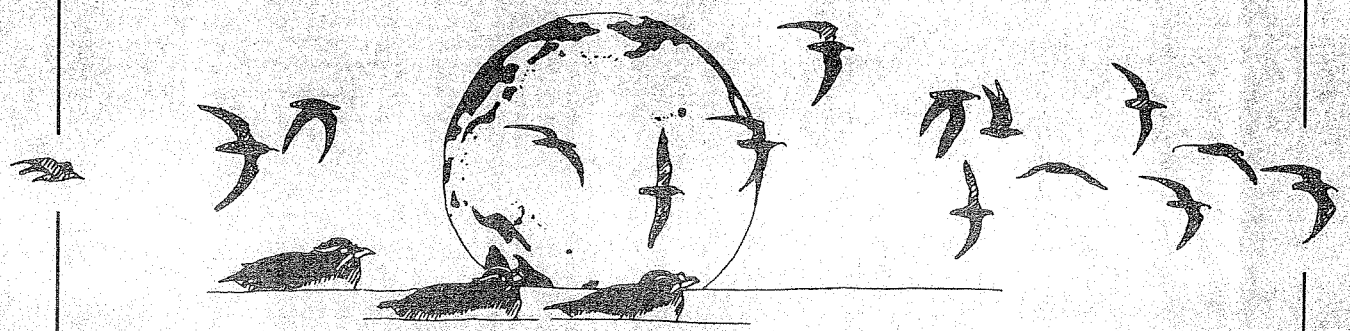
Pacific Seabird Group



BULLETIN

Volume 18 Number 1 1991

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 its members and informs its membership and the general public of conservation issues relating to Pacific seabirds and the marine environment. 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. Annual dues for membership are $15 (Individual and Family); $10 (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. Members receive the PSG *Bulletin* (Family members receive only one copy).

PACIFIC SEABIRD GROUP *BULLETIN*

The Pacific Seabird Group *Bulletin* (ISSN 0740-3771) is published twice a year, in the spring and fall. It contains news of interest to PSG members and regional reports, including a listing of current research and information on seabird conservation. The PSG *Bulletin* is not an outlet for the results of scientific research, but articles on seabird conservation, seabird research activities, or other topics related to the objectives of PSG are welcome. All materials should be submitted to the Editor. Back issues of the *Bulletin* 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.

PERMANENT ADDRESS

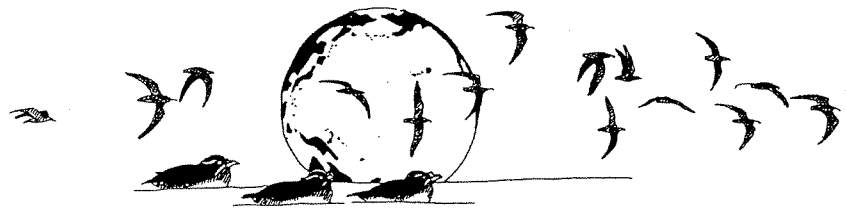
Pacific Seabird Group, c/o Point Reyes Bird Observatory
4990 Shoreline Highway, Stinson Beach, CA 94970

This address is for use only by those who have lost track of current officers. Routine correspondence should be sent to the appropriate Executive Council member listed on the back cover.

DONATIONS

Contributions to the Pacific Seabird Group qualify for tax deductions under IRC Section 501(c)(3).

Pacific Seabird Group



DEDICATED TO THE STUDY AND CONSERVATION OF PACIFIC SEABIRDS AND THEIR ENVIRONMENT

THE CHAIR'S PAGE

Malcolm Coulter

Greetings! I would like to express my appreciation for the opportunity to contribute to the future of the Pacific Seabird Group. This is a strong group with contributions both to research and conservation. While we're involved primarily with seabirds in the north Pacific, our involvement and influence is worldwide. We have accomplished a great deal, we have much to be proud of, and we have great potential.

We are all proud of the accomplishments of the Marbled Murrelet Committee. The group has increased interest and awareness in this species and made major accomplishments for its conservation. I offer a warm welcome to the new members who have joined PSG through their involvement with the Marbled Murrelet. There is a lot to be done, and this group is doing it.

At the last meeting, the new PSG 2000 Committee meeting was well attended in a discussion of the future of the Pacific Seabird Group. There was strong interest in greater involvement and developing greater influence in conservation issues. At the same time, the strong point was made that we should also support basic research. The committee dealt with the direction of the PSG. Discussions were general and will continue over the next few years. A PSG 2001 Committee was formed to pursue the issues and discussions will continue at the next annual meeting.

While we are a strong organization, there are many ways in which we need to improve. I would like to see greater involvement among all of the members. Many of the new members and many of the older members feel that there is an 'old guard' and that it is difficult to find a way to contribute. At the same time, we need new people and new ideas. Ellen Chu has well organized our finances and membership lists. She will be stepping down in a couple of years. Maybe not immediately, but in the next year or so, we would like to find someone (preferably but not necessarily with an Apple© system) to take her place.

We also need to share the responsibilities. Art Sowls has done an excellent job chairing the Conservation Committee for many years. He has written most of conservation our letters. Many of us may not have experience writing these kinds of letters, but with a couple of examples we could write the letters and ease the burden on Art. We need people to become more involved in the conservation committee. The committee meeting was well attended at the 1990 annual meeting, and any of the attendees could contribute.

Finally, we need to include more of the members in the efforts of the Pacific Seabird Group. We would like to increase participation of the membership. If you have Ideas, I would like both your ideas and your increased participation.

THE PROGRAM CHAIR'S COMMENTS
SEVENTEENTH ANNUAL MEETING

January 23 - 27, 1991
Monterey Conference Center
Monterey, California

The 1990 meeting was held at the Monterey Conference Center. The meetings were organized by the Local Committee chaired by Nancy Naslund, with the participation of Bob Burton and Jim Harvey. The meeting was cosponsored by The Institute of Marine Sciences, University of California, Santa Cruz; the Monterey Bay Aquarium; Moss Landing Marine Laboratory; and the Savannah River Ecology Laboratory. The local committee put a tremendous effort into the meeting and the success of the meeting is a tribute to their efforts.

Thirty-two oral and 12 posters were presented. The papers were excellent. There was no special symposium this year and the extra time (two afternoons) was available for informal discussions and committee meetings. This gave a more relaxed feeling to the meeting. The two afternoons were devoted to the Executive Council, the Conservation Committee, the Seabird and Fisheries Committee, and the Marbled Murrelet Committee. Almost everything was accomplished within schedule so people were not pressed and could enjoy the meeting.

The PSG 2000 committee met on Friday afternoon. This committee was instituted by Doug Siegel-Causey last fall to open the topic of the direction of the Pacific Seabird Group. Almost everyone at the meeting attended. This offered an opportunity to discuss the status and future direction the group. There was a tremendous interest. The discussions will continue over the next couple of years with an opportunity for everyone to participate.--Malcolm Coulter

TREASURER'S REPORT - 1990

Treasurer's checking acct.	$1362.00
Bulletin checking acct.	$806.07
UK account	$330.00
Savings	$10,463.56
Endowment (as of 12/31/90)	$21,977.61
Total carryover	$34,939.28
1990 INCOME	
Dues	$5,235.00
Donations	$105.00
Annual meeting (Victoria): net	$1,814.85
Fund raising (T-shirts)	$600.00
Interest on savings	$865.73
Interest on endowment	$2,235.61
Misc. income (incl. interest on chkg)	$21.16

Total income	$10,877.35
1990 EXPENSES	
Bulletin and related costs	($3,200.50)
Annual meeting (Monterey): actual	($407.50)
Fund raising	($1,012.55)
Officers' (supplies, postage, etc.)	($1,872.59)
ICBP dues	($200.00)
Total expenses	($6,693.14)
1990 INCOME OVER EXPENSES	$4,184.21
ACCOUNT BALANCES	
Main checking (as of 12/31/90)	$3,633.32
Bulletin acct. (as of 12/31/90)	$325.55
UK acct. (@ £1.00 = $1.50)	$563.20
Savings (as of 12/31/90)	$8,696.45
Endowment (as of 12/31/90)	$24,680.58
Total assets	$37,899.10

Income

As usual, the bulk of our income in 1990 came from membership dues, including life memberships. Unlike regular memberships, which become part of PSG's yearly cash flow, life membership dues are deposited directly into the Endowment Fund, which we may be able to start spending in 1991. In 1990 PSG received $4,490.00 in regular memberships and $1,125.00 in life memberships. In addition, PSG received $600 from T-shirt sales at the Victoria meeting and $105 in unsolicited donations. The net income from the Victoria meeting will all go toward publishing the proceedings from the symposium held there, "Status, Ecology, and Conservation of Seabirds of the North Pacific Ocean."

Expenses

The expenses shown for 1990 are typical of what PSG spends per year under its present structure. The *Bulletin,* as it is was produced before this issue, cost about $3,000–3,750 per year, including printing and mailing.

The accounts for the Monterey meeting are being kept by Nancy Naslund of the local committee and were not completed at press time. The $407 listed in the table was an early deposit for rental of the conference facilities. The expenses for the meeting in Victoria came to about $6,000. Expenses for Monterey are likely to be relatively high because the conference center itself is expensive.

The 1990 figure for officers' expenses is high because it includes more than $1,200 to send Chair Doug Siegel-Causey to the Colonial Waterbird Group meeting in Newfoundland, Canada, as agreed by the Executive Council at the Victoria meeting.

Finally, note that we spent more than one-and-a-half times as much to make T-shirts as we gained from their sale in 1990. This does not seem to be a good fund-raising option unless we sell a lot more shirts, or sell them for a lot more money.

Endowment Fund

The endowment fund is in the form of US Government Securities, brokered through Dean-Witter Reynolds. At the end of 1990, PSG owned 2,634 shares at a market value of $9.37 per share (compared with 2,311 shares at $9.51 per share in December 1989). Donations, life memberships, and income from fund raising are deposited directly into this fund.

The potential uses of this fund need to be considered carefully by the Executive Council. It is probably unwise to use the endowment for any ongoing operational expenses, such paying an administrative officer to keep PSG running. Such operational expenses should come out of yearly receipts. It makes more sense to use the endowment as seed money for new undertakings or, perhaps, to use the interest to fund awards.

Membership

As of 1989, "current members" are defined as those who have paid their dues for a given year before the first issue of that year's *Bulletin* has been mailed. Forgetful members can rejoin at any time, but only current members receive the *Bulletin*. In April, PSG had 291 members who were paid through 1991 or later (i.e., 74 people are late paying 1991 dues); of these, 38 were new members who joined in 1990, most at the Victoria meeting, and 26 who joined in 1991. In addition, 53 institutions worldwide receive the *PSG Bulletin,* of which 26 are paid subscriptions and the rest are journal exchanges or goodwill gifts.

Dues notices were sent out in November 1990; reminders to late payers went out in April 1991. Although our renewal rate has been good for the past two years, we are not putting any effort into recruiting new members; for example, an invitation to join could be sent to every nonmember who attends the annual meeting.

RESOLUTIONS PASSED BY THE MEMBERSHIP

BAJA CALIFORNIA SEABIRD SURVEY

WHEREAS
Knowledge of the distribution and abundance of seabird populations is essential for their effective conservation, management, and for assessment of oil-spill risks;

WHEREAS
Efforts during the last 15 years have resulted in acquisition of substantial amounts of information about seabirds from Alaska through California;

WHEREAS
Many species and populations of seabirds extend south from the U.S. into Mexican waters and little is known about their status there; and

WHEREAS
Having seabird colony information from Baja California would be highly desirable from conservation and management considerations regarding seabirds of the California coast;

THEREFORE BE IT RESOLVED
That the Pacific Seabird Group urges the Minerals Management Service, the US Fish and Wildlife Service, and other governmental agencies to place a high priority on supporting a seabird survey of Baja California in conjunction with approprial Mexican institutions.

LOCAL COMMITTEE

WHEREAS
The Pacific Seabird Group has enjoyed a tremendously successful annual meeting at the Monterey Conference Center, and

WHEREAS
The PSG Local Committee worked under difficult time constraints, yet produced a meeting characterized by comfort, coordination, colorful entertainment, and contagious comradarie,

THEREFORE BE IT RESOLVED
That the Pacific Seabird Group extends its heartfelt thanks and congratulations to the Local Committee, chaired by Nancy Naslund, Bob Burton, and Jim Harvey, for their efforts on our behalf.

