models to resource management issues. Results indicate that seabirds displayed strongest affinities for distance to shelf-break, distance to the nearest breeding site or landfall, and depth. Sea surface temperature was a significant factor for some nearshore and mid-shelf species, particularly during ENSO years. Species distinctly segregated along distance and depth gradients, although associations varied annually. A few species displayed strong affinities for specific locations such as Cordell Bank. When tested with 1992 field data, models adequately characterized the distribution of species for which there was a large number of sightings in 1992.

3 FLIGHT ENERGETICS OF FREE-RANGING RED-FOOTED BOOBIES. *Lisa T. Ballance*, SW Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, CA 92037.

I studied flight energetics of free-ranging Red-footed Boobies (*Sula sula*) on Johnston Atoll in the central Pacific using doubly labeled water to measure field metabolic rate (FMR), an open, flow-through system to measure oxygen consumption (resting metabolic rate or RMR), and activity recorders to monitor foraging behavior at sea. During the period of FMR measurement, birds spent an average of 49% of the time brooding and 51% of the time foraging at sea. Of the time at sea, 84% was spent in flight. Mean FMR of nine adults with a mean mass of 1070 g was 1224 kJ d⁻¹. Mean RMR of eight adults with a mean mass of 1039 g was 34.8 kJ h⁻¹. The power required for flight for six adults with a mean mass of 1014 g was 68.1 kJ h⁻¹, less

than one-third of the predicted value based on aerodynamic theory. Cost of transport averaged 1.5 kJ km⁻¹, a value 36% of that predicted from aerodynamic equations. Differences between measured and predicted values are likely due to two factors not accounted for by aerodynamic theory: flight behavior patterns of seabirds on the open ocean, and subtleties of wing morphology. Clearly, much more data are needed in order to understand the striking flight proficiency of this species.

4 RADAR TRACKING OF MARBLED MURRELETS ON VANCOUVER ISLAND, BRITISH COLUMBIA. *Alan E. Burger and Sharon B.C. Dechesne*, Dept. of Biology, University of Victoria, Victoria, B.C. V8W 2Y2.

We used a modified high-frequency marine radar to track Marbled Murrelets flying over the forest habitat in 1993 (Furuno FR810D, 9410 MHz, 10 Kw, 2 M antenna). Radar had limited value in comparing relative densities of murrelets in different habitats, because a significant proportion of the birds evaded radar detection among trees and behind hills. On average the radar detected 1.65 times the number of detections recorded by human observers using the standard protocol, but at some sites humans recorded more detections than radar. The timing of activity peaks in dawn surveys was similar for radar and human observers. All-night radar watches at full-moon and new-moon showed that murrelets were active over the forest only at dusk (low level of activity) and dawn (lots of activity). The mean flight speed of the murrelets was 66 km h⁻¹ (SD = 14; range 30-100, N = 46), and was not significantly affected by circling or turning.

5 STATUS OF SEABIRDS AT BOGOSLOF ISLAND, ALASKA, SITE OF A RECENT VOLCANIC ERUPTION. *G. Vernon Byrd*, Alaska Maritime NWR, 2355 Kachemak Bay Dr., Suite 101, Homer, AK 99603.

Bogoslof Island in the southeastern Bering Sea has changed size and shape substantially during 5 eruptions since it first rose from the sea in the late 1700s. The most recent event was in 1992 when a new dome was built adjacent to the northern end of the island. Food limitations, instead of limited nesting habitat, have been suggested as a cause for population declines and re-

productive failures of kittiwakes (*Rissa* spp.) and murre (*Uria* spp.) elsewhere in the southeastern Bering Sea. Thus the newly available habitat at Bogoslof may provide an opportunity to evaluate whether food, or habitat, has been limiting. Restricted use of the new dome suggests that birds are not nest-site limited. If food is plentiful in the area, but nest sites have been scarce, the new dome should be rapidly occupied by: 1) adults shifting from other areas, 2) progeny recruiting from breeding populations at Bogoslof and Fire islands or elsewhere, or 3) adults associated with the colonies but previously unable to nest due to lack of sites. Brief surveys in 1993 indicated a few kittiwakes, murre and tufted puffins (*Fratercula cirrhata*) were present on the still-steaming dome. Additional surveys are planned for 1994 to evaluate occupancy rates.

6 BREEDING POPULATION SIZE AND DISTRIBUTION OF XANTUS' MURRELETS (*Synthliboramphus hypoleucus*) IN SOUTHERN CALIFORNIA. Harry R. Carter and Gerard J. McChesney, National Biological Survey, 6924 Tremont Road, Dixon, CA 95620.

In 1991, we re-surveyed 15 colonies of the Xantus' Murrelet and estimated about 1,760 breeding birds in the Channel Islands, southern California. Higher numbers had been estimated in 1977 (range=4,374-10,000) using different techniques. Most birds (88% of the CA population) nested in the Santa Barbara Island area. Nests were located mainly in crevices within steep slopes or on the surface under shrubs. Eggshell fragments were found in 29% of 1,421 potential nest sites (PNS) counted during large-scale searches mainly after the breeding season. PNS were adjusted to determine breeding population size using site occupancy correction factors developed during the breeding season. Very small colonies occurred in the northern Channel Islands where birds nested in scattered pairs either on small offshore rocks or in steep cliffs. Prince Island (off San Miguel Island) hosted 150 breeding birds (9% of the CA population) and was the second largest colony. At small colonies, population estimates were based mainly on nocturnal vocalizations, eggshell fragments in crevices and historical estimates.

7 APPROACHES TO DETERMINING BAG LIMITS AND HUNTING SEASONS FOR MURRES IN NEWFOUNDLAND. John W. Chardine, Canadian Wildlife Service, P.O. Box 21276, St. John's, NF, Canada A1A 5B2.

Recently a legal mechanism to regulate the murre hunt in Newfoundland was identified, with the result that a bag limit and shorter hunting season are now in place. In this paper I describe the approach taken to determine these new hunting restrictions. Data on harvest levels and hunter preferences were obtained from nine murre harvest surveys conducted between 1977 and 1990, and a survey of hunter opinion conducted in 1988. A population model estimating the effects of harvest levels on murre populations was constructed. The model predicted a sustainable harvest at 50% of current levels, which range from 600,000 to 900,000 birds annually. Seventy-four percent of hunters surveyed (n=1224) requested a daily bag limit of 20 birds/person or less. Preferred hunting seasons followed a north-south pattern with the majority of hunters in the north opting for Sep-Oct-Nov or Oct-Nov-Dec and those in the south opting for Jan-Feb-Mar. Data on the frequency distribution of daily bag size and the monthly trend in the number of murre harvested in each of three murre hunting zones was used to model the effects of varying bag limit and season length on harvest reduction. Finally, bag and possession limits, and zone-specific hunting seasons were determined such that the target harvest reduction was achieved while at the same time accommodating hunter preferences.

8 SURVEY OF PIGEON GUILLEMOT COLONIES IN PRINCE WILLIAM SOUND, ALASKA. Mary B. Cody and Gerald A. Sanger, U.S. Fish and Wildlife Service, Coastal and Marine Bird Project, 1011 E. Tudor Rd., Anchorage, AK 99503.

We found 184 Pigeon Guillemot colonies in May and June 1993 during a survey of 98% of Prince William Sound's (PWS) shoreline; most were previously unknown. We found no guillemots at the sites of 14 former colonies, but we found new colonies within a few km of eight of these. Southwestern PWS, with 41% of the shoreline, had 62% of the guillemots, while eastern PWS, with 24% of the shoreline had

10% of the guillemots. The Naked Island area, with only 2.5% of the shoreline, had 27% of all guillemots. Half of the guillemots throughout PWS were at 22 major colony clusters. We counted a total of 3,028 guillemots, including 1,012 that were unassociated with colonies. Our count is at the low end of a Sound-wide estimate of 3,000 to 4,900 guillemots from pelagic and shoreline surveys by another project in July 1993. The PWS guillemot population remains depressed compared with a high of 15,000 in the 1970's. Counts at oiled Naked Island have declined steadily since the spill, but numbers are also depressed in unoiled areas of PWS compared with the 1970's. Reasons are unclear, but besides the oil spill killing birds outright, reduced food availability and increased predation are implicated. Most PWS guillemots nest on National Forest land. Protection of important colonies may enhance population restoration. Studies on predation prey usage and are needed, and non-lethal predator control may be warranted.

9 AN OVERVIEW OF THE IWRB/ICBP/IUCN SPECIALIST GROUP ON STORKS, IBISES AND SPOONBILLS. Malcolm C. Coulter, P.O. Box 48, Chocorua, New Hampshire 03817.

The Specialist Group on Storks, Ibises and Spoonbills (SIS) is an international group working for the conservation of these birds: 21 stork species, 25 ibises and 6 spoonbills. I wish to share with PSG members, the scope and depth of our involvement for greater understanding and cooperation. We work under the auspices of IUCN-The International Union for the Conservation of Nature (IUCN) which includes all specialist groups from elephants to seabirds/storks to butterflies. All bird specialist groups also work under ICBP (now BirdLife International). All bird groups are not included, although seabirds have a specialist group under David Duffy as Chair. All wetland bird groups also work under the auspices of the *International Waterfowl and Wetlands Research Bureau* (IWRB). We have two chairs: Koen Brouwer (the Netherlands) and myself; about 25 coordinators in different parts of the world, no staff and minimal support from our parent groups. Our membership includes about 900 people worldwide who are involved with these birds. We work to increase cooperation and coordination among conserva-

tionists and researchers. We continuously review the conservation status of these birds. We also maintain a complete bibliography and library for these birds; and provide bibliographies and copies of articles to people involved in conservation. We also are involved in conservation efforts of birds of critical concern: e.g., Oriental Crested Ibis, Greater Adjutant Stork, Waldrapp Ibis, Oriental White Stork, and American Wood Stork.

10 VOCALIZATIONS OF THE MARBLED MURRELET: POTENTIAL FOR INDIVIDUAL RECOGNITION. *Sharon B.C. Dechesne*, Dept. of Biology, University of Victoria, Victoria, B.C. V8W 2Y2.

Individual vocal-recognition has been found in many colonial seabirds. Recognition potential in these birds has been attributed to structural and/or temporal differences in the calls. The Marbled Murrelet is not colonial, but individual recognition would be advantageous in pair-bond maintenance. I will briefly compare the murrelet's calls to other related species and consider potential influences of their unique nesting strategy. I used a Sony TCD-3 DAT, Stewart Electronics UDP-1 preamplifier, AKG C1000S microphone for the recordings and analyzed with the Kay Elemetric's CSL (Model 4300). From recordings of birds on the water, the temporal aspects of the calls are highly variable, however, the structural aspects have more potential for stereotypy (a brief comparison will be made to calls in the forest and at the Caren Range nest). From this initial investigation, some call types may have sufficiently stereotypical structure that they could be used to discriminate among individuals, however, grading of calls (eg. keer to alternate) within a series complicates the location of potential cues for individual recognition. At this early stage, this method is viable in limited circumstances, but I hope to develop techniques whereby this method could be applied more broadly.

11 DECREASED SURVIVAL AND REDUCED COLONY SIZE IN BLACK GUILLEMOTS IN NORTHERN ALASKA. *George J. Divoky*, Institute of Arctic Biology, University of Alaska, Fairbanks, AK 99775.

Creation of nest-sites at the Cooper Island Black Guillemot colony increased

the breeding population from 10 pairs in 1972 to 220 pairs in 1989. Most of this increase was due to immigration. While annual survivorship of breeding birds averaged 89 percent for the period 1980 to 1988 it dropped to an average of 81 percent from 1989 to 1993. Survival in the year before the 1993 breeding season was only 70 percent. This increase in mortality has resulted in the breeding population declining from 220 pairs in 1989 to 150 pairs in 1993. A coincident decline in the number of nonbreeders at the colony also occurred, from approximately 200 in the late 1980s to fewer than 30 in 1993. A shortage of breeding birds in 1993 was indicated not only by vacancies in previously occupied nest sites but also by widowed site owners that did not attract mates, widowed established breeders abandoning nest sites to breed at adjacent sites, and one instance of a single male pairing with two females at adjacent sites. Some predation by Snowy Owls and Peregrine Falcons occurs during the breeding season but most mortality apparently occurs during the nine months the birds are away from the colony. Diminished survival may be region wide since immigration to the colony has greatly decreased.

12 ANNUAL SURVIVAL OF PREBREEDING THICK-BILLED MURRES BANDED ON COATS ISLAND, NORTHWEST TERRITORIES, CANADA. *Garry Donaldson*, Dept. of Biology, University of Ottawa, Ottawa, Ontario, K1N 6N5; and *Tony Gaston*, Canadian Wildlife Service, 100 Gamelin Blvd., Hull, Quebec, K1A 0H3.

Annual survival rates based on breeding birds accurately estimate mortality for only a portion of the overall life cycle. The survival of prebreeding cohorts in long lived species is generally thought to be lower. The Thick-billed Murre (*Uria lomvia*) colony on Coats Island offers an excellent opportunity to address questions of survival as banding has been carried out there annually since 1984. Survival estimates from banding data are generally based on one of two approaches: either recovery of hunted individuals or the resighting of living individuals over a period of time. Recovery data were analyzed using the program SURVIV while resightings were analyzed with SURGE. A model holding survival rate constant but allowing for inter-year variation in recovery or resighting

probabilities gave the best fit to our data. Both approaches generated survival probabilities suggesting the survival of young murrets, aged two to six years, from Coats Island is probably lower than that of adults greater than six years.

13 VIDEO TAPING ALCID CHICKS IN ARTIFICIAL BURROWS AT THE SEATTLE AQUARIUM. *Barbara K. Douma* and *Mary Carlson*, The Seattle Aquarium, Pier 59, Waterfront Park, Seattle WA 98101.

Since 1991, the Seattle Aquarium has successfully bred Tufted Puffins in captivity. Although the eggs were infertile, in 1991, 1992 and 1993 a pair of Rhinoceros Auklets also laid an egg in an artificial burrow. In 1993, a high resolution camera with infrared light was installed in an artificial breeding burrow of a Tufted Puffin. This allowed us to observe the incubation, hatching, post-hatch care, feeding and early development of a Tufted Puffin chick. This presentation describes the breeding program, equipment used and presents excerpts from the hundreds of hours of video tape collected. In addition, the staff has conducted research projects with the Alcid population and is interested in entertaining research proposals from the Pacific Seabird Group.

14 BREEDING ECOLOGY OF XANTUS' MURRELET ON SANTA BARBARA ISLAND, CALIFORNIA. *Charles A. Drost*, Colorado Plateau Research Station, Box 5614, Northern Arizona University, Flagstaff, AZ 86011.

Nest effort and success of Xantus' Murrelets (*Synthliboramphus hypoleucus*) have been studied over a 12-year span at two sites on Santa Barbara Island in the southern California Channel Islands. Nest success (nests with at least one chick successfully leaving the nest) varied from 27-75%. Minimum productivity ranged from 0.3-1.1 chicks/pair. Barn Owls preyed heavily on adult murrelets in some years. Predation reduced nest success, but did not have a consistent effect on numbers of nesting pairs. Island deer mice preyed on untended murrelet eggs, taking from less than ten to fifty percent in different years. High mouse predation was linked to lower nest success, and lower productivity. Warm-water episodes over the 12-year period appeared to directly affect murrelet nesting

effort and possibly timing of nesting, presumably through effects on food supply in surrounding waters. However, the warm water periods may have indirect effects as well, as heavy rainfall during these times leads to high deer mouse numbers and, subsequently, high barn owl numbers. Despite a variety of negative influences, murrelet numbers during this 12-year time-span have been remarkably stable.