And it is further resolved that PSG expresses its appreciation to the Co-sponsors of the meeting:

The Institute of Marine Sciences, University of California, Santa Cruz;
The Monterey Bay Aquarium;
Moss Landing Marine Laboratories, California State University; and
The Savannah River Ecology Laboratory, University of Georgia.

DRIFTNET FISHERIES

WHEREAS
The use of large-scale driftnets is an indiscriminant and destructive method of fishing that kills seabirds and other living marine resources of the world's oceans;

WHEREAS
There may be severe adverse impacts of high-seas driftnets on seabirds and other marine resources, since preliminary estimates indicate that about 875,000 seabirds die annually in North Pacific driftnets; and

WHEREAS
Jurisdiction over seabirds under the Migratory Bird Treaty Act extends only 3 miles from the coast of the United States, although the nation protects marine mammals from drift nets and other threats out to 200 miles offshore;

THEREFORE BE IT RESOLVED
That the Pacific Seabird Group supports banning large-scale high-seas driftnets in the world's oceans, as stated in United Nations Resolution 44-225, United States Public Law 101-627, and the Wellington Convention; and
That the Pacific Seabird Group urges the United States Congress to amend the Migratory Bird Treaty Act to extend jurisdiction of the United States over migratory birds to 200 miles off its coast.

REGIONAL REPORTS

LATIN AMERICA

Enriqueta Velarde

BRAULIO ANAYA. Instituto de Oceanologia. Universidad de Valparaiso. Casilla 13d. Viña del Mar, CHILE. He has been working with the distribution and population status of the Humboldt Penguin along the Chilean coast. A field guide of the Chilean birds, written by him, is at present in press.

CARLOS G. GUERRA. Instituto de Investigaciones Oceanologicas. Universidad de Antofagasta. Casilla 1240, Antofagasta, CHILE. His research has been about water exchange in Grey Gull (*Larus modestus*) chicks in the Atacama desert, as well as water loss and water vapor conductance in Grey Gull eggs. He is interested in working on mainly demographic aspects of Pelecaniformes, Spenisciformes, and Charadriiformes (*Larus*). He has studied demographic,

behavioral, and bioenergetic aspects of some guano seabirds since 1983. He is also interested in comparative studies of Larus species concerning niche segregation and life histories. Using *L. modestus* as a main model, he has studied its breeding biology, life history, metabolic efficiency, and time budgets.

JUAN GUZMAN. Departamento de Biologia Marina. Universidad Autonoma de Baja California Sur. Apartado Postal 219B. 23000 La Paz, BCS, MEXICO. His research group is working on inventory and distribution of birds in La Paz Bay and adjacent islands in the Gulf of California, and in Santa Margarita Island on the Pacific side of Baja California. Some of the species they have concentrated on are: *Fregata magnificens* (nestling growth patterns and parental offspring behavioral relations) and *Pelecanus occidentalis* (food habits and distribution).

MICHAEL MCCOY. Escuela de Ciencias Ambientales. Universidad Nacional, Heredia, COSTA RICA. Since 1979, his group has studied pelicans in the Costa Rican Pacific. Their main interest: number of breeding pairs, nests, and number of chicks in the four breeding colonies known in Costa Rica. They also have a banding program. They are also working with Dendrocygnon and Anas discors in freshwater marshes near the Pacific coast.

VICTOR M. PULIDO. Director de Flora y Fauna Silvestre. Instituto Nacional Forestal y de la Fauna. Paseo de los Eucaliptos 285. Camacho, Lima 3, PERU. His work is mainly concerned with conservation and population biology aspects of shorebirds. He has mainly worked in two Peruvian projected areas: Santuario Nacional de las Lagunas de Mijia and Reserva Nacional de Paracas,both managed by his institution.

ROBERTO P. SCHLATTER. Universidad Austral de Chile. Instituto de Zoologia. Casilla 567, Valdivia, CHILE. His group is mainly doing censuses of the Antarctic and Subantarctic seabirds, and also in the archipelago in southern Chile. They are also studying shorebirds. He is directing thesis on seabirds communities of Pan de Azucar Island, northern Chile.

HUMBERTO TOVAR. Subdirector del Area de Aves Marinas. Instituto del Mar de Peru. Apartado Postal 22, Callao, PERU. His areas of interest include: distribution of seabirds on the Peruvian coast; parental care in seabirds, guano seabird populations on the Peruvian coast, mainly in relation to the "El Niño" phenomenon, and studies on marine mammals.

JOSE VALENCIA. Universidad de Chile, Facultad de Ciencias Basicas y Farmaceuticas. Departamento de Ciencias Ecologicas. Casilla 653, Santiago, CHILE. Since 1983 he has been working with penguins in the Audley peninsula, mainly on *Pygoscelis adelie*, *P. antarctica*, and *P. papua*. The studies focus mainly on the feeding and breeding ecology of these species, such as function of creches. They are starting to gather information on the Humboldt and Magellanic penguins as well in colonies near to Santiago. He is also starting a study on the guano seabirds. For the last three years, they have been carrying out a banding program with Passeriformes in the brushlands of central Chile.

CLAUDIO VENEGAS. Instituto de la Patagonia. Universidad de Magallanes. Avda Bulnes Km 4 Norte, Casilla 113D, Punta Arenas, Chile. He is currently working on feeding aspects of the Magellanic and Yellow-crested penguins and hopes to do similar research with the Macaroni Penguin in the near future.

HUGH DRUMMOND. Centro de Ecologia, Apartado Postal 70-275, 04510 Mexico, D.F., MEXICO. His interests lie primarily with Pelecaniformes, especially *Sula nebouxii*, with behavioral ecology, brood reduction, conflict between siblings, aggressive dominance, sex ratio, filopatry, and diet. During the last nine years he has been working on Isabel Island in the Mexican Pacific.

ANDRES M. SADA. Apartado Postal 1124, Monterrey, Nuevo Leon, 64000, MEXICO. He has extensive experience in bird watching especially in oceanic regions. He has traveled for many years all around Mexico's different habitats. Last year in May he made a trip to the Revillagigedo Islands and is preparing a note for publication.

JOSE LUIS OSORNO. Lab. de Conducta Animal, Centro de Ecologia, Apartado Postal 70-275, 04510 Mexico D.F., MEXICO. He works mainly on Pelecaniformes, particularly boobies and frigatebirds, and studies brood reduction, mating systems, sex ratio and parental investments. He works in the subtropical pacific: Isabel Island, Nayarit, Mexico.

ENRIQUETA VELARDE. Instituto de Biologia, Departamento de Zoologia. Apartado Postal 70-153, 04510 Mexico D.F., MEXICO. I have been working on behavioral patterns, feeding and breeding ecology of Heermann's Gull, Elegant, and Royal Terns. I am banding and color marking of Heermann's gulls (4,000 per year) and banding of Elegant Terns (1,000 per year) and are working on diet analysis of barn owls feeding on seabirds and fishing bats in Rasa and Partida Islands. I am continuing a long term conservation project of the islands of the Gulf of California together with the Mexican government and the World Wildlife Fund. I am also interested in pelagic distribution and abundance of seabirds in the Gulf of California and censuses of seabird colonies in the Gulf Islands.

Pacific Region

Ken McDermond

Long-line fishing

The Western Pacific Regional Fishery Management Council voted in February to ban long-line fishing within 50 nautical miles of the Northwegtern Hawaiian Is1ands from Nihoa Is1and to Kure Atoll. The purpose of this closure was aimed mainly at protecting endangered Hawaiian Monk Seals, but it will add some protection for albatrosses whose numbers increase the closer one comes to the breeding colonies. Interactions of long-line fishing with seals and albatroses were noted at Tern Island, French Frigate Shoals during January and February 1991. These included a Black-footed Albatross with mono-filament around its legs and a Laysan Albatross that had been spray painted red. Additionally, three albatros band recoveries were reported by long-line fishermen during this period. Two of these died as a result of being hooked on long-line gear and the third survived.

Clearly the above resolution, which is in the process of being made into an Emergency Ruling (90-180 days), will not fully protect seabirds from interactions with this fishery. The Fish and Wildlife Service together with the State of Hawaii, National Marine Fisheries Service, and Western Pacific Regional Fisheries Management Council, is in the process of developing educational materials for fishermen in a effort to minimize take. Recommendations similar to those developed by Nigel Brothers for a long-line fishery in the Tasman Sea will be made and tested through a proposed observer program.

Tern Island, French Frigate Shoals

Standardized year-round monitoring studies of resident breeding species continue.

FWS staff are studying basic breeding biology parameters of Brown Noddies and White Terns.

Oiling of Red-footed and Masked Boobies has presented biologists at the station an opportunity to monitor survival of these birds. In addition many of the birds are in the initial stages of breeding activity. Birds have been banded, color marked, and classified as to degree of oiling and will be followed through the upcoming breeding season.

Laura Gill will initiate a behavioral study of Great Frigatebird predation on Sooty Tern chicks, in April, for a Masters project through the University of Maryland.

Paul Sievert (University of Pennsylvania) will return in May to begin the second year of a three year effort studying: I) nesting ecology of Wedge-tailed Shearwaters, Sooty Terns, and Brown Noddies and 2)the relationship between the morphology of osmoregulatory organs and diet of seabirds.

SOUTHERN CALIFORNIA

DONNA C. BREWER

University of California, Los Angeles

Bryan Obst continues his research concerning the energetics and digestive physiology of seabirds in Antarctica, Baja California, Northern Chile, and a Mono Lake in California. He is also the administrator of the California Department of Fish and Game's Least Tern monitoring contract.

Betty Anne Schreiber is continuing work for her Ph.D. studying populations, growth rates, longevity, pair bonds, and general breeding biology of nesting seabirds in the Central Pacific Ocean (Christmas and Johnston Islands).

Lisa Ballance is continuing work for her Ph.D. studying seabirds in the eastern tropical Pacific. Her research, in conjunction with Bob Pitman and Steve Reilly of the Southwest Fisheries Center, involves studies of community structure and flight energetics of seabirds which forage in flocks above schools of yellowfin and skipjack tuna, and spotted and spinner dolphins.

Scott Johnston is studying Least Terns at Camp Pendleton Marine Corps Base in San Diego County for his M.A. thesis. His work involves a study on the effects of human disturbance and predation on nesting behavior of Least Terns, and habituation to disturbances.

University of California, Irvine

George Hunt is continuing his NSF funded research on arctic seabird energetics and foraging strategies. This research is being conducted in the Pribilof Islands and is focusing on examining correlations between ocean thermal fronts, seabird prey concentrations, and seabird foraging activities. Marine mammal distributions are also being examined.

Zoe Eppley is continuing her research on temperature as a selective force on the evolution of charadriiform breeding biology. Specifically, her studies are focused on examining the role of parental brooding behavior, nest thermal biology and the ontogeny of thermoregulation in the young in the colonization of diverse thermal environments by charadriiform birds. Zoe is also writing up the results of her work on Antarctic charadriiforms (Kelp Gulls, South Polar skuas and Greater Sheathbills). In October, Zoe will begin a post-doc at the University of Illinois Medical School (UI, Physiology, Mail Code 901, Box 6998, Chicago, Il. 60680), where she will be studying the molecular events underlying the development of thermoregulation. Once the critical events in the development of thermoregulation are understood, Zoe plans to to use population biology approaches to look at microevoluntionary responses within seabird colonies during climatic fluctuations.

Mary Beth Decker is continuing her third year of graduate research with George Hunt on a NSF funded study of the atsea distribution and foraging behavior of seabirds of the Pribilof Islands relative to oceanographic features. Mary Beth and Dave Irons just completed a Fish and Wildlife Service funded study of the distribution of marine birds of the Prince William Sound relative to their prey.

California State University, Long Beach

Pat Baird and Barbara Massey are continuing research for the U.S. Navy on the breeding biology and longevity of the California Least Tern at Camp Pendleton in southern California. Pat and Brian Obst have received a grant from the Environmental Protection Agency to establish a new colony of California Least Terns in the Santa Monica Bay estuary system.

Kathy Keane has received a grant from the Ocean Studies Institute to monitor the breeding success of California Least Terns at a new site in the Port of Los Angeles.

National Park Service

Trudi Ingram reports that the Park Service will be continuing monitoring efforts initiated in 1984 to document the nesting effort, productivity, and phenology of seabirds within the Channel Islands National Park. Species which will be monitored this year include the California Brown Pelican, Western Gull, Xantus' Murrelet, Cassin's Auklet, Pelagic Cormorant, Double-crested Cormorant, and Western Snowy Plover.

Minerals Management Service

Gordon Reetz reports that the Minerals Management Service (MMS) hopes to award a study of the distribution seabirds and mammals of the southern California planning area (San Luis Obispo County south to the Mexican border) to the State of California, University of California system sometime this year. A study of shorebirds from southern California to Baja California is planned for fiscal year 1992.

Fish and Wildlife Service

Harry Carter and Dave Gilmer just received funding from the Minerals Management Service to complete a 1 year survey of nesting seabird colonies in the southern California area. Last year Harry and Dave completed a survey of nesting seabird colonies of central and northern California for the MMS.

Other PSG members

Bill Everett is continuing research on the breeding biology of storm petrels on the Coronados Islands. In addition, Bill is continuing his conservation efforts with the Mexican government regarding Townsend's Shearwater on the Revillagigedos Islands and writing up results of his fall 1990 expedition to Alijos Rocks. Dan Anderson and Bill are continuing preparation of a Baja disturbance brochure.

Peter Major and Pat Mock are conducting studies of shorebird foraging activities in Mission Bay park. Pat Mock is also continuing his studies of the energetics of nestling Thick-billed Murres in the central Pacific.

Paula White is continuing her graduate research on the natal dispersal of endemic arctic fox on St. Paul Islands.

Bernice Wenzel has just had a manuscript on the brain atlas of Northern Fulmars accepted by Brain, Behavior and Evolution (w/ J. Matochik and C. Reems).

Frank Twohy is happy to report that on August 1, 1991, Sea World celebrated the successful hatching of a Common Puffin (first known in U.S.). The puffin has fledged and has joined other captive Horned and Tufted puffins at their facility.

NORTHERN CALIFORNIA / OREGON

Roy W. Lowe

University of Oregon.

Dr. Jan Hodder and students at the Oregon Institute of Marine Biology will continue studying nesting success of Pelagic Cormorants at the OIMB colony (CC#270-008) in Sunset Bay. This will be the 19th consecutive year that this colony has been studied. Study will also continue on the breeding biology of Pigeon Guillemots at the sitka dock (CC# 270-001) in Coos Bay.

USFWS.

Roy W. Lowe of the Western Oregon Refuges Complex is continuing seabird monitoring projects in Oregon. Activities in 1991 will include aerial photographic surveys of all Common Murre and Brandt's and Double-crested Cormorant colonies on the Oregon coast; colony census of all species at select locations; continue beached bird mortality transects near Newport; conduct the fifth annual aerial survey of Brown Pelicans along the Oregon and Washington coasts; conduct opportunistic at-sea transects of Marbled Murrelets; conduct spring and fall aerial surveys of Aleutian Canada Goose use of Oregon coastal rocks; and conduct aerial photographic surveys of northern sea lion pupping colonies in Oregon.

Robert L. Pitman will be continuing a long tern study of the reproductive biology of Leach's Storm-Petrels on Saddle Rock, Oregon Islands NWR. Since 1979, a total of 4973 birds have been banded here including 2621 adults, 2352 chicks, and 122 recaptures. Food habitats information is currently being analyzed.

Range Bayer is continuing his long term beached bird mortality transects north of Newport, Oregon.

Robert Loeffel is also continuing his long term bird mortality transects south of Newport, Oregon. This study is now in the 14th year.

Palmer Sekora and Roy Lowe (USFWS) and Jan Hodder (OIMB) have initiated planning for the 1992 PSG Annual Meeting to be held at OIMB in Charleston, Oregon 15 - 19 January 1991. Attempts are being made to organize a one-day workshop prior to the meeting on 14 January concerning networking data storage, transfer, and retrieval systems for marine resource information.

WASHINGTON/BRITISH COLUMBIA REGIONAL REPORT

George J. Divoky

University of Victoria

Alan Burger:

A. The nesting behavior of Marbled Murrelets on southern Vancouver Island is being studied in conjunction with Irene Manley and Robyn Shortt. They will be monitoring behavior and flight activities and searching for nests in the Carmanah Valley and adjacent watersheds.

B. Diving depths in Rhinoceros Auklets and Cassin's Auklets, as well as other alcids, are being studied using time-at-depth recorders .

C. Experiments are being conducted on the persistence of carcasses on beaches and the buoyancy of oiled seabirds to improve assessments of mortality following oil spills. This work is a follow-up study on the "Nestucca" oilspill of 1988-89.

D. In conjunction with the British Columbia Ministry of Environment systematic beached bird surveys are being conducted at over 30 sites in British Columbia.

State of Washington, Dept. of Wildlife

Eric Cummins and Tom Hamer will conduct Marbled Murrelet surveys on U.S. Forest Service land, research nest-site stand characteristics, and survey old growth groves on private lands. Lora Leschner will survey potential nest habitat for Marbled Murrelets in the San Juan Islands. Cummins has organised a volunteer effort to survey for Marbled Murrelets. Lora Leschner will coordinate these surveys in Northern Puget Sound.

The National Marine Fisheries Service has contracted with the Washington State Department of Wildlife and the Oregon State Department of Fish and Game to study seabird and marine mammal mortality related to the Columbia River gill net fishery. Steve Jeffries is the project leader for Washington.

State biologists will survey those seabird colonies that are not located on federal refuge Islands.

Univ. of Washington

Dee Boersma is conducting studies on food limitation chick growth rates of storm-petrels on the Barren Islands, Gulf of Alaska .

Seattle Aquarium

The aquarium is collaborating with C.J. Ralph (U.S. Forest Service, Arcata. CA) and Daniel Varoujean (Oregon Institute of Marine Biology, Charleston, OR) in conducting studies of the effects of radio transmitters on captive birds.

Others

Terry Wahl (Bellingham, WA) continues to gather and analyze data on interannual variation in seabird occurrence off the Washington Coast. This will be the 20th year of pelagic surveys.

Jean Cross (Monroe, WA) has been conducting weekly surveys near Mt. Pilchuk, in eastern Puget Sound since August to examine patterns of attendance in nesting areas during the nonbreeding season .

CONSERVATION ISSUES

Fidalgo Bay Oil Spill

An oil spill estimated to be 210,000 gallons occurred at Anacortes in Fidalgo Bay in northeastern Puget Sound on 22 February as a booster pump exploded during the offlofIding of North Slope crude. Much of the spill was contained on land before entering the bay. Recovery efforts have produced 110 dead and 40 live birds, primarily diving ducks. Hazing activities, including propane cannons and human scarecrows, were used to drive birds from the area. These, in conjunction with the commotion of cleanup activities and equipment, kept most of the 4,000 birds in the area away from the spill affected area.

Sanctuary Drilling Proposed

The Olympic Coast National Marine Sanctuary was created by Congress in 1988 and now is in jeopardy of being the site for offshore drilling. The Bush administration is recommending that the portion of the sanctuary further than 12 miles from land be open to oil and gas exploration after the turn of the century. State officials and legislators have been quick to denounce the proposed drilling. The recommendations for drilling come in an environmental impact statement prepared by NOAA. According to the Seattle Times, NOAA planners originally recommended against drilling in the sanctuary but the recommendation was changed at a "higher level of the agency."

Navy Bombs Wildlife Refuge

The U.S. Navy continues to use Sea Llon Rock for target practice. The rock is in the Washington Islands Wilderness Area and Coplalia National Wildlife Refuge but also 80 air miles from the Whidbey Island Naval Station. Naval aircraft use 20-lb practice bombs that do not explode but emit puffs of smoke to mark the point of impact. The most damage to wildlife comes not from the bombs but from the sounds of attack bombers traveling at low altitudes and speeds in excess of 400 miles per hour. The Department of Defense obtained the right to bomb the island during World War II and has resisted attempts by the Department of the Interior to have the permit revoked. The rock is a favored haul out area for Northern sea lions. The American Society of Mammalogists passed a resolution at its 1989 meeting urging the Navy to discontinue the use of the site as a target. Small battle-hardened populations of Black Oyster-catchers, Glaucous-winged Gulls, and Pigeon Guillemots breed on the island.

Inland

Jim Lovvorn

University of Manitoba

Roger Evans and his graduate students have completed a foraging study of American White Pelicans. They are beginning research on factors affecting brood reduction (death of latter-hatched young) in pelicans and Double-crested Cormorants. Another study of terminal egg neglect in Ring-billed Gulls will continue for a second summer.

University of Saskatchewan

A major outbreak of Newcastle Disease occurred in Double-crested Cormorants, White Pelicans, and Ring-billed Gulls in late summer 1990 in Manitoba, Saskatchewan, and Alberta. About 7,000 cormorants. at least 100 pelicans, and 2,000 gulls died in Saskatchewan, and around 300 cormorants in Alberta. Mortality and typical symptoms were reported among the 40,000 cormorants that summer on Lake Winnipegosis, Manitoba, but no firm diagnosis or mortality estimate was made. Federal and provincial wildlife agencies and Agriculture Canada are cooperating with G. Wobeser and F. Leighton (Department of Veterinary Pathology) to survey populations for recurrence of the disease and for antibodies to the Newcastle virus. Antibody surveys will include distant populations for comparing affected versus unaffected groups .

F. Leighton is also continuing experimental studies of petroleum toxicity to birds, focusing on avian embryos.

Keith Hobson and Malcolm Ramsay (Department of Biology) are investigating trophic relationships in a High Arctic seabird community in Barrow Strait/Lancaster Sound, Northwest Territories. These relationships are being determined through stable carbon and nitrogen isotope analyses of selected tissues from both seabirds and their prey. Seabirds in the study area include Thick-billed Murres, Black Guillemots, Northern Fulmars, Glaucous Gulls. Blacklegged Kittiwakes, and Arctic Terns. Analysis of tissues of birds raised in captivity will indicate isotopic fractionation factors between diet and consumer muscle, bone, liver, blood, and feathers. Integration of both analyses are allowing construction of simple models that predict the seasonal trophic position of each seabird species based on the isotopic signature of their various tissues.

Saskatchewan Natural History Society

The Society will coordinate surveys of potential habitat of the Piping Plover in Saskatchewan during the spring and summer as part of the first international census for this species. About 12% (500 birds) of the world's Piping Plovers are thought to nest in Saskatchewan. Participants include the Canadian Wildlife Service, Saskatchewan Parks and Renewable Resources, and a number of experienced volunteers who will search potential but unconfirmed nest sites.

National Ecology Research Center (U.S. Fish and Wildlife Service)

Susan Skagen and Gonzalo Castro have completed studies of the migration ecology of shorebirds at Cheyenne Bottoms, Kansas. This staging, area, identified as critical habitat in the Western Hemisphere Shorebird Reserve Network, has been dry for two years and taken over by emergent vegetation. Associated studies at Quivira and Salt Plains National Wildlife Refuges indicate that shorebirds carry little fat while migrating through this region of the Great Plains, and depend not on specific wetland sites but rather on complexes of wetlands scattered throughout the area.

University of Wyoming

Scott Findholt is completing his Ph.D. thesis on food habits and foraging behavior of American White Pelicans in reservoirs and rivers in southeastern Wyoming. Erika Wilson is finishing her Master's thesis on characteristics of nest sites and foraging areas of Least Terns along the Platte River in Nebraska. John Baldwin and Jim Lovvorn will continue their study of dabbling ducks feeding in the intertidal zone and nearby uplands of the Fraser Delta, British Columbia.

Utah State University

Anthony Wasowicz, Tim Modde, and Dale Hepworth (Utah Division of Wildlife Resources) have submitted a manuscript on predation by Double-crested Cormorants and Western Grebes on rainbow and cutthroat trout stocked into a Utah reservoir.

Idaho State University

Chuck Trost will be updating the state inventory of colonial water bird colonies, verifying the continued existence of past colonies and identifying any new ones.

Idaho Department of Fish and Game

Craig Groves is continuing his research on Harlequin Ducks in the Idaho Panhandle.

University of Kansas

Douglas Siegel-Causey is continuing studies on North Pacific Pelecaniformes. Based on skeletal material found in museum collections and in subfossil remains on Amchitka Island, he has described a new species, Kenyon's Shag, likely still present in Beringian waters. Close survey of skin collections throughout the world has identified three possible specimens, one in Leningrad and two at the Smithsonian. If these prove to be the same species, Kenyon's Shag may have features identifiable in the field (still working on this one!). He is leading an international team of archaeologists on an excavation of an early Aleut midden on Buldir Island; the zoologists hope to begin reconstructing the past seabird community of western Beringia for the past 10,000 years. Siegel-Causey is also working on the population genetics and systematics of coastal populations of Bering Sea seabirds using DNA sequences.