15 INDIVIDUAL VARIATION IN PHENOLOGY AND BREEDING SUCCESS OF COMMON MURRES IN CALIFORNIA. *Jeremy Eddy, William J. Sydeman, and Nadav Nur*, PRBO, 4990 Shoreline Highway, Stinson Beach, California 94970.

We evaluated individual variation in breeding phenology and reproductive success in a sample of approximately 70 color-banded Common Murres on Southeast Farallon Island, California over a 8 year period (1986 - 1993). Laying dates were determined by daily observations or back-dated from exact hatching dates using a mean incubation period of 32 d (Ainley and Boekelheide 1990). Standardized deviations (anomalies) were estimated by adding (or subtracting) an individual's value from the grand population mean generated from an independent sample of observations taken for unbanded pairs ($n \approx 100$) in the general vicinity of the banded birds. Results showed that about 20% of the individuals consistently laid eggs earlier than the population mean, while another 20% consistently laid late; a third set of birds was variable about the population average. Breeding success, however, was not correlated with individual anomalies in laying dates. Age-structure of the population may explain some of these results, but variation in bird "quality" is also indicated.

16 WINTER DISTRIBUTION OF WESTERN AND CLARK'S GREBES. *Ruth Anne Elbert*, University of California, Davis, CA, 95616.

The winter distribution of western grebes (*Aechmophorus occidentalis*) and Clark's grebes (*A. clarkii*) was examined using Christmas Bird Count data. The two species were grouped together for the analysis because they were often grouped together in the counts. To assess variation in winter distribution, I examined data for the past fifteen years from all count points in

western North America where *Aechmophorus* were counted. An index of birds per total party hours was used to analyze the data. *Aechmophorus* species winter mainly along the Pacific coast from Alaska to Mexico, with some as far inland as central Texas. Clark's grebes are usually found only in southern counts. The winter distribution of *Aechmophorus* was highly variable from year to year. The greatest concentration of *Aechmophorus* (almost all western) was found in the Vancouver Island/Puget Sound area. Some other areas showed extreme year-to-year fluctuations in birds/party hours. I hypothesize that *Aechmophorus* are highly keyed to prey availability, going where prey are easily accessible, and moving on when they are no longer available. Another important factor in winter distribution is weather. Many birds are found at inland lakes of high altitude. If lakes freeze over, the birds must move on.

17 XANTUS' AND CRAVERI'S MURRELETS: A SYNOPSIS OF THEIR BIOLOGY. *William T. Everett*, Western Foundation of Vertebrate Zoology, 439 Calle San Pablo, Camarillo, CA 93012; and *Dan W. Anderson*, Dept. Wildl. and Fish. Biol., Univ. of California, Davis, CA 95616.

Xantus' Murrelet *Synthliboramphus hypoleucus* and Craveri's Murrelet *S. craveri* are similar diminutive alcids with relatively small populations and limited distributions. Xantus' Murrelets breed on islands off the coast of Southern California and the west coast of Baja California. Both species nest in crevices or under bushes, lay a typical clutch of two eggs and produce precocious young that go to sea within several days of hatching. Diets for both species include small pelagic fish and marine invertebrates. During the non-breeding season, Xantus' Murrelets typically range north to northern California (and as far as Washington) and south to Cabo San Lucas, Baja California (and as far as Guatemala). Although there are few available data, it appears likely that varying numbers of Craveri's Murrelets remain in the Gulf of California during the winter, depending on oceanographic conditions. Approximately 1,700 Xantus' Murrelets breed at Southern California colonies. No precise estimates for the Mexico populations of Xantus' Murrelets are available, but they could in-

clude up to 20,000 pairs. The population of Craveri's Murrelet could be as high as 5,000 pairs, but detailed data are unavailable. Both species face a variety of threats, including destruction of adults, eggs, and young by native and introduced predators. Oil spills and other pollutants may also pose significant threats to local populations.

18 TIMING, MAGNITUDE, AND SYNCHRONY OF TROPICAL SEABIRD BREEDING IN RELATION TO A DECADE-LONG CLIMATE EVENT IN THE CENTRAL NORTH PACIFIC. *Elizabeth N. Flint*, U.S. Fish and Wildlife Service, Hawaiian/Pacific Islands National Wildlife Refuge Complex, P.O. Box 50167, Honolulu, Hawaii 96850.

I examined seabird data collected year-round for 13 years at Tern Island, French Frigate Shoals, to quantify variation in breeding in terms of magnitude, timing and synchrony. All eggs of nine species were counted at intervals equivalent to their incubation periods to estimate total eggs laid per year and describe their temporal distribution. Reproductive success was also measured throughout the period for 3 species. These time series were compared with time series of physical and biological oceanographic data, as synthesized by *Polovina et al.* (Fisheries Oceanography, *in press*), which describe a large scale climatic event that occurred during the period of 1975 to 1988. This event caused a greater mixed layer depth and possibly more nutrient input into the euphotic zone. Time series of reproductive success rates in Red-footed Boobies and Red-tailed Tropicbirds show declines of 30% to 50% that correspond with declines in productivity over a range of trophic levels since the early 1980's. Patterns of synchrony and mean Julian date of laying showed striking parallels among species throughout the years, despite their ecological differences, but did not obviously reflect the climatic event.

19 UNUSUAL MARBLED MURRELET NEST DISCOVERED IN SOUTHEAST ALASKA. *Cheri Ford*, Thorne Bay Ranger District, Tongass National Forest, Thorne Bay, AK 99919; and *Mike Brown*, Ketchikan Area Supervisor's Office, Tongass National Forest, Ketchikan AK 99901.

In July 1993, a ground-level Marbled

Murrelet nest was discovered in old-growth forest in the Log Jam Creek drainage of northern Prince of Wales Island in southeastern Alaska. On 23 July, an unidentified bird was flushed from the top of a cliff and closer inspection resulted in the discovery of an egg. On 27 July, the nest was visited and an incubating adult Marbled Murrelet was observed. The nest was located on a platform of moss on top of three intertwining roots of a western hemlock. The tree was located at the top edge of an 11 m high cliff. This nest was unusual because it appeared to have two separate natures. When approached from up slope, it was at ground level, although the platform was on tree roots. When approached from down-slope, it appeared to be in the overstory canopy.

20 LOW LEVELS OF PETROLEUM FOULING SUPPRESS SEX HORMONES AND REPRODUCTION IN BREEDING MAGELLANIC PENGUINS. Gene S. Fowler, Dept. of Biology, 609 N. College Ave., Claremont, California 91711 USA

Petroleum fouling has many deleterious consequences for marine vertebrates, ranging from increased energy expenditure to the death of the organism. I studied circulating levels of reproductive and adrenocortical hormones in Magellanic penguins that were lightly covered with petroleum following a marine oil spill off the Patagonian coast, and in a non-oiled control group. Levels of luteinizing hormone, androgens and estradiol, but not progesterone, were lower in oiled penguins than non-oiled control birds. Corticosterone was higher in oiled than control females, but did not differ and were basal in males. Few of the pairs with an oiled partner later established nests with eggs. Even low levels of oil fouling in Magellanic penguins appear sufficient to interfere with reproduction. Oiled penguins that were held captive for washing had elevated levels of corticosterone, and appeared to be stressed both by captivity and by the washing process.

21 PATTERNS OF VEGETATION AND NESTING SEABIRDS AT MIDWAY ATOLL, NORTHWESTERN HAWAIIAN ISLANDS. Holly Freifeld, Department of Geography, University of Oregon, Eugene, OR 97403.

Patterns of vegetation were investigated on Sand Island at Midway Atoll with the objective of elucidating seabird habitat use in an extremely disturbed environment. Fifty-eight plots were sampled across seven vegetation types (six exotic and one native). In each plot data were collected on seabird abundance and diversity and on nine environmental variables. Principal components analysis and locally-weighted regression performed on these data reveal associations between nesting seabird species and three composite variables. For example, nests of red-tailed tropicbirds were predicted to be most abundant in plots with dense, unmaintained shrubby vegetation far from buildings and other structures. Environmental conditions in the exotic Casuarina forest that dominates Sand Island appear to provide nesting habitat for a high diversity of seabird species, although the only species found in high abundance are arboreal nesters: black noddies (*Anous minutus*) and white terns (*Gygis alba*). Comparison of Midway's seabird community with that of other Northwestern Hawaiian Islands reveals the extent to which Midway's seabird habitat has been altered by human activities. The results of this study raise questions that must be considered in the restoration and management of seabird habitat at Midway and on other highly disturbed islands.

22 A MOLECULAR INVESTIGATION OF EVOLUTIONARY RELATIONSHIPS WITHIN THE ALCIDAE. Vicki Friesen, Allan Baker, Dept. Ornithology, Royal Ontario Museum, Toronto, Ontario M5S 2C6, Canada; and John Piatt, Nat. Biol. Survey, 1011 E. Tudor Rd., Anchorage, AK 99503, U.S.A.

To clarify evolutionary relationships within the Alcidae, we compared nucleotide sequences of 1045 base pairs of the mitochondrial cytochrome *b* gene and electrophoretic profiles of 38 allozyme loci among all 22 extant species. Phylogenetic analysis grouped species into six distinct lineages that correspond closely to tribes. The Dovekie (*Alle*) was allied with the auks, and the murrets (*Uria* spp.) were sister species. Pigeon (*Cepphus columba*) and Spectacled (*C. carbo*) guillemots were closely related, in contrast with their morphological divergence. The Long-billed Murrelet (*Brachyramphus marmoratus perdix*) was genetically most divergent of

the brachyramphine murrelets, and clearly merits full specific status. Synthliboramphine murrelets comprised two distinct lineages: i) Xantus' (*Synthliboramphus hypoleucus*) and Craveri's murrelets (*S. craveri*; both formerly genus *Endomychura*), and ii) Ancient (*S. antiquus*) and Japanese murrelets (*S. wumizusume*). Cassin's Auklet (*Ptychoramphus aleuticus*) was genetically most distinct of the auklets. The Parakeet (*Cyclorhynchus psittacula*) and *Aethia* auklets were closely allied, although relationships among these species were not clear. The Rhinoceros Auklet (*Cerorhinca monocerata*) was most divergent of the puffins, and Atlantic and Horned puffins were closely related. Auklets and puffins formed sister groups. Population genetic studies are required to clarify genetic affinities among several of the murrelets, auklets and guillemots.

23 POPULATION GENETICS AND THE CONSERVATION OF RARE SEABIRDS. Vicki Friesen and Allan Baker, Dept. Ornithology, Royal Ontario Museum, Toronto, Ontario M5S 2C6, Canada.

Understanding the extent to which genetic variation is distributed among colonies (i.e. genetic structure) is critical for designing successful conservation policies for rare or endangered seabirds. If birds from different colonies are genetically distinct, then loss or decimation of a colony may reduce the species' genetic resources and thus its long-term viability. Protection of numerous colonies from throughout the breeding range would therefore be essential. Furthermore, some colonies may contain larger proportions of a species' genetic resources, so should be assigned higher conservation priorities. Finally, maintenance of a minimum population size may be crucial to the species' survival. This size refers to the effective population size, i.e. the number of individuals contributing to the species' gene pool, and may be one or two orders of magnitude lower than the census size. Recent technological advances in population genetics enable quantification of genetic structure, genetic variation, and effective population size, and are potentially indispensable for the design of viable conservation programs. A recent study of population genetic structure of murrets (*Uria* spp.) illustrates several of these techniques. Population genetic stud-

ies may also lead to the 'discovery' of new or cryptic species, such as the long-billed murrelet (*Brachyramphus marmoratus perdx*).

24 IMPACT OF PREDATION BY RACCOONS ON SEABIRDS BREEDING IN HAIDA GWAI (QUEEN CHARLOTTE ISLANDS), BRITISH COLUMBIA. *Anthony J. Gaston*, Canadian Wildl. Serv., 100 Gamelin Blvd., Hull, Quebec K1A 0H3.

Raccoons were introduced into the Haida Gwaii archipelago in the 1940s and have spread throughout the main islands, feeding especially in the inter-tidal zone. Where they have invaded seabird colony islands they have had an adverse impact on breeding populations. Research at East Limestone Island showed that 75% of Ancient Murrelets killed by predators were victims of raccoons. Production of chicks from the colony was adversely affected. At Helgesen Island the populations of Ancient Murrelets and Rhinoceros Auklets have been reduced by 80% since 1986 and Cassin's Auklets have been almost wiped out. These data suggest that burrow nesting auks cannot coexist for long with raccoons. Without intervention, seabird populations in Haida Gwaii seem likely to decline very substantially. Plans for meeting this threat are described.

25 EFFECTS OF GULL PREDATION AT A DECLINING THICK-BILLED MURRE COLONY. *Grant Gilchrist*, Dept. of Zoology, University of British Columbia, 6270 University Boulevard, Vancouver, BC, Canada V6T 1Z4.

Many thick-billed murre colonies in Greenland have experienced severe population declines. Although recent restrictions on hunting and salmon gill-net fisheries have been implemented to reduce adult mortality, murre colonies have not recovered. Gull predation may provide a proximate mechanism to explain this observation. Glaucous gulls are the primary predator of thick-billed murre eggs and chicks in the eastern arctic. Murres nesting together on cliff ledges collectively defend against attack by striking gulls with their beaks. Gulls are most successful when they attack low nesting density sites on broad ledges, while foraging on foot. Thus, gull predation should have a greater impact at declining colonies where low nesting densities

may be common. To test this hypothesis, I compared murre nesting densities and gull foraging ecology at two separate murre colonies. The first was an expanding colony located on Coats Island, Canada, studied in 1989-1992. The second was a declining colony located in the Upernavik region of Greenland studied in 1993. At Coats, gulls avoided contact with murres when stealing eggs and preferred to attack murres located on the periphery of nesting groups. They also preferred to attack from the air when windy conditions enhanced their maneuverability in flight and enabled them to reach narrow ledges where murre defense was less effective. At the declining Upernavik colony: 1) gulls foraged primarily on foot on broad low-density ledges regardless of wind conditions, 2) a greater proportion of murres bred on nest sites vulnerable to gull predation, 3) gulls took more eggs, and, 4) there were more breeding gulls present.

26 COSTS OF REPRODUCTION IN BLACK-LEGGED KITTIWAKES *Rissa tridactyla*. *Gregory Golet and David B. Irons*, U.S. Fish and Wildlife Service, Division of Migratory Bird Management, 1011 East Tudor Rd., Anchorage, Alaska 99503.

We conducted an experiment to determine if there were costs of reproduction associated with chick rearing in the Black-legged Kittiwake. We colored-banded adults on about 500 nests and removed the eggs from randomly selected nests so that about half the adults raised young and half the adults did not raise young. Following the manipulation, adult attendance and body condition were studied at control and manipulated nests. Survival and fecundity were measured the following year. Late in the chick-rearing period, adults from control nests were significantly lighter for their size, although body condition was reduced in both groups relative to the preincubation level. Adults that raised chicks had significantly lower survival than adults that did not raise chicks (0.898 vs. 0.953), suggesting that attempting to raise chicks may reduce life expectancy by 54% (assuming age-constant mortality). The year after the manipulation, no differences were found in average laying date and clutch size, between the manipulated and control birds. These results suggest that reproductive costs may be expressed via a physiological

mechanism in which reproductive stress imposes a degeneration in body condition, thereby reducing survival and potentially future fecundity.