REPORT FROM THE MARBLED MURRELET TECHNICAL COMMITTEE

Kim Nelson

ANNUAL MEETING

At least 42 people attended the Marbled Murrelet Technical Committee Meeting in Monterey. A variety of topics were discussed including Interim Management Guidelines for the murrelet, the status of the species in the U.S. and Canada, the lawsuit filed against the Canadian government to prevent logging in the Carmanah and Walbran Valleys, and how to deal with individual timber sales. We also passed 2 resolutions on behalf of the murrelet in the U.S. and Canada.

Because the size of the Marbled Murrelet Technical Committee has grown to over 50 members, a smaller working group will be formed to expedite correspondence and decisions on research and management issues. With the blessing of the Chair of PSG, Malcolm Coulter, the group will formally be called the Research Subcommittee and will include individuals who have or are currently conducting research on Marbled Murrelets. Members of this subcommittee will be appointed by the Chair of the Marbled Murrelet Technical Committee. During 1991 this group will include the following people: Alan Burger, Harry Carter, Eric Cummins, Kathy Kuletz, Lora Leschner, Nancy Naslund, Kim Nelson, Peter Paton, C. J. Ralph, Michael Rodway, Jean-Pierre Savard, Fred Sharpe, Steve Singer, Steve Speich, and Dan Varoujean.

INTERIM MANAGEMENT GUIDELINES

Guidelines for the management of the Marbled Murrelet on forested lands in Oregon, Washington, and California were drafted by an interagency working group including representatives from the U.S. Forest Service (Regions 5 and 6), Bureau of Land Management, State Fish and Wildlife agencies (Oregon, Washington, California), Department of Forestry (Oregon), and the Pacific Seabird Group Marbled Murrelet Technical Committee. The objective of these guidelines is to provide interim management direction for land managers in Oregon, Washington, and California, to assist in identifying and conserving habitat occupied by murrelets, until state, federal, or regional management plans can be developed. These guidelines include four essential steps: (1) identification of proposed activities within the range of Marbled Murrelets; (2) identification of suitable habitat that might be affected; (3) survey of habitat for use by murrelets; and (4) designation and conservation of habitat areas. The guidelines request that all sites identified as potential nest or occupied sites be preserved for murrelet nesting habitat. A minimum of 8151236 ha (330-500 acres) is proposed for the size of these areas and management activities within 0.8 km (0.5 miles) of this area are recommended to be curtailed during the breeding season (1 April- 15 September) to minimize disturbance. The guidelines also outline a methodology for surveying murrelets in timber sale areas and locating occupied sites using protocol developed by Paton et al. (1990).

Once completed, these guidelines will be presented to the superiors in the cooperating land management agencies for consideration and potential adoption. Unfortunately, when the guidelines were presented to the U.S. Forest Service in Region 6 on 28 January, they were rejected. The agency was unwilling to be proactive in this habitat management issue (at least at the regional level) and will wait until they are forced to manage for Marbled Murrelets through the endangered species listing process.

SPECIES STATUS

United States.

The Washington D.C. office of the U.S. Fish and Wildlife Service is currently reviewing the Species Status Report written by the Pacific Northwest Region in Fall 1990. The region recommended that the Marbled Murrelet be listed as a threatened species in Oregon, Washington, California, and Alaska (Alaska was not included in the original petition filed in 1988). A final decision on a listing recommendation is expected in the next several weeks.

Canada

The Marbled Murrelet was listed as threatened in April 1990. A Recovery Team has been formed to draft management plans for the species in British Columbia. Members of the Recovery Team include: Gary Kaiser, Canadian Fish and Wildlife Service (Chair); Alan Burger, University of Victoria; Dennis Kangasniemi, Western Canadian Wilderness Committee; Hugh Barclay, Canadian Forestry Service; Charlotte Husband, Laskeek Bay Conservation Society; Bill Munro, Wildlife Branch, Parliament; Dale Seip, B.C. Ministry of Forests; David Lindsay, Fletcher Challenge Canada; and Bill Pollard, Macmillan Bloedel Ltd.

If anyone is interested in reviewing the status report on the Murrelet written by Michael Rodway for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) you can write to the Canadian Wildlife Federation, 543 Sussex Drive, Ottawa, Ontario, Canada KIN 6Z4.

REGIONAL REPORTS

Oregon - Kim Nelson

The first two nests of the Marbled Murrelet in Oregon were discovered in summer 1990! Both nests were located in old-growth trees in forests >100 years in age. Unfortunately both nests were unsuccessful. One chick fell off the nest platform during a windstorm, and the other fell prey to a Great Horned Owl. Habitat fragmentation played a part in both nest failures. See abstract from the annual meeting for more details on these nests.

Some interesting behaviors recorded at the nest sites included the following: (1) The nesting murrelets used flight paths to and from the nest site in predictable patterns based on time of arrival and direction of travel. They approached the nest from several directions, however they always left the branch in the same manner. The exchanges occurred within 5 minutes of the same time each morning (within 5 minutes of official sunrise), even during adverse weather conditions, and lasted between 5 seconds and several minutes. (2) After the chicks hatched, exchanges occurred up to one-half hour later and adults remained on the nest for 5-25 minutes. (3) Vocalizations of the nesting pairs were heard during incubation exchanges and chick feeding periods with the aid of sound recording equipment. These vocalizations are distinct from those made during aerial flight or on the ocean.

A third suspected nest site was discovered in a mature forest (80 years old) on lands administered by the Oregon Department of Forestry. On 13 September, a downy chick was found on the ground by a state forester. When it was rescued from the site on 14 September, the chick had lost its down feathers and had moved 90 m downstream. After gaining 16 g in 5 days at a nearby rehab center (it weighed only 104 g when discovered), the juvenile murrelet escaped from the cage and flew off toward the ocean. Eggshells and a potential nest tree were discovered after an extensive search of the area in early October. This site occurs within a proposed timber sale, however, the Oregon Department of Forestry has agreed to cooperate with my research and has postponed the sale until at least 1993!

A second research crew working for me in 1990 conducted intensive and road transect surveys for murrelets in timber sales on the Siuslaw National Forest. Twenty-seven new occupied sites were discovered in mature and old-growth forests. At present, these sites, as well as those found between 1986 and 1990 on this National Forest, are being protected from timber harvest. The protection of these areas for an unlimited time period will not be guaranteed, however, unless the species is listed as threatened.

In 1991, I plan to continue ground searches for nests of the murrelet. I will begin an experimental project using sophisticated recording equipment to aid in nest discovery (vocalizations from the chick and adults on the nest can be detected on sensitive equipment up to 50 m away). I will also continue murrelet counts on the ocean from land-based survey stations, and monitor site fidelity in potential nest stands.

Washington

Elwha River Basin - Fred Sharpe

A survey of Marbled Murrelet use of the Elwha River, from its mouth at Angeles Point to rivermile 19.8, was carried out during the 1990 breeding season. Results of 62 inland dawn

surveys suggested that a majority of the birds detected only utilized the river as a flight corridor between the marine environment and nesting stands. Based on the presence of calling and circling birds, murrelets may have been nesting in old-growth stands in the upper Elwha and along many of its tributaries including Boulder, Cat, Idaho, and Stuckey Creeks, and above Altaire Campground. It is estimated that approximately 15 pairs of birds used the Elwha Valley during the 1990 breeding season. No observations of birds resting or feeding on either two lakes in the area (Mills and Aldwell) were recorded.

A total of 960 murrelet were sighted at 9 marine survey stations during 120 observation periods. Distribution of murrelets at sea was positively correlated with increasing habitat complexity such as the presence of embayments and/or mixed rock-sand substrates. Areas that consistently possessed the highest numbers of murrelets included Crescent Bay and Ediz Hook, while relatively featureless marine habitats such as the Elwha Delta, Oceanview, and the eastern portion of Freshwater Bay had lower numbers of murrelets.

Stillaguamish Basin and Puget Sound - Eric Cummins and Tom Hamer

Two tree nests of the Marbled Murrelet were located at Lake 22, 35km inland. The nests were found within 100 m of one another in old-growth western Hemlock trees >80 cm in diameter. Behavior of the chick and adults were monitored with a 35 mm automatic infrared camera and time lapse video camera. See abstract from the annual meeting for more details.

Surveys were conducted in the South Fork of the Stillaguamish River basin to determine habitat relationships and distribution of Marbled Murrelets. The study area extended from Puget Sound east to the crest of the North Cascades. Murrelets were more abundant in mature and old-growth forests than other cover types, and were uncommon between 0 and 32 km inland. See abstract from the annual meeting for more details.

Volunteer efforts for surveying murrelets in inland forests continued in summer 1990. More occupied sites were identified, adding to our knowledge about the distribution of this bird in western Washington. The scope of these surveys will expand in 1991 with the help of an intern from Evergreen State College, who will coordinate the volunteer team.

Experiments were conducted to capture murrelets at sea with floating nets. The nest were 8 m by 15 m and were designed to catch birds as they surface from a dive. A single murrelet was caught in the net, and although it was unhealthy, we attached a radio transmitter on its back to monitor its movements. The bird died several days later and was found floating on the water in sitting position. It did not sink as would be expected.

Some districts of the Mt. Baker-Snowqualmie National Forest and all districts of the Olympic National Forest conducted surveys for murrelets in proposed timber sales and other locations. Murrelets were found only in large, contiguous mature and old-growth forests within these areas.

California

Santa Cruz City Museum of Natural History - Steve Singer

Steve Singer is continuing to monitor the activities of Marbled Murrelets in Big Basin Redwoods State Park, with an emphasis on the recording and analysis of their vocalizations. He is working with other researchers in northern California (Brian O'Donnell), Oregon (Kim Nelson), and Alaska (Kathy Kuletz) to compare murrelet vocalizations among populations.

Humboldt State University - Dr. Rudolf W. Becking

Nest trees and places where Marbled Murrelet eggs were found in Washington were visited and intensive forest stand structure inventories were completed. Additional forest structure inventories of known Marbled Murrelet nest trees may be important in evaluating nest tree selection by this species. To date six such forest stand structure profiles have been measured in California and Washington.

The systematic survey of skin collections of Marbled Murrelets and allied alcids progressed with the completion of measurements of skin collections in Oregon and Washington in 1990. The two Marbled Murrelet eggs from Washington have been described as well as egg fragments suspected of belonging to the Marbled Murrelet.

During a visit to Japan, I measured specimens of the Asiatic Marbled Murrelets in collections of the Yamashina Institute for Ornithology and added them to the North American database for future analysis.

Plans for future studies include the continuation of measuring available skins in California, continuing with descriptions of reported eggshell fragments, and continuing with forest stand structure descriptions of suspected and actual nest sites when permitted. Needed is temporary loans of Marbled Murrelet skins and eggshell fragments. Locations of suspected nest trees would be most welcome. Currently, all available information of Kittlitz's Murrelet (Brachyramphus brevirostris) is of special interest.

U.S. Forest Service, Redwood Sciences Laboratory - C. J. Ralph, Sherri Miller, and Brian O'Donnell

Intensive surveys at inland sites -- Surveys were continued throughout the year at sites established and monitored since 1989. Murrelets were detected during all months, with the exception of two time periods : (1) late August to early October, and (2) late March, corresponding to the post- and prenuptial molts, respectively. Ambient light levels during the night, as determined by how long the moon was up and its phase, as well as percent cloud cover were found to have a significant effect on the level, timing and duration of murrelet activity in the forest. Mornings with high levels of cloud cover were associated with activity periods of greater intensity and longer duration than mornings of low cloud cover. Mornings following nights with high moonlight levels included activity periods of less intensity and shorter duration than those following a dark night. These behavior patterns may relate to predator avoidance.

This year we will examine the effectiveness of various censusing methods for surveying populations of nearshore ocean birds. Marbled Murrelet decoys, constructed from 16 oz. soft drink bottles, will be randomly positioned within a 1 km by 2 km survey grid which extends out to 1 km from shore. Observers will then census the decoys from shore stations, small boats and from airplanes under a variety of sea conditions. The accuracy of each census method will be determined and comparisons made between the three survey techniques.