27 IMPLICATIONS OF FASTING AND SHORT-TERM MASS LOSS IN PLANKTON-FEEDING AUKLETS AT THE PRIBILOF ISLANDS, ALASKA. *Alexandre N. Golovkin*, Res. Inst. of Nature Conserv. and Reserves, Znamenskoye - Sadki, P.O. VILAR, Moscow 113628, Russia; and *J. Christopher Haney*, The Pennsylvania State University, DuBois, PA 15801.

During fasting periods corresponding to incubation shifts (ca. 24 hrs), Least Auklets lost mass at 0.4-0.8 g/hr. Total mass loss as a function of initial body mass (TML) ranged from 10.0-21.0% ($\bar{x} = 15.2 \pm 2.2\%$; $n = 45$). Body mass loss not due to gut evacuation (BML) ranged from 2.4-18.3%. BML did not differ between the first and second 12-hr fasting intervals, and there were no significant differences in rates of BML across three age/breeding classes (subadults, adults with, and adults without prior breeding experience). TML in Parakeet Auklets ranged from 7.5-15.9% ($\bar{x} = 11.7 \pm 1.9\%$; $n = 16$). In contrast to Least Auklets, BML in Parakeet Auklets was lower (5.9-10.4%), it varied significantly between the first and second 12-hr fasting intervals, and there was an interaction between fasting interval and initial capture time within individuals. Time of day buffered BML in Parakeet Auklets caught during mid-morning and late evening (but not late afternoon), most likely a consequence of recently-completed foraging trips just prior to capture. Short-term mass fluctuations rival the magnitude of mass loss that occurs immediately after incubation in alcids, i.e., the "pre-programmed anorexia" thought to be adaptive in reducing energetic costs of flight during chick-rearing.

28 A STATISTICAL MODEL OF HABITAT SUITABILITY FOR THE MARBLED MURRELET. *Thomas E. Hamer*, Hamer Environmental, 615 State St., Sedro Woolley, WA 98284; *William P. Ritchie*, Washington Department of Wildlife, 600 N. Capitol Way, Olympia, WA 98504; and *Charles W. Turley*, Wash. Dept. Nat. Res., P.O. Box 47001, Olympia, WA 98504.

There has been little research effort to quantify and describe the within-stand forest structural characteristics that are associated with occupied stands. We used logistic regression and analyzed 38 forest structural variables to develop a predictive model for the binary dependent variable which was defined as occupied and unoccupied stands. The model results gave a predicted probability of occupancy with an accuracy rate of 74.2%. The probability of occupancy of a stand was positively related to percent slope, total number of potential nest platforms, stem density of dominant trees, mean dbh of western hemlock, and the moss coverage on the limbs of dominant trees. The probability of occupancy was negatively related to stand elevation, canopy closure, and lichen coverage on the limbs of dominant trees. The number of platforms available in a stand, and the cover of moss on tree limbs, were the most important variables used to predict occupancy. Detection rates and the percent of occupied stands declined sharply with an increase in elevation over 1,067 m, and for stands >63 km from saltwater. Land management activities that reduce the: (1) number of platforms/ha; (2) composition of low elevation conifers; (3) moss cover on tree limbs; (4) stem density of dominant trees; or (5) canopy closure, will reduce the quality of a site as nesting habitat for murrelets.

29 THE VANISHING ACT OF CRESTED AUKLETS: WHY THE APPARENT SCARCITY AT SEA? *J. Christopher Haney*, The Pennsylvania State University, DuBois, PA 15801.

Relative to Parakeet and Least auklets, Crested Auklets seem uncommon during ship-board surveys in the northern Bering Sea. But when birds in flight are combined with birds on the sea surface, numbers actually exceed values generated from colony sizes of the three plankton-feeding auklets. Up to 76% of Crested Auklets offshore are commuting versus only 47% of Least Auklets. Crested Auklets depart colonies in large groups which disperse during foraging; Least Auklets commute in small groups which aggregate on the ocean surface. Crested Auklets from western St. Lawrence Island disperse seaward in narrow vectors, flying into southwesterly or northeasterly winds on outbound flights, converging along the coastline during inbound flights. A larger proportion of Crested

Auklets in flight at any given time suggests: 1) they travel further from colonies, or 2) they fly longer linear distances among more foraging sites during a single trip than Least Auklets. Crested Auklets' preference for large, aggregated prey (euphausiids) instead of small, dilute prey (copepods) may enable it to allocate more of its activity budget to aerial searches prior to feeding. Based on flight speeds of 68-82 km/hr and two provisioning trips/day/adult, extended linear distances (550-650 km/trip) and large foraging radii (275-325 km/trip) make a substantial portion of the northern Bering Sea accessible to Crested Auklets during chick rearing. Aerial segments of breeding seabird populations should not be ignored in foraging models.

30 IMPACT OF INTRODUCED RATS ON THE BREEDING ANCIENT MURRELETS (*Synthliboramphus antiquus*) OF LANGARA ISLAND AND THE FEASIBILITY OF RAT ERADICATION. *Anne Harfenist*, Canadian Wildlife Service, Delta, B.C. V4K 3Y3; *Rowley H. Taylor*, 22 Waterhouse St. Nelson, New Zealand; and *Gary W. Kaiser*, Canadian Wildlife Service, Delta, B.C. V4K 3Y3.

A 1993 survey of the ancient murrelet colony on Langara Island, B.C., indicates that the breeding population has declined by approximately 40% over the last five years and is now probably less than 10% of its historical size. The colony now covers only 50 % of the area used by breeding murrelets in 1988. The primary cause of the colony decline appears to be predation on eggs and adults by Norway rats (*Rattus norvegicus*). These rats were introduced to Langara in the 1950's. We adapted New Zealand's successful strategy for rat eradication on small offshore islands to Langara Island (3,200 ha). The program uses the anti-coagulant brodifacoum and should pose minimal risk to non-target species. The operation will involve bait stations laid along a 100 x 100 m grid to cover the entire island. Stations will be checked every two to four days for approximately six weeks, at which point the rats should all be dead. The major threat to long-term success of the project is the risk of re-introduction of rats to the island.

31 A SEABIRD MONITORING DATABASE FOR THE NORTH PACIFIC—WHAT, WHY, AND HOW.

Scott A. Hatch, National Biological Survey, 1011 E. Tudor Rd., Anchorage, AK 99503.

Seabird monitoring is the accumulation of time series data on any aspect of seabird distribution, abundance, demography, or behavior. A survey of past and ongoing effort reveals that upwards of 5,000 observations on seabird population parameters are available from North Pacific colonies, and new data are accumulating steadily. Much of this information is not readily accessible, which suggests the need for a consolidated database and a distribution system that places data in the hands of researchers and resource managers on a timely basis. Potential uses of this database include: (1) detection and geographic analysis of trends, (2) hypothesis-testing using correlation or concordance procedures, (3) analysis of means and variability in seabird life table statistics, and (4) evaluation of the scope and effectiveness of the monitoring program in the North Pacific. There are three main obstacles to achieving the goal of a comprehensive database on seabird monitoring: (1) professional competition and mistrust, (2) ethical issues concerning the ownership and distribution of unpublished data, and (3) constraints of time and money among those who would need to participate. The PSG Seabird Monitoring Committee believes these obstacles are surmountable and that the benefits of a comprehensive database for seabird monitoring can be realized within the next few years.

32 KLEPTOPARASITISM AND PREDATION OF BLACK GUILLEMOTS (*Cepphus grylle*) BY GULLS IN THE GULF OF MAINE. *D. Lindsey Hayes*, National Biological Survey, 1011 E. Tudor Rd., Anchorage, AK 99503.

Kleptoparasitism, the behavior in which a parasite steals food procured by a host of the same or another species, is especially common among some groups of seabirds. On Great Duck Island, Black Guillemots, returning to the colony with food in their bills to feed their chicks, are often intercepted by kleptoparasitic Herring Gulls (*Larus argentatus*) or predatory Great Black-backed Gulls (*L. marinus*). Interactions between gulls and guillemots were monitored during the 1991-92 breeding seasons. In 1992, 99% of all kleptoparasitic interactions involved adult Herring Gulls (88% by solitary

kleptoparasites). Three distinct kleptoparasitic tactics were used: 1) lunge-jump, 2) rush (fly or run), and 3) aerial pursuit. Predation by a single pair of Great Black-backed Gulls was probably responsible for most adult guillemot mortality in one study plot. Gulls of both species were observed feeding on the carcasses of fledgling guillemots. Kleptoparasitism provides Herring Gulls with a supplemental source of food from a minimal investment of energy. Their success rate is about 20%. Most of the guillemots on Great Duck Island probably can bear current rates of kleptoparasitism. Young guillemots in their nests are relatively safe from natural predators, but adults and fledglings are susceptible to predation by gulls. Predation may significantly affect the provisioning rates at some guillemot nests.

33 ECOLOGY OF RHINOCEROS AUKLETS ON AÑO NUEVO ISLAND, CALIFORNIA.

Michelle Hester, William J. Sydeman, and Elizabeth B. McLaren, PRBO, 4990 Shoreline Highway, Stinson Beach, CA 94970.

Human habitation and occupancy has disturbed seabird breeding habitat on Año Nuevo Island (ANI) over the past two centuries. Rhinoceros Auklets, extirpated from California in the late 1700s, recolonized ANI in 1986. In 1993, we initiated a restoration project for this species on ANI. This work complements ongoing restoration and protection studies on Southeast Farallon Island (SEFI). As part of the program we installed 40 nest boxes on ANI and removed human debris from nesting habitat. We monitored nest boxes and natural burrows weekly for occupation from April through August. Twenty-five percent of the nest boxes were occupied by nesting Rhinoceros Auklets. Nesting phenology on ANI was about 2 weeks later than on SEFI. Productivity in nest boxes was slightly lower than on SEFI with roughly 35% of the pairs producing independent offspring. Dietary studies indicated that anchovies were an important prey item in 1993, although other fish, notably California Sardines were documented as well. A total of 75 apparently occupied sites was tallied, but some of these were used by non-breeding birds. The population has increased in recent years and is recovering from oil spill mortality (~1500 were killed or debilitated in the 1986 *Apex Houston*).

34 FACTORS AFFECTING PROVISIONING RATES OF NESTLING THICK-BILLED MURRE AT COATS ISLAND, N.W.T. *Mark Hipfner*, Dept of Biology, University of Ottawa, Ottawa, Ontario K1N 6N5; and *Anthony J. Gaston*, Canadian Wildl. Serv., 100 Gamelin Blvd., Hull, Quebec K1A 0H3.

The rate at which parents provision their chicks has been cited as a potential tool in monitoring feeding conditions, and hence environmental changes. We examined the rate at which Thick-billed Murre chicks were provisioned at Coats Island, N.W.T. in several years to assess variation among years and the effects of time of day and chick age. We found that provisioning rates varied significantly among years. When rates were high, there was a two-peaked daily pattern of deliveries, with one peak early in the morning and another in late afternoon. This pattern was less clear when feeding rates were lower. When years were combined, feeding rates increased with chick age up to about 15 days and then decreased, but this pattern was not found in every year. We suggest that inter-year variation is mainly caused by differences in the availability of food, but that variation with age is adapted to chick growth requirements.

35 DIETARY RANGE AND FORAGING HABITATS OF A BREEDING COLONY OF TERNS AND SKIMMERS AT THE BOLSA CHICA ECOLOGICAL RESERVE. *Michael H. Horn, Wendy E. Loeffler, Patricia A. Cole and Jacqueline F. Wilson*, Dept. of Biological Science, California State University, Fullerton 92634.

Within the last several years, Caspian, Elegant, and Forster's terns and the Black Skimmer have colonized one of the two nesting islands at the Bolsa Chica Ecological Reserve in Orange County, California. This natural invasion, numbering as many as 5,000 adult birds per breeding season, has greatly reduced nesting space for the endangered California Least Tern. In 1992, we began a long-term study of foraging patterns and food web structure in this newly formed guild of nesting seabirds. Weekly collections of fish prey dropped on the island by the four colonizing species during the 1992 nesting season revealed that this assemblage feeds in freshwater and estuarine habitats as well as in coastal

marine locations. Of the 40+ fish species identified from the dropped samples, Northern Anchovy and Pacific Sardine were the most abundant marine prey items, whereas Topsmelt was the most common estuarine prey species and Mozambique Tilapia, an exotic species, the most prevalent freshwater fish in the samples. A quantitative model of spatial and temporal use of habitats and prey is an expected eventual outcome of our research.

36 DOES FLUCTUATING ASYMMETRY IN WHISKERED AUKLET (*Aethia pygmaea*) ORNAMENTS REVEAL INDIVIDUAL QUALITY? *Ian L. Jones*, Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia V5A 1S6 CANADA.

Fluctuating asymmetry (FA) refers to small deviations from bilateral symmetry that result from genetic or environmental stresses on individuals. FA has been invoked as a possibly important mechanism by which sexual ornamentation could reveal individual mate quality and thus be favored by sexual selection in a viability-indicator process. Whiskered Auklets have the most elaborate facial ornamentation of any seabird, and the form of their ornamentation appears to be ideal for revealing FA. I obtained right and left side measurements of facial ornaments of 197 Whiskered Auklets at a breeding colony at Buldir Island, Alaska in 1992 and 1993. As in other putative sexually selected traits, ornament size varied highly among individuals, was repeatable within individuals and between years, and exhibited FA. However, tests of the sexual selection hypothesis failed to confirm the prediction of a negative relationship between FA and ornament size, although several ornament measures were correlated with body condition. Thus while Whiskered Auklet ornaments may reveal quality, there was little evidence that FA plays a role in sexual selection in this species.

37 CANADA'S FIRST ACTIVE MARBLED MURRELET NEST. *Paul H. Jones*, 3563 West 32nd Avenue, Vancouver, B.C. Canada, V6S 1Z1; and *Sharon Dechesne*, Dept. of Biology, University of Victoria, Victoria, B.C. V8W 2Y2.

The first active nest of a Marbled Murrelet (*Brachyramphus marmoratus*) in

Canada was found in an old-growth Yellow Cedar (*Chamaecyparis nootkatensis*) at an altitude of 1100m on the Caren Range, South-western British Columbia. This was a first for this tree species and a record for altitude also. The nest was found by four observers on August 7, 1993 in the Caren sub-alpine remnant 800ha old-growth forest which is threatened by logging. A chick estimated to be 16 days old when the nest was found was observed by three observers until it left the nest 14 days later. High-8 video, and still photographs were taken of the chick. Sketches were also made of the adults feeding the chick. Nesting, flight behavior and vocalizations are described. After the chick departed the tree was climbed and egg fragments, the egg membrane, down and a small fish removed from the nest. The Canadian find is remarkable for the number of broad daylight flights as well as the number of feedings. The average number of feedings per day was seven with four taking place after sunrise. Most of the fish fed to the chick were Pacific Sandlance. The find may influence forest practices in British Columbia.

38 RELATIONSHIP BETWEEN TRANSECT LENGTH AND NUMBERS OF BIRDS AND POPULATION ESTIMATES ON MARINE BIRD SURVEYS. Steven J. Kendall, Beverly A. Agler, Pamela E. Seiser, and David B. Irons. U.S. Fish and Wildlife Service, Migratory Bird Management, Anchorage, Alaska 99503.