All seabirds will be surveyed along parallel transects at 800 m and 1400 m from shore. The transects, 20 - 24 km in length and located adjacent to Humboldt and Del Norte counties, will provide coverage of greater stretches of coastal waters than we have previously surveyed. In September and October, additional transects will be surveyed to provide complete coverage of all nearshore waters adjacent to the three inland populations centers of Marbled Murrelets in California. Data from these surveys, in conjunction with results of our studies on the effects of weather and sea conditions on the detection of Marbled Murrelets, will provide the basis for a revised estimate of the Marbled Murrelet populations in California.

Attempts will be made to determine the nest location of at least ten breeding birds from the population feeding offshore of Humboldt and Del Norte counties in northwestern California. Birds will be captured at sea using net-firing guns and by spot-lighting at night. In order to determine if modifications are necessary for the present capture or transmitter application techniques, 2 to 6 Marbled Murrelets will be captured in March from Puget Sound and retained at the Seattle Aquarium. The behaviors of transmittered birds and control birds without transmitters will be compared.

Morning surveys will continue throughout the winter at two locations in Humboldt County providing additional information on the behavior and use of forest stands by MMs during the non-breeding season.

Ocean surveys from the shore -- We continued surveys of nearshore waters from land-based stations, initiated in 1989 and continued through August 1990. In these surveys we looked at the effects of observer elevation, swell height and time, and wavelet height on the ability of the observers to see murrelets on the water. Observation stations of moderate elevation (10-25 m above the water) allowed observers to effectively survey out to about 800 m from shore. Observers could see more birds from a moderate elevation station as time between ocean swells increased and fewer birds as the swell height increased. Wind-generated wavelet height had no effect on numbers of birds observed.

Ocean surveys from small boats -- Surveys along parallel transects at 400 m, 800 m, 1400 m, 2000 m, and 3000 m from shore were continued. In addition, a transect at 5000 m from shore was also begun. Murrelets were found at greater distances from shore than in 1989; however, the majority of birds were observed within 1500 m of shore during both years. We examined several variables for their effect on detection of birds at sea: swell height; swell time; wind speed as measured by wavelet height and average distance between white caps; and percent cloud cover. These variables mostly affected the distance at which birds were seen. Determining the effective

detection distance is necessary for calculating the estimates of population density. Percent cloud cover and wavelet height had a significant effect on detection distances. The results of this research, applied to the data of Sowls et al. and Carter et al., suggests that the California population of murrelets may be between 5,000 and 10,000 birds.

Capture and transmitter application -- An intensive effort was made during 1990 to determine daily inland and at-sea behavior patterns, find nests, and determine inland habitat selection through the use of radio telemetry. Four birds were captured at sea using a net gun fired from a Zodiac, and transmitters were applied. Signals were located for a minimum of two days and a maximum of 24 days after capture. Birds moved along the coast a maximum of 26 km from capture points. Only one bird was located at an inland location. This project will be continued in 1991.

Alaska - Kathy Kuletz

In summer 1990, Kathy conducted a pilot project on Naked Island, Prince William Sound, to identify Marbled Murrelet nesting habitat. Twenty-two survey stations were established for observing dawn activity on the island. The PSG protocol for monitoring inland activity worked well and observations were largely consistent with those recorded in the southern range of the species. A total of 2307 detections were recorded between 1 June and 18 August. The average number of detections per survey ranged from 40-58, with a high of 115. Detections increased after mid-July, peaked in late July and declined rapidly after 10 August. Peak activity occurred within 15 minutes before and after sunrise, even when dawn was only a few hours after sunset. Kathy located several inland areas on the island with high murrelet activity and observed birds landing in trees on two occasions. Inland activity mirrored relative at-sea distribution around Naked Island. Nesting birds may be remaining near their nest sites when foraging. In addition, nesting sites may be chosen based on the proximity of good foraging areas to quality nesting habitat.

For the 1990/91 fiscal year the U.S. Fish and Wildlife Service (USFWS) in Alaska may receive funding through the Oil Spill Restoration Team to study the nesting habitat requirements of the Marbled Murrelet. If these funds are forthcoming, Kathy will organize a team to continue intensive surveys on Naked Island. In cooperation with the USFWS, the U.S. Forest Service is interested in conducting detailed habitat inventory at this study site. Concurrently, surveys of murrelet upland activity will begin in other areas of Prince William Sound and Kachemak Bay. Surveys will conducted in a variety of habitat types and will include information on the Kittlitz's Murrelet where they co-occur with Marbled Murrelets. Depending on funding levels, at-sea surveys near upland areas may also be conducted. In addition, vocalizations of murrelets in southcentral Alaska will be recorded for the Vocalization Research Team (led by S. Singer). Kathy is also providing information to Forest Service Biologists in southeastern Alaska who are interested in initiating upland surveys for murrelets.

British Columbia

Marbled Murrelet Research in Carmanah Valley, 1990 - Alan Burger

A study was initiated in 1990 to monitor the activities of Marbled Murrelets in the Carmanah Valley, southwest Vancouver Island. This valley is one of the last unlogged watersheds on Vancouver Island and has some of the largest trees in the Pacific Northwest. The lower half of the valley has been proclaimed a provincial park, but the upper half of the valley is involved in a controversy and is slated to be clearcut. A team from the Biology Department at University of Victoria, headed by Dr. Alan Burger, and aided by volunteers from the Victoria Natural History Society and the Western Canada Wilderness Committee, worked in the valley through summer. Irene Manley and Robyn Shortt were the principal field personnel.

High levels of murrelet flight activity were evident throughout the valley, and through most of the summer. The frequencies of detections, up to 70 per morning, are among the highest recorded anywhere. Flight patterns suggested that the valley was used by both breeding adults (making direct flights at or below canopy level with no vocalizations) and prospecting birds (making high level circling flight, punctuated by steep dives and flights through the canopy, and involving frequent vocalizations). Birds were seen to land in trees at several sites, and intensive observations were made at likely-looking trees, but no nests were located. A platform erected in

the crown of a very large Sitka Spruce was used during part of the study to search for nests and to record early morning flight activities. Quantitative data on the spatial and seasonal patterns of activity are being analyzed.

On 31 July 1990 Irène Manley and John Kelson discovered a nest in the upper Walbran Valley, adjacent to Carmanah. An adult murrelet was seen flying into a tree, which was later climbed. The nest was empty, but egg shell fragments and feathers were found, which matched those of Marbled Murrelets. The nest was 50 m high, in a 70 m Sitka Spruce tree within a grove of oldgrowth forest. This represents the first intact nest to be found in British Columbia.

Funding and logistic support for the 1990 season was provided by the British Columbia Wildlife Branch, Friends of Ecological Reserves and the Western Canada Wilderness Committee. Further research in Carmanah Valley and adjacent areas is planned for 1991.

1990 and 1991 Research in British Columbia - Jean-Pierre Savard

Research projects conducted in British Columbia in 1990, other than what was presented above, are summarized below: (1) At-sea surveys were conducted along the sunshine Coast near Powell River. Numbers of murrelets were considerably higher in July than other months of the survey. A report by G.W. Kaiser on this research is nearly completed. (2) Inland surveys of murrelet activities were conducted near Vancouver. High activity areas were located. (3) Variability in the daily, weekly and seasonal activities of murrelets were monitored both inland and at sea in the Queen Charlotte Islands. Levels of detections were also compared among old-growth, second growth and alpine areas. A report on this research is nearly completed.

Most research efforts for 1991 are still in the planning stage, but will tentatively include the following: (1) A continuation of inland activity surveys and nest searched in the Carmanah and Walbran Valleys, Vancouver Island (University of Victoria, Western Canada Wilderness Committee (WCWC), and Ministry of Forests); (2) Large geographical survey of inland activities in other watersheds on Vancouver Island and on the mainland coast (Canadian Wildlife Service (CWS), several forest companies, Parks Canada, Ministry of Forests, Ministry of Environment, WCWC); (3) Radio telemetry and at-sea surveys near Powell River (CWS, B.C. Conservation Foundation, and The World Wildlife Fund); (4) Inland and at-sea surveys in the South Moresby Islands, Q.C.I. (CWS and Parks Canada); (5) Documentation of the degree of use of remnant old growth by murrelets and production of a Marbled Murrelet Recovery Plan (CWS); (6) Possible preliminary studies of murrelet abundance in the Kitlope area and adjacent inlets, and boat surveys in inlets of Vancouver Island (CWS and other agencies).

RESOLUTIONS

CARMANAH-WALBRAN RESOLUTION

A Resolution of the Pacific Seabird Group
Drafted at the Marbled Murrelet Technical Committee Meeting, 25 January 1991

WHEREAS
Coastal old-growth coniferous forests within 75 km of the ocean are required as nesting habitat for the Marbled Murrelet in British Columbia;

WHEREAS
The removal of old-growth forests by logging has probably caused a large decline in Marbled Murrelet populations of British Columbia and now threatens its continued viability in the future;

WHEREAS
The first verified Marbled Murrelet nest in Canada has been found in the Walbran Valley, Vancouver Island, and Marbled Murrelet activities indicative of a significant nesting area have been documented in the Carmanah - Walbran Valley system; and

WHEREAS
Further research is needed to fully determine the geographic extent of nesting, and to estimate the size of the breeding population in the Carmanah - Walbran Valley system and throughout coastal British Columbia;

THEREFORE BE IT RESOLVED
That the Pacific Seabird Group strongly urges the governments of Canada and British Columbia to support efforts to prevent logging and to permanently set aside the entire Carmanah-Walbran system as a scientific or ecological reserve, and to protect Marbled Murrelet populations for long term research and population monitoring, research which will ultimately provide sound scientific information required for a coastal old-growth management strategy that provides for continued viable populations of Marbled Murrelets throughout British Columbia.

MANAGEMENT OF THE MARBLED MURRELET

A Resolution of the Pacific Seabird Group
Drafted at the Marbled Murrelet Technical Committee Meeting, 25 January 1991

WHEREAS
The 1982 Pacific Seabird Group resolution on Marbled Murrelets recommended that US. and Canadian forest and wildlife management agencies consider Marbled Murrelets in all management plans and other proposed developments that may adversely affect the integrity of old-growth forests, and the Pacific Seabird Group respectfully requested that U.S. and Canadian forest and wildlife management agencies fund studies to investigate the habitat requirements of nesting Marbled Murrelets;

WHEREAS
The 1986 Pacific Seabird Group resolution on Marbled Murrelets recommended that the state, provincial and federal agencies immediately establish an interagency working group to address research and management needs for the Marbled Murrelet, that the Marbled Murrelet be designated as a sensitive species within its North American range, and the U.S. National Forests within 75 km of salt-water include the Marbled Murrelet as a sensitive species in their current National Forest Management Plans;

WHEREAS
There is additional concern because of mortality from entanglement in fishing nets and oil pollution at sea and other factors;

WHEREAS
All of the nests that have been found from southeast Alaska south were located in old-growth trees, thus supporting the old-growth dependency of the species;

WHEREAS

The Marbled Murrelet is a Category II species under the U.S. Endangered Species Act, and is a Threatened Species in British Columbia;

THEREFORE BE IT RESOLVED

That surveys of Marbled Murrelet be conducted in all old-growth and mature forests prior to any timber harvest or other habitat modification, according to the survey protocol by Paton et al. (1990) (Surveying Marbled Murrelets at Inland Forested Sites: A Guide. United States Department of Agriculture, Forest Service, General Technical Report PSW-120);

AND BE IT FURTHER RESOLVE D

That when Marbled Murrelet activity is observed indicative of an occupied site that timber harvest or other habitat modification be deferred until such time as it can be shown that the activity will not adversely affect murrelet populations at that location.

* Occupied Site: a location with conclusive evidence of nesting (chicks or eggshells found on the ground, or discovery of a nest) or with circumstantial evidence of probable nesting including one or more of the following: birds observed in the breeding and non-breeding seasons (a) flying into or out of the canopy, (b) landing in trees, (c) calling or sitting bird at a stationary location, and (d) flying silently through canopy. Stands with consistent high activity (>25 detections/visit) and with birds circling just above the canopy on at least 2 surveys during the year are also considered occupied sites.

PUBLICATIONS

Paton, P.W.C., C.J. Ralph, H.R. Carter, and S.K. Nelson. 1990. Surveying Marbled Murrelets at inland forested sites: a guide. United States Department of Agriculture, Forest Service, General Technical Report PSW120. 9pp.