Marine boat surveys were done in Cook Inlet, Alaska in 1993 to estimate populations of seabirds and marine mammals. Estimates were calculated from counts done on randomly-selected transects. We examined the difference in population estimates and confidence intervals using 2 different transect lengths. Our survey area was divided into 3 strata: pelagic, coastal and shoreline. Pelagic transects and most of the coastal transects were 2 nm long. Data for the 2 nm transects were recorded in 1 nm segments, allowing us to compare population estimates from 2 different transect lengths. If the estimates were similar, we could increase our sample size, thus decreasing our variance in future surveys by doing transects of shorter length. Mathematical and practical aspects of using 1 versus 2 nm transects will be discussed.

39 COMPARISON OF THREE CONFIRMED AND TWO PROBABLE MARBLED MURRELET NESTS FOUND ON PRIVATE COMMERCIAL TIMBERLAND IN NORTHERN CALIFORNIA. Steven J. Kerns, Wildland Resource Managers, P.O. Box 102, Round Mountain, CA 96084; and Mark Freitas, Wildland Resource Managers, P.O. Box 102, Round Mountain, CA 96084.

Three confirmed and two probable marbled murrelet nests have been located on The Pacific Lumber Company lands in Humboldt County, California. Two confirmed nests were found in Coast Redwoods (*Sequoia sempervirens*) and one was found in a Douglas-fir (*Pseudotsuga menziesii*). All three nests were evidenced by well developed fecal rings and eggshell fragments being found on the forest floor. The two probable nests were both in redwoods and evidenced by eggshells and tree platforms. Nest support structure differed for each nest. One nest was positioned against the trunk of a redwood tree and was supported by the confluence of two relatively small limbs. Nest substrate consisted of scattered thin clumps of moss. The second nest, also in a redwood, was on a larger limb, located at a wide spot where the limb had a broken off branch. Nest substrate here consisted of needle cast and litter. The third nest was located against the trunk of a Douglas fir on a single moss covered limb. One probable nest was on a flat area against the trunk at the confluence of three limbs. The second probable nest was on a wide spot of a limb. Nest trees, nest structure, and nest locations are compared.

40 BREEDING BIOLOGY, FEEDING ECOLOGY AND GROWTH ENERGISTICS OF THE SPECTACLED GUILLEMOT (*Cephus carbo*). Alexander S. Kitaysky, Institute for Biological Problems of the North, Magadan, Russia; and Department of Ecology and Evolutionary Biology, University of California, Irvine, CA 92717.

I studied the breeding biology of Spectacled Guillemots on Talan Island (northern Sea of Okhotsk) during summer, 1987-1989. About 35-40 individuals breed on the island. Birds arrived at the colony in early May and departed in mid-September. Breeding densities appeared to be limited by feeding conditions in spring. It seems that only those pairs with individual feeding

territories in spring initiated breeding. Overall, about 50% of birds nested. The complete clutch of the Spectacled Guillemot contains two eggs, the mass and size of which are considerably larger than those of other species in the genus *Cephus*. Possibly because of this, the Spectacled Guillemot has a longer period between laying of the first and second egg (mean of 7 d). Incubation lasts for 27 d and hatching less than 24 h. Growth and development patterns of Spectacled Guillemot nestlings are similar to those of the Black Guillemot (*C. grylle*). Nestlings spend about 35 d in the nest. I found that in 45% of nests, both young survived until fledging; something not previously observed for this species. The most important prey fed to chicks were benthic fish: Cottidae (44% by number) and *Pholis pictus* (27%). *Ammodytes hexapterus*, along with *Gimnelis* spp., *Triglops* spp., *Alectrias alectrolophus* were also taken. The stomachs of adult birds collected near the island contained crustaceans: *Sabinea* spp., *Sclerocrangon* spp. (*Macrura*) as well as fish: *Pholis* spp. and *Triglops* spp. Individual Spectacled Guillemots differ in the food they bring back to their chicks, even between members of a pair. Composition of prey species was very constant for each individual bird. Average daily feeding rates ranged from 12.5 fish/d at the beginning of the chick-rearing period to 15.3 fish/d at the end. A captive chick had an estimated total energy intake of 729 kJ/d (calculated from food intake) with a growth rate of 13.04 g/d. I estimated that energy requirements (according to oxygen consumption rate measures) were 497 kJ/d, or 68.2% of the total energy intake. Efficiency of biosynthesis (daily gain in body mass / daily food intake) was 10.9%.

41 POPULATION STATUS AND BREEDING BIOLOGY OF THE SPECTACLED GUILLEMOT. Alexander Ya. Kondratyev, Institute for Biological Problems of the North, Russian Academy of Sciences, Magadan, 685000 Russia.

The Spectacled Guillemot (*Cephus carbo*) breeds on the mainland and islands throughout the Sea of Okhotsk and Japan Sea. In the southern part of their breeding range Spectacled Guillemots are generally resident. Wintering areas are known from the inshore waters of Sakhalin Island, the southern Kuril islands, and around Japan. The total population of Spectacled Guillem-

ots has not been accurately censused, but we calculate that it is close to 100,000 individuals. On Talan Island in the northern Sea of Okhotsk, Spectacled Guillemots arrive on the nesting grounds in late April to early May. The nesting period is extended, and non-incubated eggs have been found from 13 June to 18 July. The incubation period is about 26-32 days. Chicks remain in the nest for 30-36 days, and fledge in the second part of August. Only a few guillemots remain on the nesting grounds by early September. Chick diets contain Polychaeta (1.5%), *Trigllops* spp. (70.0%), Pholidae (8.5%), other fishes (9.0%), and unidentified invertebrates (11.0%). The main predators of Spectacled Guillemots include foxes, gulls, owls, and Peregrine Falcons. An important source of natural mortality at nesting colonies is heavy rainfall brought by strong storms. Negative human impacts include oil pollution of shallow coastal areas, and human disturbance at breeding sites. There is evidence for degradation of nesting colonies and an overall decline in Spectacled Guillemot populations, especially in the southern part of their range.

42 PREY SELECTION BY THE SLATY-BACKED GULL ON TALAN ISLAND, SEA OF OKHOTSK. *Luba F. Kondratyeva*, Institute for Biological Problems of the North, Russian Academy of Sciences, Magadan, 68500 Russia.

The diet and foraging strategies of Slaty-backed Gull (*Larus schistisagus* Stejneger) were studied on Talan Island, which supports one of the largest aggregations of breeding seabirds in the Russian Far East. The main part of the diet of Slaty-backed Gulls on Talan Island is comprised of adult seabirds, their chicks, and their eggs. Prey preference was evaluated using Ivlev's Elective Index (E), which is calculated from the % composition of *i*-th prey species available (P_i) and % composition of the *i*-th species in the diet (R_i), where $E = (R_i - P_i) / (R_i + P_i)$. Positive E (from 0 to +1) suggests a "preference" for the *i*-th prey, and negative E (from 0 to -1) suggests "avoidance" of the *i*-th prey. Slaty-backed Gulls showed a positive preference for ($E = 0.9$) Ancient Murrelet *Synthliboramphus antiquus* and Parakeet Auklet *Cyclorhynchus psittacula*; and for ($E = 0.5$) Black-legged Kittiwake *Rissa tridactyla* and the murre *Uria aalge* and *U. lomvia*; none of which are overly abundant

on the island. Slaty-backed Gulls showed a negative preference for Horned Puffin *Fratercula corniculata* ($E = -0.4$), and Tufted Puffin *Lunda cirrhata* ($E = -0.2$), and for the most abundant species on the island, Crested Auklet *Aethia cristatella* ($E = -0.4$).

43 FOREST AND AT-SEA STUDIES OF MARBLED MURRELETS IN CLAYOQUOT SOUND, B.C., 1993. *Irene Manley, John Kelson*, Tucker Bay Road, Lasqueti Island, B.C. V0R 2J0; *Stephanie Huges*, and *Kevin Jordan*, Box 67, Tofino, B.C. V0R 2Z0.

From April to August 1993 we conducted at-sea surveys and forest studies of Marbled Murrelets in Clayoquot Sound, B.C. We examined 30 sites in hemlock mix, spruce mix, and cedar mix forests. Activity was monitored once per month in May, June, and July. Habitat was measured using 30 x 30 m vegetation plots at each site. Of 1574 detections, 5.78% were occupied behaviors that occurred at 22 of the 30 sites. Occupied detections were positively correlated with the total basal area ($r = 0.73$) and average tree diameter ($r = 0.59$) of the plots. Ninety six trees were climbed at these sites resulting in discovery of one nest. An additional nest was located elsewhere above eggshell fragments found on the ground. A third year of at-sea surveys of Clayoquot Sound counted 2776 birds in 353 km² compared to 4500 birds in 1982 and 2704 birds in 1992 (both in 293 km²). 319 km of shoreline was surveyed for juveniles from July 2 to August 17. Juveniles accounted for 10.4% of the 395 murrelets on these surveys and were found consistently in the same areas of coastline, usually within 50 m of rocky shoreline in or near kelp.

44 DISTRIBUTION AND ABUNDANCE OF SEABIRDS ON MONTEREY BAY DURING THE 1992-93 EL NIÑO. *John Mason, Jim Harvey*, and *Patience Browne*, Moss Landing Marine Laboratories, Moss Landing, CA 95039.

The Monterey Bay area, California, recently designated a National Marine Sanctuary, is a unique habitat for seabirds due to its location along the Pacific flyway and abundant food resources. The bay is currently experiencing an El Niño, which may potentially attract seabirds from less abundant food areas. Thirteen random and 11 fixed strip transects were conducted from

April 1992 to October 1993 in Monterey Bay. There was no significant difference in mean number of the four most abundant seabirds (Sooty Shearwaters, gull species, Common Murres, and Western Grebes) between fixed and random transects. Sooty Shearwaters (arriving in late May and leaving in October) had the most variable counts, whereas, gulls and Common Murres (year-round residents) had the least variable counts. Greatest numbers of birds occurred in late summer when thousands of Sooty Shearwaters (151/square km) occupied the bay. Arriving in fall, Western Grebes, loon species, and Surf Scoters occurred almost exclusively in the north-east part of the bay. Cormorant species occurred primarily within 5 km of shore throughout the bay. Continued counts of seabird abundance in the bay will be necessary to determine potential effects of the 1992-93 El Niño.

45 EFFECTS OF NEAREST NEIGHBOR INTERACTIONS ON TIMING OF BREEDING AND BREEDING SUCCESS IN COMMON MURRES (*Uria aalge*). *Elizabeth B. McLaren* and *William J. Sydeman*, PRBO, 4990 Shoreline Highway, Stinson Beach, California 94970.

We studied the relationship between breeding parameters (egg-laying dates and fledging success) and nearest neighbor distance in a single study plot located within a large, stable colony of Common Murres (*Uria aalge*) on Southeast Farallon Island, California from 1990-1993. We evaluated neighbor interactions on different spatial scales: (1) among birds in physical contact with one another ("physical neighbors"), (2) among a focal bird and its four nearest breeding neighbors ("proximate neighbors"), and (3) among birds grouped together by physical characteristics of the study plot ("tier neighbors"). There was considerable year-to-year variation in synchrony of murres at all spatial scales, however the differences were not significant. We found a slight tendency towards synchrony as spatial scale decreased. Birds were more likely to breed synchronously with physical neighbors than with proximate, tier, or colony neighbors. Reproductive success was strongly related to the degree of synchrony exhibited among proximate neighbors. These results may provide a means of assessing the effects of a major oil spill on Common Murres and other highly colonial seabirds.

46 MONITORING OF SEABIRD POPULATIONS AND PRODUCTIVITY IN WESTERN ALASKA, 1989-1991. Vivian M. Mendenhall, U.S. Fish Wildl. Serv., Anchorage, AK 99503; Donald E. Dragoo and Arthur L. SOWLS, U.S. Fish Wildl. Serv., Homer, AK 99603; Ada C. Fowler, National Biol. Surv., Anchorage, AK 99503; Lisa Haggblom, U.S. Fish Wildl. Serv., Dillingham, AK 99576; Edward C. Murphy, Univ. Alaska, Fairbanks, AK 99775; and Brian E. Sharp, 2234 NE 9th, Portland, OR 97212.

In a joint project of the U.S. Fish and Wildlife Service and Minerals Management Service, we monitored populations and productivity of kittiwakes (*Rissa* spp.) and murrelets (*Uria* spp.) at six colonies in the Bering and Chukchi Seas: St. George Island, Cape Peirce, St. Matthew Island, Bluff, Little Diomed Island, and Cape Thompson. Diets were also monitored at several sites. Methods were standardized to facilitate comparisons among colonies and years. Most populations have been stable since 1984 or earlier at colonies (5 of the 6) where we could analyze trends by comparison with earlier data. Exceptions were a long-term decline in red-legged kittiwakes at St. George and recent moderate declines in two species at St. Matthew. Productivity (particularly of kittiwakes) fluctuated during the study, probably in association with diet. Mean productivity differs greatly among colonies in western Alaska; causes appear to include food resources and possibly predation. For meaningful interpretations of seabird trends, we need not only statistically sound monitoring studies, but also careful selection of sites (representative of larger populations), regular, frequent observations (at least every 3 years), and supporting data on resources and life history.

47 THE RELATIONSHIP OF MARBLED MURRELET ACTIVITY LEVELS AND BEHAVIORS WITH HABITAT CHARACTERISTICS OF FOREST STANDS IN CALIFORNIA. Sherri Miller and C. John Ralph, Redwood Sci. Lab., Arcata, CA 95521.

We compared relationships between stand size, structure and landscape characteristics with murrelet presence, activity levels and types of behaviors. Detection numbers were standardized for seasonal variation using three sites surveyed weekly

during the breeding season for 4-5 years. The density of the old-growth tree cover and presence of redwood trees were positively related to mean murrelet detection levels. Old-growth tree density was also a significant variable for predicting observations of occupied behaviors. To identify patterns of activity associated with landscape features and habitat characteristics, we surveyed stations placed at 400 m intervals within the large contiguous stands of old-growth redwood in state and federal parks in California. We found an effect of elevation and topography on the proportion of stations with observations of occupied behaviors highest in major drainages.

48 ISLAND FORMATION AND WHITE PELICAN NESTING HABITAT PROTECTION: A GEOGRAPHIC INFORMATION SYSTEMS APPROACH. Leopoldo A. Moreno and Daniel W. Anderson, University of California, Davis, CA 95616.

In California, the American White Pelican (*Pelecanus erythrorhynchos*) breeds in Clearlake reservoir and Sheepy Lake both located in the Klamath Basin, along the California-Oregon border. During the early 1900's the Klamath Basin was "reclaimed" by the U.S. Bureau of Reclamation (USBR) for irrigation projects. Clearlake reservoir is one of the main sources of irrigation water in the area and thus its water levels vary along with water demand for agriculture and cattle ranching. In Clearlake the location of white pelican colonies varies with the availability of nesting islands, which in turn are formed by water level fluctuations. The timing of island formation and their availability is crucial for the success of breeding white pelicans especially during egg-laying and incubation, when the colony is most vulnerable to predation by coyotes or trampling by cattle. Water levels in Clearlake have been monitored by the USBR since 1910 and, in any given season projections for water levels for each month are available. In coordination with the USBR and the U.S. Fish and Wildlife Service (USFWS) digital maps of Clearlake have been developed using a Geographic Information System. By combining seasonal water level projections with the digital maps it is possible to predict where and when nesting islands may become connected to land, allowing the USFWS to plan in advance the use of predator deterrents.

49 BROWN NODDIES ON CAYO NOROESTE, CULEBRA, PUERTO RICO: WHAT HAPPENED IN 1990? Ralph D. Morris, Department of Biological Sciences, Brock University, St. Catharines, Ont. L2S 3A1; and John W. Chardine, Canadian Wildlife Service, P.O. Box 21276, St. John's, NF, Canada A1A 5B2.

In 1990, Brown Noddy (*Anous stolidus*) adults nesting on Cayo Noroeste, Culebra, Puerto Rico were delayed in their daytime arrival at the colony and in egg-laying. The head-bill length, body mass and condition of breeding birds that returned in 1990 were within the normal annual variation established for earlier years. However, whereas in earlier years about 90% of banded birds alive the previous year returned in the following year, in 1990 only 68% of birds present in 1989 did so. None of the noddies that failed to return in 1990 has been seen through June 1993. We considered several causes for the reduction in the proportion of previous breeders who returned in 1990 including a higher incidence of non-breeding, movement to other breeding sites, and death of the missing birds. We conclude that those failing to return were directly or indirectly killed by Hurricane Hugo during passage in September 1989. We report shifts in patterns of nest-site and mate fidelity as a direct result of this mortality and predict a long-term impact on age-structure of breeders at the colony.

50 POPULATION STATUS AND REPRODUCTIVE SUCCESS OF COMMON MURRES AT BLUFF, ALASKA, 1975-1991. Edward C. Murphy, Institute of Arctic Biology, Univ. of Alaska Fairbanks, Fairbanks, Alaska 99775-0180.

Numbers and reproduction of Common Murres (*Uria aalge*) at Bluff, Alaska were studied in 1975-1991, with daily observations of reproductive plots in 1987-1991. Annual means of mid-season counts of two large Census Plots varied markedly, ranging from 1166 (in 1984) to 2541 (in 1981), with no overall trend during the 17-year period. Reproductive success also varied considerably among years; for example, the total number of eggs hatching on the Reproductive Plots varied between 57 (in 1984) and 341 (in 1983). Mid-season counts of adults were highly positively correlated with reproductive success, indicating that interpretations of any changes in numbers must consider concurrent changes in repro-

ductive performance. Overall, hatching success and fledging success of first attempts averaged 65% and 91%, respectively. Replacement attempts occurred at 41% of the sites where first eggs were lost. Hatching success and fledging success of replacement attempts (72% and 81%, respectively) and first attempts were comparable. Although Bluff is at the northern extreme of colonies where Common Murres outnumber Thick-billed Murres (*U. lomvia*), these figures suggest that the duration of the period that is favorable for reproduction is no shorter at Bluff than at colonies far to the south.

51 FEEDING BEHAVIOR AND GROWTH OF A CAPTIVE FULMAR, HORNED PUFFIN, AND TWO TUFTED PUFFINS. Nancy L. Naslund, John F. Piatt and Ann Harding, National Biological Survey, 1011 East Tudor Road, Anchorage AK 99503.

We studied the feeding behavior and growth of four seabirds collected as chicks (under permit) and raised in captivity. Over a 240 d period after reaching full subadult mass, the fulmar (ca. 545 g) consumed an average of 143 g/day of food, or 26% of body mass (OBM). However, the fulmar showed extreme daily variation in food intake, ranging on average from 15-35% OBM, with extremes of 0-80% OBM. This variation in average food intake cycled over 1-4 week periods, with pronounced troughs in feeding rate prior to moult, and peaks during moult. Body mass also cycled ($\pm 7.5\%$) with food intake, lagging by 1-2 d. Puffins were monitored from chicks (2-10 d) up to 160 d of age, and all showed similar growth patterns: rapid initial mass growth (8.9-10.5 g/d) over 40-50 d with high food intake (40-50% OBM), followed by loss of appetite (20% OBM) and weight at "fledging" (10-15 d period), then a period (80-90 d) of slow growth (1.7-3.6 g/d) to a stable subadult mass. Food intake increased markedly after fledging (40-50% OBM) and then fell to a relatively steady level (Tufted 30% OBM, Horned 40% OBM). Puffins also exhibited weak cycles in feeding rate over 1-4 week periods. Tarsus and wing-growth peaked at fledging, but culmen growth continued and was correlated ($r^2=0.97$) with body mass.

52 BREEDING BEHAVIOR AND NEST SITE FIDELITY OF

KITTLITZ'S MURRELET. Nancy L. Naslund, John F. Piatt, and Thomas van Pelt, National Biological Survey, 1011 E. Tudor Rd., Anchorage, AK 99503.

We studied the breeding behavior of Kittlitz's Murrelet (*Brachyramphus brevirostris*) at a nest situated on a mountain at 900 m elevation and located 12 km inland from Kachemak Bay, Alaska. The nest-site was at the base of a small boulder on talus slope near the mountain top, in sparsely-vegetated alpine habitat. About 5 days after hatching (ca. 3 July), we installed a video camera with an infrared sensor that was triggered by adults when they visited the nest. We recorded 53 feeding visits, encompassing the early and late nestling stages. All food loads consisted of single fish carried crosswise in the adults' bills. Murrelets fed their chick throughout the day (4-6 feeds/day), although most (67%) feedings occurred between dusk and dawn. Of 33 prey items recorded close up, 67% were sandlance, 18% capelin, and 15% unidentified. The average length of feeding visits was 11.4 minutes. Adults could usually be identified individually from plumage characteristics, one being darker than the other. Each provisioned the chick about equally (light adult 43%, dark adult 40%, unknown 17%). On the morning of 27 July, the chick was covered with down on all but its head. At 2150 that evening, the chick had no down, was fed once by each parent, and subsequently fledged. The next morning, both parents carried fish to the nest, indicating that neither had attended the chick at sea during the night, or were aware the chick had fledged. Eggshell fragments and weathered fecal material were found in the nest cup prior to hatching, establishing that the nest had been used during a previous year, and indicating high nest-site fidelity. Clumps of chick-down embedded in rocks and vegetation adjacent to the nest indicated that a chick had fledged successfully during the prior year.

53 TREE CLIMBING AS A TECHNIQUE FOR FINDING MARBLED MURRELET NESTS. S. Kim Nelson, Robert W. Peck, and Toni L. De Santo, Oregon Cooperative Wildlife Research Unit, Oregon State University, Nash 104, Corvallis, Oregon 97331.

This study was designed to evaluate the effectiveness of tree climbing as a method for finding Marbled Murrelet

(*Brachyramphus marmoratus*) nests within a Douglas-fir/western hemlock (*Pseudotsuga menziesii*/*Tsuga heterophylla*) old-growth forest stand in the Oregon Coast Range. Following the 1993 nesting season, a study plot (70 m radius) was established within an area of known Marbled Murrelet activity. Twenty-eight of 40 trees with branch platforms ≥ 18 cm in diameter and ≥ 15 m above the ground were climbed using ropes and ascenders. Six nests were found (5 measured) on branch platforms within the upper canopy of five of the trees. Platforms averaged 49.4 m above the ground (SE=4.6), 57.2 cm from the trunk (SE=22.8), and 35.6 cm in width (SE=6.8). The absence of eggshell fragments, fecal material, and down feathers, combined with the accumulation of needles, cones, and bark fragments within and around each nest suggested that the nests were not active during 1993. Climbing old-growth Douglas-fir was technically difficult and labor intensive but was an effective method for finding nests. An increased number of climbing plots will allow quantitative identification of nest site characteristics and determination of nest density within the stand.

54 SERUM CHEMISTRY AND HEMATOLOGY REFERENCE RANGES FOR SPECIES OF SEABIRDS COMMONLY AFFECTED BY OIL SPILLS. Scott Newman, Grad. Group of Compar. Path., Univ. of Calif. (UC), Davis, CA 95616; John F. Piatt, Nat. Biol. Survey, 1011 E. Tudor Rd., Anchorage, AK 99503; Jan White, School of Vet. Med., UC Davis, CA 95616; and Michael Fry, Dept. Avian Sci., UC Davis, CA 95616.

In this study of 13 species of Pacific seabirds commonly affected by oil spills, blood was analyzed from 151 seabirds collected in the wild to establish reference ranges for hematologic and serum chemistry parameters. Of the 13 species studied, nine were from the family Alcidae and four from the Phalacrocoracidae, Laridae, and Procellariidae. Glucose, cholesterol, alkaline phosphatase, alanine aminotransferase, total protein and field total plasma solids were the only parameters that varied significantly among species. Alkaline phosphatase and total solids also varied significantly with sex. Triglycerides, aspartate aminotransferase, lactate dehydrogenase, total bilirubin, calcium, and creatinine ki-

nase did not vary significantly with species, sex, brood patch size, or body condition (fat). Multiple regression analyses of all data collected on females showed no correlation between different measures of breeding condition and calcium or alkaline phosphatase concentrations. Possible sources of variation (or lack thereof) in these parameters will be discussed. These data provide a useful series of reference ranges for the clinical evaluation of seabirds commonly rehabilitated after exposure to oil pollution.

55 POPULATION DYNAMIC MODELS OF FARALLON SEABIRDS. *Nadav Nur, R. Glenn Ford, David G. Ainley, and William J. Sydeman.* PRBO, 4990 Shoreline Highway, Stinson Beach, CA 94970.

We have developed computer models describing population dynamics of three seabird species breeding on the Farallon Islands: Brandt's Cormorants (*Phalacrocorax penicillatus*), Common Murre (*Uria aalge*) and Western Gull (*Larus occidentalis*). We describe, in particular, the computer model, *Farallon Seabirds*, running on a Macintosh computer, developed for the Gulf of the Farallones National Marine Sanctuary. The model is intended as a research and management tool and incorporates: (1) recent information regarding demographic parameters for each species (in most cases derived from PRBO's intensive studies of the Farallon populations), (2) year-to-year variation in food and oceanographic conditions and their influence on seabird demography, and (3) stochasticity of environmental and demographic parameters. The model can be used to project future population growth in the face of environmental perturbations, such as oil spills, die-offs (e.g., due to red tide), change in food availability, and ENSO events. One component of the model can be used to predict seabird mortality from oil spills in the Gulf of the Farallones. We contrast short-term and long-term responses of the three species to such perturbations. Brandt's Cormorants appear particularly vulnerable since they respond strongly to changes in prey availability, yet are not able to recover from catastrophic events. This prediction of the model is consistent with observations on population behavior.

56 CURRENT STATUS AND BREEDING ECOLOGY OF JAPANESE

MURRELETS. *Koji Ono*, Dept. of Biol., Toho Univ., 2-1, Miyama 2, Funabashi, Chiba, 274 Japan; and *Yutaka Nakamura*, Miyazaki Medical College, 5200 Kiwara, Kiyotake, Miyazaki, 889-16 Japan.

Japanese Murrelets *Synthliboramphus wumizusume* breed at rocky islets or reefs in warm waters of Japan and South Korea. Murrelets nest in crevices, burrows and hollows of rocks, gaps in a pile of stones, or among grasses. There are 26 colonies with a total estimated population of 4000-5000 birds. Of this total, 2000 concentrate at Biro Is. (off Miyazaki Prefecture), and 1000 in the Izu Islands. The population on Koyashima Is. (off Fukuoka Pref.) was largely destroyed by rat predation. Despite extermination of rats there, the population has only recovered to about 10% of its previous abundance. On Nanatsujima Is. (off Ishikawa Pref.) the murrelet population appears to be decreasing because rabbits occupied the burrows. Shikine Is. and Torishima Is. (in the Izu Islands), and Tsukue Is. (off Fukuoka Pref.), are known historical colonies, but current populations are extremely small or already extinct. Many colonies are threatened by sports fishing activities, introduced animals, or other causes, but impacts are unknown. The breeding ecology of Japanese Murrelets was studied in 1992 at Kojine Islet (off Hachijo Is. in the Izu Islands), and in 1993 at Biro Island (off Miyazaki Pref.). Results of these studies will be discussed.

57 GHOSTS OF THE GREAT AUK: BIODIVERSITY AND CONSERVATION OF THE RARE ALCIDAE. *John F. Piatt*, National Biological Survey, 1011 East Tudor Road, Anchorage, Alaska 99503.

One hundred and fifty years ago (1844), the Great Auk (*Alca impennis*) met its final fate before any competent naturalist had a chance to study the living bird in the field. It still seems inconceivable that a species once distributed widely from Florida to Newfoundland, Greenland, Norway, western Europe, and even into the Mediterranean, could have vanished from the face of the Earth. Wanton slaughter by humans is widely supposed to be the cause of the Auk's demise, but Bengtson (1984, *Auk* 101:1-12) provides a compelling argument that the "decline of the Great Auk commenced long before man is known to have caused havoc in breeding colonies in the mid-16th century and onwards". He sug-

gests that the period of severe climate from 1200-1900 A.D. resulted in a decline and redistribution southwards into localized relict Auk populations, which probably set the stage for their extirpation by man. Today, we recognize the predominant influence of ocean climate on the population ecology of many well-studied alcids (e.g., Common Murre). At greater risk to both climate change and anthropogenic threats, however, are a number of rare alcids with small, relict populations. Owing to their scarcity, inaccessibility and secretive habits, we know almost as little today about some living alcids (e.g., Japanese, Craveri's and Kittlitz's murrelets), as we know about the extinct Great Auk. If we embrace the challenge to "conserve biodiversity" in a changing global environment, we should take stock of these rare species before they, too, go the way of the Great Auk and take their Auk genes with them. Whether knowing more about them will aid in their conservation remains to be seen, but we already know the ghostly price of ignorance.

58 STATUS OF A "NEW" RARE ALCID, THE LONG-BILLED MURRELET. *John F. Piatt*, Nat. Biol. Surv., 1011 E. Tudor Rd., Anchorage AK 99503; *Vicki Friesen*, Dept. Ornith., Royal Ontario Mus., Toronto, ON M5S 2C6, Canada; and *Gus van Vliet*, Box 210442, Auke Bay, AK 99821.

Recent genetic studies (Friesen *et al.*, Zink *et al.*, in prep.) indicate that the Asian subspecies of the Marbled Murrelet (*Brachyramphus marmoratus perdix* Pallas) is actually a species more distinct from the North American Marbled Murrelet (*B.m. marmoratus* Gmelin) than is the Kittlitz's Murrelet (*B. brevirostris* Vigors). Pallas assigned this bird specific status (as *Cephus perdix*) in *Zoographia Rosso-Asiatica* (1811), based on a specimen probably collected by Stellar in Tauiskaya Gulf, Sea of Okhotsk. Years later, Stejneger (1886, *Zeitschr. Ges. Orn.* 213), correctly assigned the species to the proper genus (*Brachyramphus perdix*), a taxonomy accepted by Ridgeway (1919, *Bull. U.S. Nat. Mus.* 50). *B. perdix* was later lumped with *B. marmoratus* and given subspecific status. Known variously as the "Long-billed Murrelet", "Partridge Murrelet", or "Asian Mottled Murrelet", *perdix* is quite distinct morphologically from *marmoratus* and *brevirostris*. The culmen of *perdix* (20.3

mm) is substantially longer than *marmoratus* (15.5 mm) and *brevirostris* (10.7 mm), as are wing, tarsus, and tail dimensions. *Perdix* (296 g) is considerably larger overall than *brevirostris* (241 g) and *marmoratus* (225 g). In basic plumage, adult *perdix* may be distinguished from *marmoratus* by its white eye-ring, and in alternate plumage by its complete lack of cinnamon-edged feathers on the back. The distribution of *perdix* is restricted to forested coasts of the Japan and Okhotsk seas, Kuril Is., and outer Kamchatka. Four tree-nests (in *Larix daurica*) have been described from Russia. Except for vagrants, the distributions of *perdix* and *marmoratus* do not overlap. There are no objective estimates of *perdix* population size. Increasingly rapid logging of old-growth forests in Russia, and offshore oil development, pose immediate threats to the population of *perdix*.