LETTER TO THE MEMBERSHIP

Dear PSG members,

This letter is a clarification of my "issue paper" on Marbled Murrelets (PSG Bulletin vol. 17, 1). First, the paper was a personal endeavor to outline data gaps and recommend actions regarding the Marbled Murrelet in Alaska. It was not meant as a statement by the US Fish and Wildlife Service. Second, the population estimate for Marbled Murrelets in southcentral Alaska was based on a preliminary review of data. A more detailed analysis may have different results, and the previous estimate should not be cited. Thus, the inference of a significant decline in the population was premature.

I appreciate the efforts of PSG to provide a forum for these issues. Hopefully, the large and complicated endeavor to describe seabird population trends in southcentral Alaska will soon have results available to all.

Sincerely, Kathy Kuletz.

Joint Publishing Proposal

After considerable debate and discussion at the Annual Meeting, the Executive Council did not support the motion to enter into negotiations with the Colonial Waterbird Society concerning joint publication of a seabird journal. The Council felt that to undertake publishing a journal at this time would be financially imprudent at this time and, perhaps more importantly, a drift away from the state goals of the Pacific Seabird Group. In appreciation to the Executive Council of the Colonial Waterbird Society for their time and concern devoted to this issue, the past and present Chairs of PSG sent the following letter to Herb Kale, Chairman of CWBS.

15 June 1991

Dr. Herbert Kale
President
Colonial Waterbird Society

Dear Herb,

During the last three years, the Pacific Seabird Group has worked with the Colonial Waterbird Society to consider the proposal for a joint publication. We would like to express to you and to the CWBS membership our feelings about the resolution by our Executive Council on this proposal.

As you are aware, the idea for the joint publication was developed at our joint meeting in Washington, D.C. in 1988. Both societies agreed that the proposal had merit and that we should pursue how we might enter into such an agreement. The Executive Committee of PSG formed an ad hoc committee to explore the issues involved with joint publication, but progress was slow. You attended our annual meeting in Victoria, British Columbia and served as a valuable source of guidance for how we should proceed. As a result of this, our Executive Council authorized one of us (DS-C, Chair at the time) to attend your annual meeting in St. John's, Newfoundland to negotiate a common set of principles that we could present to the members of both societies.

Following the meeting, a copy of the results of the negotiations was sent to the general PSG membership; additional information relating to the financial consequences of joint publication was given to every member of the Executive Council. Because resolution of this issue was overdue, the issue was brought to the council for consideration at the Annual Meeting. Our discussions on this issue were frank. We believe the council was serious in sorting out the various issues at stake. When put to a formal vote, the council was equally divided on joint publication and it was therefore impossible to proceed any further.

We speak for the Executive Council and the entire membership of PSG in relaying our gratitude for the opportunity to work with the CWBS on the journal possibility. The Pacific Seabird Group wholly supports your activities and your conservation efforts. We have enjoyed working with CWBS on conservation issues and look forward to continuing cooperation."

Sincerely,

Douglas Siegel-Causey
Malcolm Coulter

THE WASHINGTON REPORT

Daphne Gemmill

The environmental agenda of the 101st Congress was influenced by two oil crises. In early 1989, the Nation's worst environmental disaster, the EXXON VALDEZ oil spill, occurred. Congress, reacting to public concern about oil damage to marine ecosystems, sought to prevent future environmental damage by banning oil drilling in ecological sensitive areas and imposing transportation restrictions.

Near the end of the session with world oil supplies threatened by the Iraq-Kuwait conflict, environmental protection efforts came under fire by oil production proponents. In the end, the 101st Congress, however, passed many landmark environmental bills, including the first amendments to the Clean Air Act in thirteen years, a farm bill with strong wetland protection, and an oil spill prevention bill.

While oil spill-related legislation was the topic of many hearings, many bills and amendments relevant to seabird, shorebird, and wader conservation were introduced. In addition to oil spill-related legislation, the 101st Congress considered bills to I) ban high seas driftnets; 2) establish marine sanctuaries; 3) protect coastal areas, wetlands, old growth forests, and Antarctica; 3) provide for a comprehensive plan for research and monitoring on migratory non-game birds; and 4) create region-wide marine research centers and a fund for land acquisition. Brief summaries of key legislation affecting the well-being of seabirds, shorebirds and waders follow.

OIL SPILL PREVENTION

In the wake of twenty major oil spills in nearshore waters from Alaska to New York, Congress voted unanimously for a comprehensive and integrated approach to preventing and coping with oil spills. The oil Pollution Act of 1990 is wide-ranging covering key problems, including ship design, the use of alcohol and drugs aboard ship, and crew fatigue and boredom. The major provisions of the bill will:

- increase the pollution liability of tanker ship owners eight-fold, with no limit in the case of willful misconduct, gross negligence, or violation of federal regulations;
- establish a federal trust fund derived from fees on crude oil shipments to pay costs above the shippers legal limit up to $1 billion per spill;
- mandate double hulls for all new tankers and oceangoing barges operating in U. S. waters;
- phase out single-hull tankers in the U.S. trade by 2010. Until then at least two tugs would be required tc accompany any single-hull ships in certain sensitive areas such as Prince William Sound and Puget Sound;
- require seagoing and inland barges to have double hulls or some other approved double containment system by 2015; and
- compel The President to immediately take over cleanup responsibilities for any oil spill, charging the cost to the ship owner up to the liability limit.

OFFSHORE OIL DRILLING ON HOLD

Due to Congressional skepticism over the oil industry's ability to contain major spills, Congress imposed a one-year moratorium on outer continental shelf oil drilling. The 1990 moratorium extended or added leasing bans in various offshore areas from the fishing banks of New England to the coral-rich waters off the Florida Keyes and from the biologically diverse southern California waters to Alaska's richest fishing area, Bristol Bay. In recent years, Congressional moratoria have been the major protection against oil drilling in environmental sensitive areas, for bills, such as the Ocean Protection Act of 1990, which would provide permanent protection from offshore oil drilling in sensitive areas, have failed.

OIL DRILLING IN THE ARCTIC NATIONAL WILDLIFE REFUGE POSTPONED

The Exxon Valdez oil spill derailed efforts to open up the Arctic National Wildlife Refuge to oil and gas exploration. Under the Alaska National Interest Lands Act, the Arctic Refuge has wilderness status unless Congress permits development. Representative Morris Udall's (Arizona) bill to give permanent wilderness status to the Refuge to protect the delicate tundra ecology and the area's wildlife did not pass.

The Middle East situation, however, has reignited interest in allowing oil and gas exploration. In fact, one day after Iraq invaded Kuwait, Senator Frank Murkowski (Alaska) attached an amendment to the National Defense Authorization bill that would require the President to target the refuge and other protected areas for oil exploration and recovery. This effort and others to open up protected areas failed.

BANNING DRIFTNETS

1989 data from the National Oceanic and Atmospheric Administration's observers on Japanese ships in the North Pacific squid fishery indicate that large scale driftnets are having a drastic effect on the highseas marine ecology. Driftnet depletion of ocean resources, however, is no longer a Pacific Ocean problem. Ignoring pleas from scientists and government officials, Mediterranean fishing fleets are using driftnets that compound the threats to a fragile sea already strained by large coastal populations, pollution and dwindling fish supplies. In May 1990, the arrival of Taiwanese driftnet fishing vessels in the Atlantic posed a new threat to already stressed fishing stocks and caused an international protest.

Prompted by new evidence that driftnet fishing is causing havoc in some of the world's most bountiful waters, most nations are calling for a total ban on this practice. The United Nations passed a resolution calling for a review by June 30, 1991 of the existing data on the effects of large-scale pelagic driftnet fishing and a moratorium on the use of driftnets worldwide by June 1992. Compliance with all UN resolutions is voluntary for UN members and nonmembers alike.

Facing mounting opposition, each of the three nations with large driftnet fleets for squid – Taiwan, Korea, and Japan – agreed to programs that would monitor the incidental catch of marine mammals, birds, and other species in their high seas squid fisheries. Japan went a step further and proposed to cut by two-thirds the number of fishing boats permitted to deploy giant driftnets.

Not satisfied that current actions would successfully protect U.S. fishing interests, or marine birds and mammals, several U. S. Representatives introduced bills or amendments prohibiting the import of any fish caught by driftnets, banning driftnets in U.S. waters, instructing the Secretary of State to seek a worldwide ban on the use of such nets, and urging the signing of the July 1989 Tarawa Declaration (an international accord that would ban large-scale driftnets in the South Pacific).

One measure made it through the Congressional labyrinth, an amendment to The Magnuson Fishery Conservation and Management Act (FCMA). This Act, which is the basis for federal efforts to conserve the nation's living marine resources, passed with an amendment requiring the Federal government to work for an international ban on large-scale driftnet fishing beyond the 200 mile limit and allowing embargoes on fishery products from countries that use driftnets in violation of international agreements. The amendment defines "large-scale" driftnets as those nets greater than one and one-half miles in length. Threats to fishery stocks, marine mammals and seabirds from smaller nets and coastal nets still remain.

MARINE SANCTUARIES ESTABLISHED

In 1988 Congress reauthorized the Marine Sanctuary Program under the Marine Protection, Research and Sanctuaries Act until 1992. The primary mission of the National Marine Sanctuary Program is to "identify, designate, and manage areas of the marine environment of special national significance due to their conservation, recreation, ecological, historical, research, educational or aesthetic qualities". The National Oceanic and Atmospheric Administration (NOAA) is responsible for implementing the program. To date, NOAA has designated eight sanctuaries. The currently designated sanctuaries vary considerably, from the historic remains of the Civil War ironclad warship, U.S.S. Monitor, in North Carolina to coral reefs of Fagatele Bay in American Samoa.

In the waning hours of the session, Congress designated a sanctuary for the first time. The Florida Keyes National Marine Sanctuary will protect the only complete tropical marine ecosystem in the United States comprising seagrass beds, fringing mangroves, and spectacular coral reefs. This Sanctuary is the Nation's largest covering 2,600 square nautical miles stretching from Miami to the westernmost point of Fort Jefferson National Monument in the Dry Tortugas. With sanctuary designation, vessel traffic within the Sanctuary is limited and oil and gas drilling is prohibited.

Presently, NOAA is writing a draft or final environmental impact study/management plan for several sites:

• The Final Environmental Impact Statement/Management Plan for Flower Garden Banks in the Gulf of Mexico 115 miles off Texas and Louisiana is scheduled for publication in March 1991. This is the last step prior to designation, which is scheduled for July 1991. This Sanctuary will protect a fragile coral reef ecosystem.

• First proposed in 1977, the Monterey Bay designation was dropped by the Reagan Administration in 1983. In 1988 Congress mandated that the site be designated no later than December 31, 1989. Although that deadline has come and gone, sanctuary designation is still months away. A possible reason for the delay is Administration infighting over the proposal to ban oil and gas leasing within the proposed sanctuary. The draft Environmental Impact Statement/Management Plan would prohibit all oil and gas exploration and development within the sanctuary. The proposed sanctuary would include the spectacular Monterey submarine canyon, the Big Sur coastline, and the waters surrounding Año Nuevo, an important breeding area for five species of seals and sea lions. The area is very productive and attracts a diverse and abundant array of marine organisms including marine mammals, fishes, and seabirds.

• By February 1991 a draft management plan for the Stellwagen Bank, an underwater plateau a few miles east of Boston, will be available. The final plan due in the fall is the last step before formal designation. The Bank is home to a large number of marine species, including the endangered Humpback whale. It also supports a large fishing industry and many seabirds.

• Congress directed the National Oceanic and Atmospheric Administration (NOAA) to designate the new Olympic Coast Sanctuary by June 1990. A draft Environmental Impact Statement/Management Plan should be available in the spring of 1991. The coastal area along Olympic National Park is one of the least developed shores in North America. This area contains numerous offshore islands where seabirds, such as Leach's and Fork-tailed Storm-Petrels, Common Murre, Cassin's Auklet, and Tufted Puffin nest. The coastal waters serve as prime feeding habitat for seabirds and marine mammals.

• Congress also directed NOAA to study the establishment of a marine sanctuary around the San Juan Islands, Washington. By March 1991, NOAA must review the suitability of creating a sanctuary surrounding the San Juan Islands. Various management schemes are under consideration. This area is exceptionally productive and provides shelter for many species of breeding and wintering birds, such as Glaucous-winged, Western, and Bonaparte's Gulls; Common Murre, Pigeon Guillemot, and Marbled and Ancient Murrelets, and marine mammals, such as Minke and Killer whales, and Harbor and Dall's porpoise. Many migrating shorebirds, including Black Turnstone, Whimbrel, Greater Yellowlegs and Sanderling, stop in the area.