59 THE SEABIRDS OF MALPELO ISLAND, COLOMBIA. Robert L. Pitman, SW Fish. Sci. Center, P.O. Box 271, La Jolla, CA 92038; Larry B. Spear, PRBO, 4990 Shoreline Highway, Stinson Beach, CA 94970; and Michael P. Force, 32304 Prince Albert St., Vancouver, BC, Canada V5T 3W5.

We present information on the status of the seabirds of Malpeo Island, Columbia, 500 km off the Pacific coast of Columbia, based on our four visits from 1985-1992. Malpeo is the second largest Masked Booby (*Sula dactylatra*) colony in the world. An accurate census based on aerial photographs indicates a population of 25,000 individuals. The Masked Booby that occurs at Malpeo is a distinctive orange-billed form (*S. d. granti*), that is endemic to the eastern Pacific and may be specifically distinct. The only other species known to breed at Malpeo is Swallow-tailed Gull (*Creagrurus furcatus*), with an estimated 50 pairs. Other species that regularly occur at Malpeo and probably breed in small numbers include: Red-billed Tropicbird (*Phaethon aethereus*), Red-footed Booby (*S. sula*), Brown Noddy (*Anous stolidus*), and White Tern (*Gygis alba*). Black Noddy (*A. minutus*) may also breed in small numbers. Great and Magnificent frigatebirds (*Frigata minor* and *F. magnificens*, respectively) are present year-round and either may breed. Malpeo was uninhabited until 1986 when a small military garrison was installed and currently there is cause for

concern about pests being inadvertently introduced onto the island.

60 MORPHOLOGICAL AND GENETIC DIVERGENCE AMONG ALASKAN POPULATIONS OF *Brachyramphus* MURRELETS. Jay Pitocchelli, Biology Department, St. Anselm College, 100 St. Anselm Drive, Manchester, NH, 03102-1310; John F. Piatt, Nat. Biol. Surv., 1011 E. Tudor Rd., Anchorage, AK 99503; and Matt Cronin, LGL Alaska Res. Assoc., 4175 Tudor Centre Dr., Anchorage, AK 99508.

We studied morphological and mtDNA divergence among three populations of *Brachyramphus* murrelets: Kittlitz's Murrelet (*B. brevirostris*), and tree-nesting and ground-nesting Marbled Murrelets (*B. marmoratus*). We found little morphological divergence in external and skeletal measurements among tree and ground-nesting Marbled Murrelets, but both populations differed significantly from Kittlitz's Murrelets. Principal Component Analysis (PCA) of external measurements showed that Kittlitz's Murrelets occupied a distinct multivariate space from Marbled Murrelets, but tree-nesting and ground-nesting Marbled Murrelets were inseparable. We obtained the same pattern from PCA of skeletal dimensions. Analysis of mtDNA revealed a sequence divergence of 4.4% between Marbled and Kittlitz's murrelets, suggesting a species divergence about 2.2 MYBP. The difference between ground and tree-nesting Marbled Murrelets was 0.3%, equivalent to comparisons between intraspecific populations of *Ammodramus* sparrows and Brown Towhees. This preliminary analysis suggests there is no detectable divergence between tree and ground-nesting populations of Marbled Murrelets.

61 OFFSHORE POPULATION ESTIMATES OF MARBLED MURRELETS IN CALIFORNIA. C. John Ralph and Sherri L. Miller, U.S.D.A. Forest Service, Redwood Sciences Laboratory, Arcata, CA 95521.

To effectively use offshore survey data to estimate the population of murrelets in California, we first determined how the birds distribute themselves in the marine environment. Intensive surveys designed to identify the distribution of the birds from the shore outwards were used to establish

the method used to survey the entire coastline of the state within the murrelets' range. We found that transects placed parallel to the shore at distances of 800 m and 1400 m from the surf could be used in California to estimate the population within a coastal section from 100 m to 6100 m out from shore. Our estimate obtained from these methods is higher than previous estimates for the state.

62 HUMAN ACTIVITY AND WILDLIFE DISTURBANCE AT THREE ARCH ROCKS NATIONAL WILDLIFE REFUGE, OREGON. Susan Riemer, Robin Brown, and Marion Mann, Oregon Dept. Fish & Wildl.; Roy Lowe and David Pitkin, U.S. Fish & Wildl. Serv., Hatfield Marine Science Center, Newport, OR, 97365.

Observations of human activities and disturbance to marine birds and mammals at Three Arch Rocks NWR off the north Oregon coast were made from May 1 through September 9, 1993, for an average of 7.5 hours per day over 5.5 days per week. Data collected included: 1) location and activities of recreational and commercial vessels; 2) aircraft over-flights; and 3) resulting wildlife disturbance events. A total of 69 and 100 observed disturbance events were caused by vessel and aircraft activities, respectively. Recreational boating, fishing and diving were the most frequently observed activities, resulting in the most severe disturbances over the greatest period of time. Over 98% of the disturbances caused by all vessels occurred within 500' of the refuge rocks. Fishing by private vessels constituted 91.5% of all activities within this zone. Aircraft disturbances were caused by private (63%), military (14%), USCG. (13%), commercial (4%), and undetermined (6%) aircraft. As a result of this study a 500' closure to vessel traffic at Three Arch Rocks NWR and a coast-wide educational program is being implemented through Oregon's Territorial Sea planning process.

63 DIET AND REPRODUCTION IN RED-LEGGED AND BLACK-LEGGED KITTIWAKES. Daniel D. Roby and Brian K. Lance, Alaska Cooperative Fish and Wildlife Research Unit, University of Alaska, Fairbanks, AK 99775-0990.

Red-legged and Black-legged kittiwakes (*Rissa brevirostris* and *R. tridactyla*) are sympatric congeners breeding on the Pribilof Islands, Alaska. Red-legged Kittiwakes primarily utilize oceanic prey, particularly lampfish (Myctophidae), during the breeding season, while Black-legged Kittiwakes feed on a diverse array of forage fish and zooplankton found in shallower waters. Lampfish are extremely high in lipids (mostly wax esters) and thus are an energy-dense food supply. These dietary differences are associated with differences in reproductive traits. Red-legged Kittiwakes have a smaller clutch size, longer incubation period, and lower growth rate compared with Black-legged Kittiwakes. Red-legged Kittiwakes deliver chick meals less frequently, but field metabolic rates during chick-rearing are not different in the two species. Chicks of the two species were interspecifically cross-fostered to test the hypothesis that interspecific differences in chick diets are responsible for observed differences in growth rate and fledging success. Survival rates of interspecifically cross-fostered chicks were similar to those of control chicks. There were no intraspecific differences in growth rates or peak mass between control and cross-fostered chicks, but Black-legged Kittiwake chicks had higher growth rates and peak masses than Red-legged Kittiwake chicks. Thus diet and feeding frequency were not the proximate factors causing differences in chick growth rate and peak mass between the two kittiwake species. Instead, interspecific differences in chick growth rates are due to species-specific physiological constraints. The reliance of Red-legged Kittiwakes on more oceanic prey, and the resultant lower frequency of chick feeding and higher energy density of chick meals, has selected for a suite of reproductive traits characteristic of offshore-foraging seabirds.

64 BUBBLING BEHAVIOR BY FORAGING ALCIDS. Fred Sharpe, Dept. of Biol. Sciences, Simon Fraser University, Burnaby, BC, Canada V5A 1S6.

Rising bubbles produce significant amounts of acoustic, visual, and mechanical disturbance which are used by several cetacean species to control the movements of fish schools. Rhinoceros Auklets and Common Murres in Puget Sound have also been found to bubble extensively while

preying on schools of Pacific herring and sand lance. These alcids were found to deploy bubbles from the mouth, although the air is often entrained in vortices behind the head and lower back before being released into the water column. Bubble trails are most often deployed as birds approach the prey patch or pursue solitary fish, while bursts are generally released as birds swim below the school or when seizing fish from the prey patch. Bubbles produced by alcids may merely be an epiphenomenon of feeding and diving activity. In contrast, bubbling could represent a deliberate, goal-orientated behavior that aids in prey capture by forcing fish up to the surface, masking the approach of birds, providing a substrate against which to herd fish, preventing fountain manoeuvres, isolating individual fish from the school or by providing a generalized confusion effect. Bubbling could also represent a type of signaling between alcids. A video of bubbling auklets will be shown and laboratory experiments on bubble-fish interactions will be presented.

65 RATS: PAST DAMAGE AND PRESENT THREATS TO ALASKA SEABIRDS. Arthur L. Sows and G. Vernon Byrd, Alaska Maritime NWR, 2355 Kachemak Bay Dr., Suite 101, Homer, AK 99603.

Norway rats have been accidentally introduced to at least 22 Alaska islands (Bailey and Kaiser 1993). The impacts of rats on seabird islands in Alaska have not been clearly documented, but comparisons of bird populations on similar islands with and without rats provides a basis for understanding. It is clear that rats extirpate most species of burrow nesting seabirds; storm-petrels, Cassin's Auklet, and Tufted Puffin. In addition, they prey on, but may not extirpate other species (e.g. auklets, shorebirds, and passerines). In Alaska most introductions of rats happened during WWII. The danger of introduction by shipwrecks continues today. Furthermore, recent harbor and commercial fishing development has greatly increased the chances of rats establishing on the Pribilof Islands. The Fish and Wildlife Service is beginning to address this threat by: 1) coordinating with other state and federal agencies, 2) an information and training effort, 3) a preventive program with the Pribilovians which includes trap and bait stations, a possible ship

inspections program, and structural innovations to the harbor, etc. and 4) requesting EPA authorizations to use rodenticides to respond to ship wrecks and preparing a ship wreck response team. Ideas and suggestions for further actions are requested.

66 AT-SEA STUDY OF FOUR ENDANGERED OR THREATENED PROCELLARIIDS IN THE TROPICAL PACIFIC, PART I: POPULATION ESTIMATES. Larry Spear, David G. Ainley, Nadav Nur and Steve N.G. Howell, PRBO, Stinson Beach, CA 94970.

We used at-sea censuses in the tropical Pacific to estimate population size of the threatened subspecies of *Puffinus auricularis*; the Townsend's (*P. a. auricularis*) and Newell's (*P. a. newelli*) shearwaters, and endangered subspecies of Dark-rumped Petrel; the Galapagos form (*Pterodroma p. phaeopygia*) and Hawaiian form (*P. p. sandwichensis*). Valid estimates of breeding populations of these birds from land-based censuses are unavailable because they are nocturnal burrow-nesters who nest in densely vegetated, often steep, mountains of tropical islands. Thus, determining colony location (not all colonies have been found), density, and colony boundaries has not been possible. We introduce a method of calculating 95% confidence intervals for at-sea population estimates taking into account "natural variation" in at-sea densities resulting from environmental factors. Population estimates (including nonbreeders and breeders) of the four forms, respectively, as given above, were 67,500, 135,000, 25,000, and 97,000 birds. By assuming a nonbreeder component of 61% in the shearwaters and 58% in the petrels, breeding population estimates were 13,000, 20-25,000, 5,000, and 25,000 pairs, respectively. Confidence intervals were 33% to 88% of the population estimates, after adjusting for natural variation.

67 AT-SEA STUDY OF FOUR ENDANGERED OR THREATENED PROCELLARIIDS IN THE TROPICAL PACIFIC, PART II: HABITAT CHOICE AND BEHAVIOR. Larry Spear, David G. Ainley, Nadav Nur and Steve N.G. Howell, PRBO, Stinson Beach, CA 94970.

We studied physical factors affecting distributions of subspecies of *Puffinus auricularis*; the Townsend's (*P. a.*

auricularis) and Newell's (*P. a. newelli*) shearwaters, and subspecies of Dark-rumped Petrel; the Galapagos form (*Pterodroma p. phaeopygia*) and Hawaiian form (*P. p. sandwichensis*). The two shearwaters used different ocean habitat, but their distributions were affected mainly by the same factor; mixing in the water column. *Auricularis* occurred mainly over upwelling fronts at the shelf break off Mexico, while *newelli* was most abundant in the Equatorial Countercurrent, also characterized by many ocean fronts. The two petrels used different ocean habitat, but (and unlike the shearwaters) distributions of both were affected mostly by wind speed and direction. Foraging incidence by the shearwaters was highest where their densities were highest. In contrast, the petrels showed little preference for feeding location. Shearwaters commuted at least 500 km (*auricularis*), to 1000 km (*newelli*) during feeding trips from colonies. The petrel's foraging ranges were similar to that of the shearwaters (*sandwichensis*, or less far, *phaeopygia*). Shearwaters flew often into head-winds to feeding areas, a more energy-demanding flight behavior than that of the petrels, which flew less often into head-winds, foraged more opportunistically and conserved energy through dynamic soaring.

68 CRITERIA FOR SEPARATING JUVENILES FROM AFTER-HATCHING-YEAR MURRELETS IN LATE SUMMER AND EARLY FALL. *Janet Stein*, Washington Department of Wildlife, 16018 Mill Creek Blvd., Mill Creek, WA 98012; and *Harry R. Carter*, National Biological Survey, 6924 Tremont Road, Dixon, CA 95620.

We examined museum specimens, literature, and unpublished data from British Columbia to California to evaluate five main field criteria for identification of juveniles versus after-hatching-year (AHY) Marbled Murrelets in the late breeding and post-breeding season from June to November. The criteria were: 1) relative size; 2) overall percentage of dark versus light coloration; 3) ventral coloration and patterning; 4) dorsal surface coloration; and 5) wing molt and shape. In June and July, the first four criteria were useful. Recently fledged juveniles are smaller than AHY birds (70% body weight of adults at fledging), lighter overall, have ventral speck-

ling, and are uniformly dark on the back. Most adults have the alternate or cryptic "breeding" plumage and are much darker overall with rust-edged back feathers. By August and September, most alternate-plumaged birds undergo the pre-basic total body and remigial molt, lose the dorsal rust coloration, appear much lighter overall, but retain some dark-edged ventral body feathers that appear as "blotches". Many juveniles that have been at sea for at least a month lose many of the characteristic "speckled" feathers. During these months, the most reliable criterion is the condition of the molted primaries. Molted adult wings have "gaps" in the primaries or appear "stubby" when they flap if primaries have recently been lost or have "rounded" wing tips if the new primaries have begun to grow out. Juveniles have more pointed wing tips. In October and November, it is not practical to separate juveniles from AHY birds in the field.

69 ABUNDANCE ESTIMATES OF MARBLED MURRELETS IN OREGON BASED ON MARINE SURVEYS. *Craig S. Strong*, *Bradford S. Keitt*, *William R. McIver*, *Clifford J. Palmer*, and *Ian Gaffney*. Crescent Coastal Research, 7700 Bailey Rd., Crescent City, CA 95531.