COASTAL PROTECTION

A Congressional report, "Coastal Waters in Jeopardy", warned the nation's coastal waters are in serious decline due to pollution, development and natural forces. Following the release of the report various bills were introduced to halt coastal abuse. The bills that passed were:

• The Reauthorized Coastal Zone Management Act, which Congress passed in 1972 to address heightening development pressures on coastal areas. The Act allows states to develop management programs and provide for wide variations in each state's regulations.

• The Coastal Barrier Improvement Act, which will almost triple the previous acreage of the Coastal Resources System by adding 800,000 acres on the Atlantic and Gulf coasts and 50,000 acres on the Great Lakes to the 452,000-acre System established in 1982. The Act removes federal subsidies (e.g. flood insurance) for new development in these sensitive areas. For the first time, coastal areas in the Great Lakes, Puerto Rico, the Virgin Islands, the Florida Keyes, and major bays, such as the Chesapeake, Narragansett, and Delaware Bays have been included in the System. The Act also includes plans for mapping Pacific Coast barriers for future consideration.

Bills that failed were:

• The Coastal Zone Improvement Bill that would amend the Coastal Zone Management Act. the bill would authorize $35 million a year to help states flag polluting practices that undermine water quality standards, beef up enforcement for protection of waters of especial ecological or aesthetic importance, and require states to plan for the adverse effects of sea level rise caused by global warming. It also would reinstate the "consistency" provisions of the Act, which

requires that federally licensed offshore activities, such as oil and gas drilling and dredge spoils dumping, be consistent with the state's coastal zone management plan.

- The Comprehensive Ocean Assessment and Strategy (COAST) Bill that would set aside critical marine areas for protection, identify farmland that contributes to non-point source pollution, and curtail sewage discharges. It also would require monitoring of pollutants and assessments of their effects on human health and the marine environment.
- The Marine Protection Bill that would expand the National Estuary program, tighten controls of sewage and waste discharges, and require EPA to adopt numerical standards for coastal pollutant and sediments.
- The National Flood Insurance Act, as amended, would require sea level rise and eroding coast lines be considered before providing funds for rebuilding.

WETLANDS PROTECTION

Approximately 300,000 wetland acres in the U. 5. are drained, dredged, or filled every year, the majority converted for agriculture. The 101st Congress, however, sought to stem the tide. Bills were introduced to 1) dedicate a percentage of federal outer continental shelf oil and gas revenues to restoration and conservation of rapidly eroding coastal wetlands in Louisiana, 2) give grants to states to develop wetland conservation plans, 3) provide money to private landowners who protect wetlands, 4) provide for the purchasing of wetlands, 5) expand the boundaries of the Everglades National Park, and 6) impose penalties on farmers for draining wetlands.

By the end of the session, the President had signed four wetland-related bills:

- The North American Conservation Act could protect nearly 2 million acres of migratory bird wetland habitat in the U.S. and more than 4 million acres in Canada and Mexico provided the program is fully funded.
- The Everglades National Park Protection and Expansion Act will enlarge the boundaries of this significant wetland by 11,000 acres and authorize the U. 5. Corps of Engineers to restore adequate water flows to the park.
- The 1990 Farm Act will penalize farmers for draining wetlands on their land, regardless of whether they plant crops on the drained land, and will create the National Wetland Reserve Program, which will fund restoration of a million acres of wetlands on agricultural lands over five years.
- The Coastal Wetland Restoration Act authorizes the expenditure of money raised from a national gas tax on small outdoor engines to mitigate Louisiana wetland loss, restore coastal wetlands in other coastal states, and protect waterfowl habitat. 70% of the revenues will go to Louisiana; 15% to other coastal states; and 15% to the North American Waterfowl Management Program.

OLD GROWTH FOREST PROTECTION

The preference for nesting in old growth forest puts the northern Spotted Owl and Marbled Murrelet in the center of a swirling controversy between powerful western timber interest and the conservation community. Bills designed to set policy for the nation's vanishing ancient forests vied for Congressional attention.

The good news for those concerned with biodiversity protection, including protection for Marbled Murrelet nesting areas, is passage of the Tongass Timber Reform Act. This Act withdraws more than a million acres of the Tongass from commercial logging. Also on the good news front was the defeat of efforts to circumvent the Endangered Species Act protection afforded the northern Spotted Owl and its habitat.

The bad news is the failure to pass the Ancient Forest Protection bill that would establish extensive ancient forest reserves and link fragmented forest tracts to create wildlife corridors, and defeat of an amendment to cut the U. S. Forest Service's road-building budget roughly in half (The U.S. Forest Service has built 360,000 miles of roadway compared to 44,000 miles of the Interstate Highway System).

BIRD CONSERVATION RESEARCH

The Bird Conservation Research Act never made it out of committee. This bill would provide for the development of a comprehensive plan for research and monitoring on migratory nongame birds in the Western Hemisphere, including provisions for training professional and

amateur ornithologists through fellowships and scholarships at U. S. colleges and universities. In addition, the bill requests the President to seek the declaration of a World Decade of Ornithology. The principal sponsor of this bill was not reelected so the bill is unlikely to be reintroduced in the 102nd Congress.

REGION-WIDE MARINE RESEARCH CENTERS PROPOSED

Title IV of the South Carolina Fish Hatchery Act of 1990 establishes ten regional marine research boards for the Gulf of Maine, the Greater New York Bight, the tropical region, the MidAtlantic Bight, the South-Atlantic Bight, the Gulf of Mexico, the Southern California Bight, the North Pacific region, the Gulf of Alaska, and the insular Pacific. The purpose of each board is to develop a comprehensive marine research plan and timetables for achievement through funding of projects under the Title.

No funds have been appropriated for these activities. Should funds be appropriated in the 102nd Congress, eligible projects would include baseline assessments of biological indicators of environmental quality, effects of contaminants and modification of habitat on marine organisms, and assessment of the effects of climate change on marine resources.

PRESERVING ANTARCTICA

By 1961, 39 countries had signed the Antarctic Treaty to preserve the Antarctic as a scientific outpost, administered not by any government but by the unanimous consent and cooperation of the member nations. In 1988, an agreement, known as the Convention on the Regulation of Antarctic Mineral Resource Activities, which would have permitted the exploitation of Antarctica's oil and mineral resources, was introduced setting off a debate not only among the 39 Treaty nations but also between Congress and the Administration.

The Administration argued that if exploitation is inevitable, it is better to have regulations governing oil and mineral extraction than a legal vacuum in which no restraints of any kind are imposed on even the most environmentally hazardous exploitation.

In the closing hours, the 101st Congress adopted two bills that opposed ratification of the Convention. One bill would prohibit mining activities in the Antarctica for the indefinite future and would make it a crime for U. S. citizens to engage in such activities. The other bill would support the preservation of Antarctica as a "global ecological commons".

In November, the President signed the Antarctic Protection Act that indefinitely bans commercial mineral resource activities by Americans in Antarctica and calls upon the Secretary of State to seek an international agreement barring such activities by any nations. The U. S. was not alone. In mid-December the UN General Assembly unanimously endorsed a permanent ban on mining in Antarctica. The next meeting to conclude a new environmental agreement for protection of Antarctica is slated for Madrid in April.

BOLSTERING A FEDERAL LAND-BUYING PROGRAM

The American Heritage Trust Act would create a selfsustaining trust that would make available up to $1 billion annually to purchase additions to the country's national parks, wildlife refuges and historic sites. This controversial bill that would bolster Federal government land acquisition programs overwhelmingly passed the House Interior Committee but faced vehement opposition from industry, large private landowners, and the Appropriations Committee that prevented any further progress.

THE 102nd CONGRESS

Pictures of dying, oiled cormorants in the Persian Gulf and recent newspaper headlines proclaiming "Long-term Damage from Exxon Valdez Spill: Recovery of Some Wildlife May Take Decades", reminded the public that energy consumption comes with a price. One can expect a heated debate over energy and conservation policies in the 102nd Congress. During the first month of the session, legislators have introduced far-reaching proposals that would change the way the nation generates, uses and pays for its energy. Many of the bills are controversial covering such topics as oil imports, energy taxes, off-shore oil drilling, auto fuel efficiency, oil exploration in the Arctic National Wildlife Refuge, solar power, and nuclear wastes.

Non-energy areas of legislative activity, such as wetland and endangered species protection, also will be equally controversial. With the reauthorization of the Clean Water Act in 1992, a flurry of anti-wetland legislation is expected in an effort to weaken a significant wetland

protection provision, known as section 404. The controversy over the northern Spotted Owl and ancient forest logging practices in the Pacific Northwest will foster efforts to amend the Endangered Species Act to reduce the protection of species when short-term economic activity is hindered.

Between the Middle East conflict at the beginning of the session and a Presidential election at the end, the 102nd Congress may not produce as long a list of environmental protection achievements as the 101st. People concerned about the well-being of seabirds, shorebirds, and waders will need to participate in a larger debate to ensure that a balanced energy program includes conservation and environmental protection.

LARGE-SCALE PELAGIC DRIFTNET FISHING

A Report on U.S. Diplomatic Initiatives in International Organizations in Support of United Nations General Assembly Resolution 44/225

On December 22, 1989, the United Nations General Assembly (UNGA) adopted a consensus resolution (Number 44/225) addressing large-scale pelagic driftnet fishing (attachment 1). The international community noted with concern the adverse impacts this fishing technique may have on the living marine resources of the world's oceans and seas. Of serious concern is the highly indiscriminate nature of driftnet fishing, particularly the incidental taking of non-target fish, marine mammals, seabirds and other living marine resources.

UNGA 44/225 recommended that the international community review no later than June 30, 1991, the best available scientific data on the impact of large-scale driftnet fishing. The resolution further recommended that moratoria on all large-scale pelagic driftnet fishing be imposed by June 30, 1992, unless jointly agreed effective conservation and management regimes are put into place to prevent unacceptable impacts caused by large-scale pelagic driftnet fishing.

The United States was a principal cosponsor and played a primary role in gaining acceptance for UNGA 44/225. With the resolution in place, the United States now has a particular interest in its effective implementation.

In its passage of the Fishery Conservation Amendments of 1990, the United States Congress called for the implementation of the moratorium set forth in UNGA 44/225, as well as a permanent ban on the use of destructive fishing practices, particularly driftnets, beyond the exclusive economic zones of any nation.

The U.S. has acted in various international fora to support the UN driftnet resolution and its call for a moratorium. In some instances, the U.S. has taken the lead in proposing initiatives in support of UNGA 44/225 and in other instances the United States has played a supporting role with regard to initiatives proposed by others. The broad international consensus in opposition to high seas pelagic driftnetting is demonstrated by the virtual universal support the resolution has received.

Abstract of:

United Nations General Assembly Resolution 45/197 Passed by consensus: December 21, 1990

Large-scale pelagic driftnet fishing and its impact on the living marine resources of the world's oceans and seas

The General Assembly,

Recalling its resolution 44/225 concerning large-scale pelagic driftnet fishing and its impact on the living marine resources of the world's oceans and seas, including enclosed and semi-enclosed seas, which was adopted by consensus on December 22, 1989, [...and]

Expressing concern about reports of reflagging of vessels by some private fishing interests, which is contrary to the spirit and content of resolution 44/225,

1. **Takes note with interest** of the report of the Secretary-General, and expresses its appreciation for his efforts;

2. **Reaffirms** its resolution 44/225, and calls for its full implementation by all members of the international community, in accordance with the measures and time-frame elaborated in paragraph 4 of that resolution concerning large-scale pelagic driftnet fishing on the high seas of all the world's oceans and seas, including enclosed and semi-enclosed seas;

3. **Also reaffirms** the importance of all members of the international community taking such measures as may be necessary to ensure compliance with paragraph 4 (c) of resolution 44/225;

4. **Requests** the specialized agencies and other appropriate organs, organizations, and programmes of the United Nations system, as well as the various global, regional, and subregional fishery organizations, to continue to study urgently large-scale pelagic driftnet fishing and its impact on living marine resources and to report their views to the Secretary-General, bearing in mind the dates set out in paragraphs 3 and 4 of resolution 44/225;

5. **Requests** the Secretary-General to bring the present resolution to the attention of all members of the international community, intergovernmental organizations, non-governmental organizations in consultative status with the Economic and Social Council, and well-established scientific institutions with expertise in relation to living marine resources;

6. **Also requests** the Secretary-General to submit to the General Assembly at its forty-sixth session a report on the implementation of the present resolution.