Using standardized strip transect techniques, Marbled Murrelets and other seabird species were counted in the nearshore waters of the Oregon coast from a boat and from a low-flying light aircraft. Additional observations were made with a telescope from locations on shore. Approximately 1,500 km of boat transects in 1992 and 1,980 km of transects in 1993 were completed, and 6 aerial surveys of the state's coastline were run. In both years, Marbled Murrelets were most abundant in central Oregon, between Cascade Head and Cape Arago. They were concentrated closer to shore in 1992 than in 1993. In both years there was an apparent shift to the north by late July. The vessel, air, and shore based surveys were used to generate population estimates for 3 regions encompassing the Oregon coast. Estimates generated by vessel surveys were considered more reliable than estimates from air or from shore-based counts.

70 ENSO 1992 AND ENSO 1983: BIOLOGICAL CONSEQUENCES AND SEABIRD POPULATION REGULA-

TION IN THE CALIFORNIA CURRENT. *William J. Sydeman*, *Elizabeth B. McLaren*, and *Peter Pyle*, PRBO 4990 Shoreline Highway, Stinson Beach, CA 94970.

We studied the physical and biological effects of the 1992-1993 EL-Niño in central California based on observations of weather, sea conditions and seabird breeding biology on the Farallon Islands. Upwelling-favorable northwest winds were significantly reduced in 1992 (less so in 1993) and SST for both years was significantly elevated. Seabird breeding was delayed and reproductive success was extremely poor. Reproductively, the ENSO event of 1992-1993 was as severe as that of 1983 for most species. As in 1983, survival of adults also was significantly reduced. Populations of certain species, notably Brandt's Cormorants (which were relatively unaffected by anthropogenic influences during the period), had not recovered from ENSO 1983 before ENSO 1992 arrived. The frequency and intensity of ENSO events in California suggests that the seabird community is far from equilibrium and calls into question the importance of density-dependent population regulating mechanisms, such as competition for food or space. In the California and other eastern boundary current systems, density-independent stochastic events are likely to limit many seabird populations below levels where density-dependent population processes operate.

71 STATUS, ECOLOGY, AND CONSERVATION OF KITTLITZ'S MURRELET (*Brachyramphus brevirostris*). *Gus van Vliet*, P.O. Box 210442, Auke Bay, Alaska 99821; and *John F. Piatt*, National Biological Survey, 1011 East Tudor Road, Anchorage, Alaska 99503.

Among the world's seabirds, the Kittlitz's Murrelet is unique because much of its life-history is associated with glacial ice. Kittlitz's Murrelet diverged from the closely related Marbled Murrelet (*B. marmoratus*) at the onset of the Pleistocene about 2.2 million years ago. Perhaps once abundant in its icy domain, the total world population may now number less than 20,000 individuals, of which 95% are found in Alaska. Extant populations in Alaska show a disjunct distribution in coastal-mountain areas with large glacial ice-fields (Glacier, Yakutat and Kachemak bays,

Prince William Sound); remnant high-elevation glaciers (Kodiak I., Alaska Pen., Aleutians); and recently de-glaciated coastal mountains (Seward and Lisburne pens.). The nesting biology of the Kittlitz's Murrelet is poorly known. To date, only 15 confirmed nests have been described, mostly from one-time visits. During the breeding season, isolated pairs of this cryptically-plumaged species nest on the ground, typically in high alpine habitat and within 5-15 km of the coast. They forage in marine waters near or downstream of silty, fresh-water plumes from glacially-fed rivers. The main short-term threats to the global population of Kittlitz's Murrelets include oil pollution, gill-nets, and diminished forage fish stocks. The main long-term threat is the possible negative effects of global warming on glacial ice-fields and associated breeding and foraging habitats.

72 STRUCTURE OF THE PRIMARY FEATHERS OF MARINE BIRDS WITH DIFFERING FLIGHT STYLES.

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We compared the microscopic structure of the primary feathers of a number of species of marine birds that exhibit differing flight styles. Wing loadings were calculated for each species and several parameters were measured from the second and third primary feather. Differences in feather structure were more strongly associated with wing loading than flight style. As a generalization the more heavily wing loaded birds had a more complex feather structure. Several parameters correlated positively with wing loading. They included the number of barbs per area, the amount of overlap of barbules between two barbs, the number of proximal barbules per area, and the number of hooklets per barbule.

73 DIFFERENT RESPONSES OF TWO DIVING SEABIRD SPECIES TO CHANGES IN FOOD SUPPLY.

Paul Walton, Pat Monaghan, and Graham Austin. Applied Ornithology Unit, Dept. of Zoology, Glasgow University, Glasgow G128QQ, Scotland, UK.

Two diving seabird species were studied during breeding in the Shetland Islands (Scotland) in two years of contrasting food

availability (as independently assessed by fisheries research), using a combination of observational and radio tracking techniques. In both shags *Phalacrocorax aristotelis* and common murre *Uria aalge*, adults made longer foraging trips, and chicks grew in mass at a slower rate in a year of low food availability. Breeding performance and adjustments of adult time/energy budgets in response to varying food supply, however, were different in these two species. Murre demonstrated a high degree of flexibility in adult time budgets and spent considerably more time at sea, and more time diving in the year of low food availability. Shags, while showing substantial differences in diving parameters between years, adjusted their overall daily activity budget less dramatically in a low food availability year. Murre breeding success (number of chicks fledged per nest) did not differ significantly between years. In shags, while clutch size did not differ, brood size and breeding success were lower in the year of low food availability.

74 RESPONSES OF BREEDING SEABIRDS TO THE CRASH OF SARDINE STOCKS IN JAPAN.

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Catch of sardines *Sardinops melanosticta* in Japan peaked in the 1980's (4 million tons/year) but has markedly decreased in the last 5 years. We monitored diet and breeding success of seabirds breeding at Teuri Island, Hokkaido during this period. Black-tailed Gulls fed on sardines in 1984, sardines and sand lance *Ammodytes personatus* in 1985 and 1987, but mostly sand lance in 1992 and 1993. Growth of their chicks was poor in 1984 and 1993 when the catch of sand lance was small. Slaty-backed Gulls fed on seabirds, discarded fish, and sardines in the 1980s, but mainly on sand lance in 1992 and garbage in 1993. Availability of Black-tailed Gull chicks (preferred prey for Slaty-backed) was restricted in 1992/1993 because of disturbance by domestic cats. Chick growth was similar in 1980-1985 and 1992, but was poor in 1993. Rhinoceros Auklets fed on some sand lance in every year, on sardines in the 1980's, but largely on anchovy *Engraulis japonica* in 1992/1993. They

exhibited high chick growth rates and heavy fledgling mass in 1992 and 1993. Thus, these three species of seabirds responded differently to the crash of sardine stocks.

75 STATUS OF ALCIDS BREEDING IN HOKKAIDO.

Y. Watanuki, Lab. Appl. Zool., Hokkaido Univ., Sapporo 060, Japan.

Six species of alcids have been reported to breed in Hokkaido, Japan. Huge numbers of Rhinoceros Auklets breed at six colonies; more than 150,000 pairs, 95% of which breed at Teuri Island. Population sizes of the other five species are small and some of them might be endangered. Numbers of Common Murres, Spectacled Guillemots and Tufted Puffins decreased rapidly (10-19% per annum) during the 1970's-1980's. Common Murres bred at 4 isolated islands in the 1960's-1970's, but now they breed only at Teuri Island. About 100 Common Murres visit breeding areas at the island, but less than 10 pairs breed. The maximum number of Spectacled Guillemots and Tufted Puffins counted around breeding areas in Hokkaido during the 1990's was 250 and <30, respectively. One nest of the Marbled Murrelet was found in eastern Hokkaido in 1961 but there has been no data gathered on this species since then. Small numbers (ca. 100 nests) of Ancient Murrelets are known to breed at Teuri Island.

76 STATUS AND ECOLOGY OF WHISKERED AUKLETS.

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Whiskered Auklets (*Aethia pygmaea*) have been less thoroughly studied than other auklets because of their remote distribution in the Aleutian, Commander, and Kuril island groups, and their nocturnal behavior at breeding colonies. During five years (1988-1992) of detailed study at Buldir Island in the western Aleutians, eggs were laid 12 May-5 June, hatching occurred 23 June-7 August, and chicks fledged 22 July-13 August. Both sexes incubated eggs and exchanged incubation duties at about 24 h intervals. Egg dimensions averaged 44.0 x 31.2 mm. Chicks weighed about 12.5-14.0 g at hatching. Maximum (linear phase) mass growth rates ranged from 3.5 to 4.8 g day⁻¹ in different years, and fledging mass

averaged about 106 g (92% of adult mass). Reproductive success averaged 0.70 fledglings/egg laid (range 0.54-1.0). At least four distinct vocalizations have been described. Primary molt begins early in incubation and continues throughout the chick-rearing period. Whiskered auklets nested in crevices in a variety of substrates ranging from unvegetated talus slopes, where their nearest neighbors were Crested (*A. cristatella*) or Least auklets (*A. pusilla*), to mixed soil and rock slopes near Parakeet Auklets (*A. psittacula*), or among beach boulders where few other species occurred. Whiskered Auklets returned from sea to nest-sites soon after dark, and usually departed from colonies within a 2-h period prior to first light. Whiskered Auklets feed primarily on copepods at Buldir, but mostly on euphausiids in the eastern Aleutians where the bulk of the Alaskan population may reside. Whiskered Auklets forage where zooplankton are concentrated at tidal fronts near Buldir Island, and in turbulent tide-rips among passes between islands in the central and eastern Aleutians. No accurate population estimates are available. Previous minimum estimates of 25,000 for the Aleutians are probably low.

77 BREEDING BIOLOGY OF THE BLUE-GRAY NODDY *Procelsterna cerulea*. Thomas R. Howell, P.O. Box 950, Gualala, CA 95445.

This species occurs only in the Pacific region, largely within tropical latitudes. It is the smallest of the pelagic terns, with a body mass of ca. 45 g (*P. c. cerulea*). It feeds in flight, taking small prey from the surface. The birds have relatively long legs and large webbed feet and sometimes patter on the water while foraging, like storm-petrels. They nest in relatively small colonies, not densely packed. Courtship includes high flights in tandem and allopreening on the ground. The nest is a scrape in the sand or on rock, with little or no nest material. The clutch is one egg, speckled. Egg mass averages 14.5 g, over 32% of body mass, the largest relative egg size of any bird (including kiwis). The incubation period is unmeasured but calculated to be ca. 34 days. The chick is covered with unspotted gray down and is fed by regurgitation. Time to fledging is at least 42 days. Breeding populations at Christmas Island (Kiribati), my study site, have greatly reduced due to El Niño effects.

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Bulletin Board

Albatross Conference

Expressions of interest are being sought for attending the First International Conference on the Biology and Conservation of Albatrosses. The conference will be organized by Durno Murray, Rosemary Gales, Nigel Brothers and Graham Robertson, and will be hosted jointly by the Australian Antarctic Division and the Tasmanian Parks and Wildlife Service. The conference will be conducted in Hobart in August 1995, and will probably run for 3-4 days. Contact Graham Robertson for further information at

*Australian Antarctic Division Channel Highway Kingston, Tasmania Australia 7050
Phone: 61-02-323-337 Fax: 61-02-323-351*

Samples Needed for a Conservation Genetics Study of Marbled and Long-billed Murrelets

We are currently conducting a population genetics study of Marbled Murrelets (*Brachyramphus marmoratus*) to aid in conservation of this species. This study involves genetic comparisons of Marble Murrelets from throughout the North Pacific using recent techniques from molecular genetics. Work is being conducted in conjunction with Dr. John Piatt (National Biological Survey, Anchorage), Dr. Kathy Martin (Canadian Wildlife Service, Vancouver), and Dr. Tom Quinn (Department of Biology, University of Denver). Samples from large numbers of murrelets (a total of 300-400) are required for this research. We are therefore requesting assistance from researchers who work directly with these birds in obtaining samples. Sampling does NOT require birds to be killed. A wide variety of tissue sources, no matter how small or badly degraded, can be used in this study: e.g., tissue (heart, liver, muscle, etc.) from beached birds or carcasses from any source; stomachs preserved in ethanol for dietary analyses; blood or blood (growing) feathers from adults or chicks caught for banding or radiotelemetry. If you have specimens from murrelets stored either frozen or in ethanol or will be catching murrelets during the 1994 field season and would like to help with this

research, please contact Vicki Friesen or Allan Baker for a sampling protocol and shipping permits at

*Department of Ornithology
Royal Ontario Museum
100 Queen's Park
Toronto, Ontario
M5S 2C6, Canada*

*Telephone: 416-586-5519
Fax: 416-586-5863
Email: ROM@ORN@ZOO.UTORONTO.CA*

The International Marine Ornithologists' Network

A new email network seeks to promote the information exchange between people dedicated to the study of seabirds. Membership of the network is not restricted in any way. The network has been initiated to help marine ornithologists exchange information and keep in contact on a worldwide basis. All email messages sent out to the network by members will automatically be sent to all other members.

The International Marine Ornithologists' Network was initiated by John Cooper, Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch 7700, South Africa (jcooper@zoo.uct.ac.za). The initial announcement of the network was sent in August 1993 to 60 marine ornithologists worldwide.

To join the network send to SEABIRD@ZOO.UCT.AC.ZA the following in the Subject Field of an email letter: SUBSCRIBE SEABIRD, and in the body of the email letter your full name and postal, telephonic, and fax addresses as you would like them listed in the network's address list. If you so desire, you may also list your research interest for inclusion with the address list.

To receive help, type HELP in the Subject Field of an email letter addressed to SEABIRD@ZOO.UCT.ZC.ZA. This will automatically send you the help facility. To send your own messages on the network enter the address SEABIRD@ZOO.UCT.AC.ZA, place the heading of your choice in the Subject Field, and enter your message in the main body below. To receive an archival file which contains all the email messages sent on the

network to date, send an email to SEABIRD@ZOO.UCT.AC.ZA with the following Subject Field: ARCHIVE. Also available is an address list which contains all the current members of the network. It is automatically accessible by typing SEABIRD ADDRESSES in the Subject Field of an email letter addressed to SEABIRD@ZOO.UCT.AC.ZA.

The Ornithological Council - Scientific Information about Birds

The recently organized Ornithological Council is currently composed of seven ornithological organizations. They are American Ornithologists' Union, Association of Field Ornithologists, Cooper Ornithological Society, Pacific Seabird Group, Colonial Waterbird Group, Raptor Research Foundation, and Wilson Ornithological Society. Each organization has two representatives.

The Ornithological Council held its first meeting on 3 December 1993; eight of the fourteen members were present. Board of Directors (affiliate society)

David E. Blockstein (AOU)
George E. Watson (AOU)
Mary E. Murphy (COS)
Sandra L. L. Gaunt (COS)
Eric G. Bolen (WOS)
Laurence R. Jahn (WOS)
Douglas J. Forsell (PSG)
George Divoky (PSG)
Keith L. Bildstein (CWG)
R. Michael Erwin (CWG)
James D. Fraser (RRF)
Sheri Chandler (RRF)
Peter D. Stangel (AFO)
Michael J. Braun (AFO)
Advisor: Richard C. Banks

The council has approximately \$6,000 mostly from individual contributions and the AOU. PSG contributed \$250.

The council has been incorporated in the District of Columbia as a non-profit organization and as such it is not a lobbying organization.

The goals printed in the Articles of Incorporation are

- (a) To operate exclusively for charitable, scientific, literary, or educational purposes.
- (b) To provide the best possible information on birds, based on the science of

ornithology, where such information should be available for sound management or policy decisions or actions.

(c) To serve as a conduit between those who have or who can obtain important and accurate scientific information about birds and those who need such information for environmental or policy decisions or actions.

(d) To facilitate the use of available ornithological information in the decision making process.

(e) To serve as a voice for scientific ornithology in situations where the study of birds might be affected.

(f) To keep the ornithological community aware of actions and potential actions that might have an effect on birds or the ability to study birds.

The three priorities for the first year are

1. To enlist the aid of an executive director or representative through an honorarium or service contract on a part-time basis. Duties would include making contacts within the appropriate government agencies and members of the Congress and their staffers. This would also entail writing some position papers on pertinent issues.

2. To seek funding from private foundations and individuals.

3. To prepare a list of "expert witnesses" who would be available to comment on proposed legislation or regulations.

The Council will meet at least twice each year, once at the AOU meeting and once in the D.C. area during the winter. PSG Members with ideas on specific issues the Council should address or ways to help the Council accomplish its goals should contact *Doug Forsell (410-626-8486)* or *George Divoky (206-525-2131)*.

POSITION ANNOUNCEMENT Biological Technicians GS-5

The Hawaiian Islands National Wildlife Refuge is recruiting applicants to fill positions working on Laysan Island. The length of the positions vary, but will average from 3-6 months in duration. The project is ongoing, with several positions available over the next year. The incumbents will spend about 60% of their time on control/eradication of the alien plant *Cenchrus*

echinatus and about 40% on habitat and wildlife monitoring projects. Vegetation control includes use of herbicides (Rodeo) and manual techniques. Remote living experience and experience working with seabirds or colonial nesting birds is preferred but not required. Opportunities exist to integrate a graduate level thesis project as part of the work. Laysan Island is a remote uninhabited island 850 miles northwest of Honolulu. Technicians live and work under primitive camp conditions. Work involves carrying heavy backpacks on soft sand and with exposure to extremes of sun and wind. Communications with the outside world are limited to irregular radio contacts with Honolulu. To apply, send a current SF-171, a transcript or CSC 1170/17, and Pre-Appointment Certification Statement for Selective Service Registration. Forms and more information can be obtained by contacting Marc Webber at the Hawaiian Islands National Wildlife Refuge, P.O. Box 50167, Honolulu, Hawaii 96850 (808-541-1201). PREVIOUS APPLICANTS NEED NOT REAPPLY TO BE CONSIDERED.

VOLUNTEERS NEEDED

The Pacific/Remote Islands National Wildlife Refuge Complex is seeking 4 volunteers to assist in a project to eradicate rats (*Rattus rattus*) on Eastern Island, Midway Atoll. Volunteers will be provided travel expenses from their home to Midway as well as food and lodging at Midway. The positions will last approximately 3 months starting in mid June. For more information contact Ken McDermond at (808) 541-1201. P.O. Box 50167, Honolulu, Hawaii 96850.

POSITION ANNOUNCEMENT Executive Director

Bird Conservation Alliance (BCA) is dedicated to the conservation of wild birds and their habitats, especially in the Americas. BCA is a new organization, formed from the merger of several organizations that operated under the name International Council for Bird Preservation (ICBP). BCA will be the partner organization in the USA of BirdLife International, which is based in Cambridge, U.K.

The Executive Director will develop

and recommend to BCA's board policies and programs to carry out the organization's mission. The Executive Director will manage the staff, implement policies and programs, represent the organization to the government and the public, and implement the organization's fund-raising strategy. The position will be based near or in Washington, D.C. and will have a salary in the range of \$60-\$80,000. For further information, contact

Dr. Gerard A. Bertrand
Chair, BCA Search Committee
Massachusetts Audubon Society
South Great Road
Lincoln, MA 01773
(617) 259-9500 FAX: 259-8899

WRITE THE EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL

PSG members should consider writing the EVOS trustee council regarding the draft restoration plan that should be available during June 1994. The final plan, which is over a year late, will establish the restoration goals and direct the expenditure of the remainder of the \$1 billion trust fund. Each letter counts as a "vote." The trustee council counts a letter from PSG as a single "vote" and 200 letters from the members of a group that wants the trust fund to be spent on fish hatcheries as 200 "votes."

During the past three years, PSG has consistently supported the following in its comments to the trustee council:

- The removal of rats, foxes and other alien creatures from seabird colonies and former colonies;
- The purchase of privately-owned seabird colonies; and
- The endowment of chairs in marine ornithology at the University of Alaska.

Copies of the draft restoration plan can be obtained from

James Ayers, Executive Director
Exxon Valdez Oil Spill Trustee Council
645 G Street
Anchorage, Alaska 99501
(800) 283-7745

PSG Enters INTERNET Email Era

Oil and Wildlife Conference

The Fourth International Conference on the Effects of Oil on Wildlife" will be held April 10-14, 1995 in Seattle. Papers on damage assessment, post-release studies, or any other issues relating to oil and wildlife are requested. The deadline to submit abstracts is August 12, 1994. For guidelines, please call the International Bird Rescue Center's Pacific Northwest Office at 206-423-3649.

Small Grants Available Mexican Seabird Conservation

The Pan American Section (PACS) of the International Council for Bird Preservation makes grants (\$1000-\$2000) for avian conservation projects in Latin America and the Caribbean. PACS has established the following priorities in descending order:

1. Conservation actions on threatened species.
2. Research by Latin Americans on threatened species.
3. Conservation actions by Latin Americans for threatened habitats containing significant numbers of threatened species.
4. Research by Latin Americans on threatened habitats containing significant numbers of threatened species.
5. Joint conservation or management efforts by Latin Americans and those from outside the region on threatened habitats containing significant numbers of threatened species.
6. Training and environmental education for Latin Americans.
7. Research or management by those from outside the region.

Proposals may be submitted in English or Spanish. Proposals received between August 1 and December 31 will be considered in May; proposals received between January 1 and July 31 will be considered in December. To obtain proposal forms, write ICBP-PACS, Attention: Cecilia Landa, P. O. Box 57242, Washington, DC 20037-7242 or call (202) 778-9563.

Many PSG members have now joined the INTERNET information highway. Once restricted largely to universities and other large institutions, access to INTERNET e-mail is rapidly becoming universal. Most of the PSG executive council now have e-mail, and this greatly facilitates communication and coordination. We urge all members to get on the highway and take a test ride. Eventually, we may set up a PSG bulletin board. In the meantime, we would like to compile an e-mail directory for all members. Please send your email address in the next time you pay your dues so we can log this address with your snail mail address, and include it in the next member directory. If you have e-mail access now, please take a minute to send your address via e-mail to John Piatt. Some PSG member addresses include:

Member Name

Anderson, Dan
Chardine, John
Divoky, George
Flint, Beth
Hatch, Scott
Hodder, Jan
Kitsisky, Alexander
Kondratyev, Alexander
Lowe, Roy
Naslund, Nancy
Nelson, Kim
Piatt, John
Ralph, C. John
Rauzon, Mark
Sharpe, Fred
Sowls, Art
Speich, Steve
Springer, Martha
Takekawa, Jean
Warheit, Ken

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chardine@morgan.uccs.mun.ca
divoky@aol.com
flint@uhunix.uhcc.hawaii.edu
r8afwrc@mail.fws.gov
jhodder@oimb.uoregon.edu
eabg079@orion.oac.uci.edu
ibpn@ibpn.magadan.su
lower@ext32.oes.orst.edu
c/o john_piatt@macchoice.com
nelsonsk@ccmail.orst.edu
john_piatt@macchoice.com
ralphc:@axe.humboldt.edu
c/o flint@uhunix.uhcc.hawaii.edu
fsharpe@sfu.ca
r7amnwr@mail.fws.gov
smswallow@aol.com
c/o fnams@acad3.alaska.edu
c/o maissf@mail.fws.gov
warheit@u.washington.edu

Meeting Calendar

1994

•June 7-12. Society for Conservation Biology and Association for Tropical Biology Joint Annual Meeting, Guadalajara. Contact: B. Benz, SCB-ATB, Laboratorio Natural Las Joyas, Univ. de Guadalajara, Apdo. Postal 1-3933, Guadalajara, Jalisco 44100; or E. Santana, Dept. of Wildlife Ecology, University of Wisconsin, Madison, WI 53706.

•August 10-18. Birdlife International, XXI World Conference, Rosenheim, Germany.

•August 21-27. XXI International Ornithological Congress, Vienna. Contact: Interconvention, 1450 Vienna, Austria.

1995

•January 10-13. PSG Annual Meeting, San Diego. Contact: William Everett, Natural History Museum, P.O. Box 1390, San Diego, CA 92112.

•August. First International Conference on the Biology and Conservation of Albatrosses, Hobart, Australia. Contact: G. Robertson, Antarctic Division, Channel Highway, Kingston, Tasmania, Australia 7050.

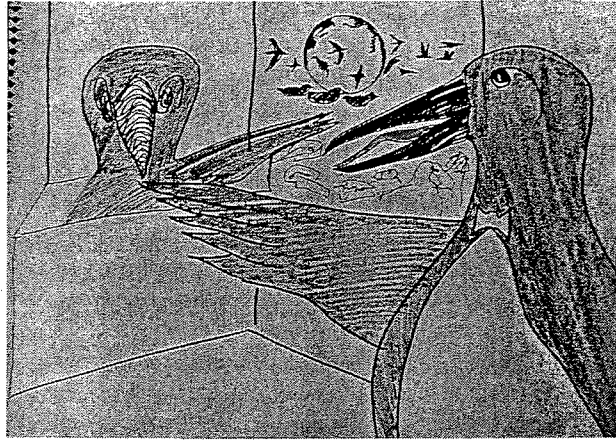
**The 41st Annual EPOC Meeting
September 28—October 1, 1994
Timberline Lodge, Mt. Hood, OR**

The officers of the Eastern Pacific Oceanic Conference (EPOC) are pleased to announce our 41st annual meeting, to be held at the Timberline Lodge at Mount Hood, Oregon. The meeting format will be changed slightly from previous meetings. The opening social function will be Wednesday night, September 28. On Thursday and Friday there will be two science sessions each day, a morning and an early evening session. We will leave the afternoons free for discussions and for people to enjoy the Mt. Hood area. The business meeting will be held Saturday morning. We will arrange for posters to be displayed throughout the meeting.

Timberline Lodge is located on Mt. Hood, an hour's drive from the Portland, Oregon airport. This classic Works Progress Administration facility built in the 1930s features an impressive, handcrafted wood interior and a first-class restaurant. Meetings will be held in the upstairs function room, the Raven's Nest. Preliminary session topics are Eastern Boundary Currents, Dynamical Processes Workshop, Physical/Biological Interactions-Long Time Series, and Posters.

A second meeting announcement will include more specifics, including a finalized session schedule with a list of chairpersons, costs (which include meals as usual), registration information, and how to get there. We value your opinion! Please send ideas on special session topics, which are meant to include all disciplines of oceanography, or on other aspects of the meeting to Toby Garfield, meeting chairperson (Phone: 408-656-3226; Internet: garfield@oc.nps.navy.mil; OMNET: OCEAN.NPS). Also, we still need two non-physical oceanography co-chairpersons and chairpersons for the poster session. Contact Toby Garfield for more details. To be added to the EPOC mailing list, contact Jack Barth, College of Oceanic and Atmospheric Sciences, Oregon State University, Ocean Admin Bldg 104, Corvallis, OR 97331-5503, 503-737-1607; Internet: barth@oce.orst.edu; OMNET: OREGON.STATE.

Murre-der Trial of the Decade by Mark Rauzon



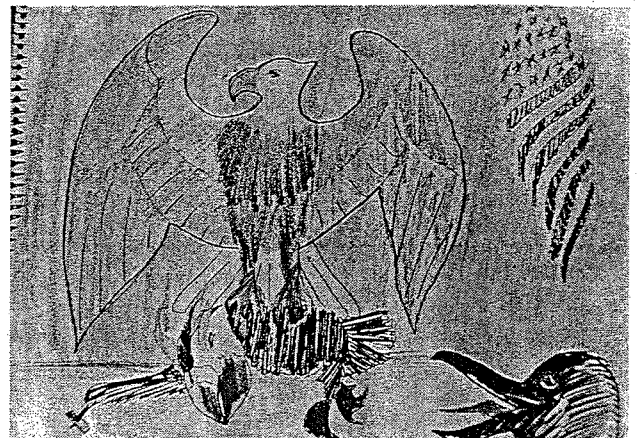
Murre-der trial of the decade begins—PSG called in as expert witness.

Jury selection favors seabird diversity: same sex gull pair, dark and light phase fulmars, phalaropes, threatened and endangered species, etc.



Judge Puffin dismisses PSG testimony, quotes researchers: "More study needed."

Judge about to rule on murre-der when eagle from atop flag standard attacks. Justice is served—for lunch!



PACIFIC SEABIRD GROUP EXECUTIVE COUNCIL 1994

OFFICERS

| | |
|-----------------------------|---|
| Chair | John Piatt, USFWS, 1011 E. Tudor Road, Anchorage, AK 99503, Phone (907) 786-3549 |
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| Vice-Chair for Conservation | Craig S. Harrison, 4001 North 9th Street, Arlington, VA 22203, (202) 778-2240 FAX (202) 778-2201 |
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| Past Chair | George Divoky, 10535 Interlake Ave. N., Seattle, WA 98133, Phone and FAX (206) 525-2131 |

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| | |
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| Canada | Tony Gaston 11-174 Dufferin Rd., Ottawa, Ontario, K1M 2A6, CANADA, 819 997-6121 (work) or 613-745-1368 (home) |
| Washington and Oregon | Roy Lowe, USFWS, 2030 S. Marine Science Dr., Newport, OR 97365, (503) 867-4550, FAX (503) 867-4551 |
| Northern California | Jean Takekawa, San Francisco Bay NWR, Box 524, Newark, CA 94560, (415) 792-0222, FAX (415) 792-5828 |
| Southern California | Pat Baird, Department of Biology, California State University, Long Beach, CA 90840, (310) 985-4806 |
| Non-Pacific United | Jim Lovvorn, Dept. of Zoology and Physiology, University of Wyoming, Laramie, WY 82071, (307) 766-6100 (work), (307) 745-9314 (home) |
| Pacific Rim | Ken McDermond, P.O. Box 50167, Honolulu, HI 96850, (808) 541-1201, FAX (808) 541-1216, FTS 551-1201 |
| Old World | Mark Tasker, Nature Conservancy Council, 17 Rubislaw Terrace, Aberdeen AB1 1XE, SCOTLAND, 0224-642863, FAX (UK) 0224-643347 |

COMMITTEE COORDINATORS

| | |
|---|--|
| Marbled Murrelet Technical Committee | Nancy Naslund, USFWS, 1011, E. Tudor Rd., Anchorage, AK 99503, (907) 786-3342 |
| Xantus' Murrelet Technical Committee | William Everett, Dept. of Birds and Mammals, San Diego Natural History Museum, P. O. Box 1390, San Diego, CA 92112, (619) 589-0480 |
| Seabird Monitoring Committee | Scott Hatch, USFWS, 1011 E. Tudor Rd., Anchorage, AK 99503, (907) 786-3529 or (907) 345-6056 |
| Publications Committee | Steve Speich, 4720 N. Oeste Place, Tucson, AZ 85749, (602) 529-1141 |