Abstract of:

LARGE – SCALE PELAGIC DRIFNET FISHING

Resolution Adopted by

The International Union for the Conservation of Nature
18th General Assembly
28 November - 5 December 1990

The General Assembly of the International Union for the Conservation of Nature:

1. DECLARES its full support for the implementation of United Nations General Assembly Resolution 44/225 and calls on all members of the international community to commit themselves to full compliance with its provisions, including the establishment of effective monitoring and enforcement measures;

2. FURTHER CALLS ON IUCN member States and other members of the international community which use high seas driftnet technology immediately to cease further expansion of large-scale pelagic driftnet fishing on the world's oceans and seas where it is currently practiced, and to undertake not to extend their operations into the high seas of other oceanic regions, as mandated by Resolution 44/225;

3. WELCOMES the commitment evident in the actions of nations fishing far from their coasts, to the implementation of Resolution 44/225;

4. REITERATES its commitment to the development and use of fishing methods which are environmentally sound and enable the effective conservation and management of target fish species while ensuring the protection of other living marine species;

5. CALLS UPON State members of IUCN to actively support full implementation of UN Resolution 44/225, as well as relevant regional and subregional commitments relating to the elimination of large-scale pelagic driftnet fishing as a fishing technique;

6. CALLS UPON the United Nations General Assembly at its 45th Session to support the eradication of large-scale pelagic driftnet fishing on the basis that it is an environmentally unacceptable fishing practice.

Report on the ICBP Seabird Specialist Group

David Duffy

The meeting was held in conjunction with the IOC held in November in New Zealand. The workshop dealt with methods of managing seabird islands and with threats against them. We examined 16 islands or island groups, including those in the Pacific, the Xisha archipelago in China, the Indonesian islands, the Gulf of California, and the Peruvian guano islands. Two exciting developments in approaches have emerged. The New Zealanders demonstrated that we have the capability to remove non-indigenous animals, such as rats, cats, and goats, from even large island. After several presentations that documented the effects of egging and hunting, Dr. K. Blanchard gave an exciting presentation on an education program on the north shore of the Gulf of St. Lawrence that has led to greater reduced human exploitation of seabirds.

In the Specialist Group meeting following the workshop, we created three committees - for education, eradication of unwanted species on islands, and on improving training for observers in the assessment of net kills on fishing vessels. We are now working with the ICBP Secretariat which is optimistic about obtaining major funding to support these committees. If this occurs, international seabird conservation will move from documenting problems and examining potential methods to providing solutions. The ICBP Seabird Specialist Group will begin to fulfill its potential as a truly global network able to provide both expertise and action in addressing seabird conservation problems.

Finally, on behalf of the Seabird Specialist Group of ICBP, I would like to express our thanks for the efforts of PSG to protect the Marbled Murrelet. This is an extremely important project for seabird conservation, as well as for the rational use of terrestrial resources. We hope you will continue as a group to make such efforts, both for the murrelet and for Pacific seabirds in general.

PSG's involvement in the International Council for Bird Preservation

Malcolm Coulter

The PSG has been strongly involved in conservation of seabirds. At present, we have three hands in the conservation pot. Most of us are aware of the Conservation Committee (Art Sowls, chairman) and the Seabird Fisheries Committee (Alec MacCall, chairman). These committees meet at our annual meetings and there develop resolutions, send out letters, and in the case of the Conservation Committee, developed a brochure on disturbance effects on seabird colonies in Alaska.

Fewer of us are aware of our involvement in the International Council for Bird Preservation (ICBP) because this has not had the same visibility at PSG meetings. While editor of the Bulletin, I included a section on the ICBP meetings to let members know of ICBP's involvement in seabird conservation, but I did not stress the interaction between PSG and ICBP.

The ICBP is the oldest international conservation organization. It was established in 1922 by Jean Delacour. It is involved in conserving all birds throughout the world. Its structure includes a board of directors, and executive director (Christoph Imboden) and his staff at the Secretariat in Cambridge, England, national delegates to the council, and a number of specialist groups on taxon groups (parrots, cranes, seabirds, etc.). The specialist groups are non-voting members of ICBP, but are dually appointed specialist groups to IUCN which is quite active throughout the world. ICBP holds World Conferences every four years in conjunction with the IOC to bring its delegates and representatives together to discuss the future of bird conservation. The last meeting was held in New Zealand just before the IOC in December 1990.

PSG has two involvements with ICBP. First, the Seabird Specialist Group responds to seabird conservation problems throughout the world. Supportive letters generated through their efforts have contributed to the saving of important seabird nesting areas on Christmas Island in the Indian Ocean. This issue was discussed in a number of issues of the PSG Bulletin., The Seabird Specialists Group is also supported of PSG's conservation efforts. Ralph Schreiber was formerly chair of this specialist group; David Duffy is the present chair.

We are also represented by the ICBP-US. This is the U.S. Section of the international group. This section is concerned with bird conservation in the United States and in the other nations of the Americas. The organization includes a Chair (Stan Senner), Vice-Chair (Ron Naveen), Treasurer (David Wilcove), Secretary (Kathleen Anderson), a board of delegates, and representatives of constituent organizations. There are various classes of membership, of which PSG has full membership which means we have two voting members of the board (Ron Naveen and Malcolm Coulter). About 40 organizations including most ornithological organizations as well as the New York Zoological Society (which has been involved in the control of the pet trade) and the American Veterinarian Association. The board meets three times a year (Nov/Dec in Washington, D.C.; April in New York; and at the AOU meeting). PSG has made an effort to elect representatives on the East Coast who would be able to attend the meetings and represent our interests. The specialist group discusses conservation issues throughout the United States, from Marbled Murrelets to Spotted Owls.

ICBP-US has been involved in all aspects of bird conservation, from writing letters to effecting legislation. Warren King (former ICBP-US Chair) recently represented the drift net issue before Congress. ICBP was very much involved in the new Non-Game initiative of USFWS and in the add-on appropriations from Congress.

There is a strong cooperative effort between PSG and ICBP-US. ICBP-US has a greater ear to conservation issues, with their many constituent organizations, than PSG could do by itself. ICBP-US brought the needed conservation efforts for Gray's Harbor to our attention. Through their efforts primarily and some support from PSG, this area in Washington State critical migrating shorebirds has been preserved.

ICBP-US has represented the interests of PSG. ICBP-US passed a resolution in support of the conservation of Old Growth for Marbled Murrelets; a letter was sent out in support of conservation efforts for the Light-footed Clapper Rail in San Francisco Bay; and a resolution, jointly proposed by PSG and CWBG at the last meeting on April 25 was passed and will shortly be sent out to appropriate agencies.

There has been strong cooperation and there will continue to be strong cooperation. We will continue to work together very effectively.

If you have important conservation issues for ICBP, please contact:

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NEWS FROM OTHER SEABIRD GROUPS

John Piatt

MEDMARAVIS NEWS

The Mediterranean Marine Bird Association continues to press government agencies around the Mediterranean to create coastal reserves that would protect important beaches, islands, and seabird colonies. Some 80 reserves exist, but they are not properly managed. Few of some 50 major seabird colonies are protected, even though threatened by tourist developments, pollution and fishing activities. Dietrich Ristow and Michael Wink have now completed a 15th year of study on Cory's Shearwater (see Die Vogelwelt, III(5):172-181). They are currently applying DNA fingerprinting techniques to determine the degree of gene flow among island populations.

AFRICAN SEABIRD GROUP

In 1990, "Cormorant", the journal of the ASG, was renamed "Marine Ornithology". Seabird researchers around the world are encouraged to submit full-length papers and short communications to Marine Ornithology for publication. A ten person international editorial board and the use of referees from around the world means that submissions will be handled to accepted journal standards. Information for contributors is available from John Cooper, Editor, c/o Fitz Patrick Institute, University of Capetown, Rondebosch 7700, South Africa.

THE SEABIRD GROUP

The Seabird Group will hold a conference with the theme 'European Seabirds' on 27-29 March, 1992 in Glasgow, Scotland. If you wish to offer a paper, contact Tim Birkhead, Dept. of Animal and Plant Sciences, The University, Sheffield S10 2TN, UK. As in 1988 and 1989, a range of seabird species suffered near total breeding failure in the Shetlands in 1990. The sandeel fishery in the Shetlands will remain closed in 1991. Lower than 'normal' breeding success was also noted for some species in the Orkneys, off the west coast of Scotland, and at the Isle of May. Kittiwakes have been particularly affected. The Seabird Group journal "Seabird" is asking for submissions. Contact the new editor: Sarah Wanless, c/o ITE, Hill of Brathens, Banchory, Kincardineshire, AB31 4BY. After a lull of several years, 1990 saw a resumption of winter wrecks of auks on beaches in the northern isles; including large numbers of Razorbills and 'unprecedented' numbers of Dovekies and puffins.

PRO ESTEROS

Pro esteros is a relative new (bi-national) organization dedicated to conservation of the estuaries in Baja California, Mexico. Their goal is to promote interest in, and conservation of, coastal estuaries in Baja which support large numbers of overwintering or breeding waterfowl, waders, and seabirds. For more information contact Barbara Massey, c/o 1825 Knoxville Ave., Long Beach, CA 90815.

THE AUSTRALASIAN SEABIRD GROUP

Conversations with Peter Dann (Philip Island, Victoria, Australia) in December of last year suggest that the AusSG is in a slump period, and no newsletter has been produced for some time. However, Peter indicated that it may be revived, so we may have something to report in future PSG Bulletins.

SEEVOGEL

Published by the German Group for the Conservation of Seabirds and Nature. Seevogel Mar 90 reports that between 1983-1988 a total of 40,518 dead seabirds were found on the German North Sea coast, 41% of which were oiled. Out of a sample of 100 dead birds, 38 Fulmars had ingested up to 19 plastic pellets. Seevogel Jun 90 has two articles summarising species breeding on the German North Sea coast. Seevogel Sep 90 reports ornithological notes from the Falklands, including accounts of 185 species and threats to populations (overgrazing, fires, predators etc.). Also given is an article on the feeding ecology of Arctic terns on Elbe estuary, discussed in relation to population dynamics and changes in the marine food

web. Seevogel Dec 90 contains an interesting article on the mass mortality (ca. 10,000) of seabirds from nonylphenol pollution, apparently dumped at sea by an unknown vessel. A large public and scientific outcry ensued, leading to an investigation on the origin and fate of nonylphenol pollution in the North Sea,

THE SEA SWALLOW

Annual report of the Royal Naval Bird Watching Society Vol. 39 provides an account of seabird population surveys conducted on Ascension Island by members of the society in March 1990; and species accounts of seabirds observed at sea by members in 1989 (ca. 37 in the Pacific)

GROUPEMENT D'INTERET SCIENTIFIQUE OISEAUX MARINS

The 8th annual meeting of the French seabird group met in Brest on 23-24 February 1991. The agenda included papers on kittiwake survival, age of first breeding in kittiwakes, influence of colony age and the role of parasites on the dispersion of kittiwakes on cliffs, tick viruses associated with seabirds breeding on Kerguelen, and several papers on the biology of gulls, cormorants and shearwaters in the Atlantic. For more information, contact Etienne Danchin, Laboratoire d'ecologie, E.N.S., 75230 Paris Cedex 05, France. A bibliography of seabird papers published by members of GIS-OM is available from Pierre Yesou, 101 Rue du 8 Mai, 85340 Olonne-sur-Mer, France.

DUTCH SEAWATCHERS GROUP

The Dutch Seabird Group was founded on 1 January 1991. Like PSG, it aims to stimulate seabird research and facilitate communication via the journal SULA (which has been around for a while). All correspondence should be directed to: The Hon. Secretary NZG, Driebergseweg 16c, 3708 JB Zeist, the Netherlands. Two volumes of SULA (Vol. 4, Nos. 3 & 4, 1990) have recently come out. No. 3 includes articles on methods for counting seabirds at sea; stormpetrel foraging inshore; murres standing on floating matter; and some recent reports on beached bird surveys, surveys of birds at sea, and sightings of marine mammals. No. 4 includes articles on a mass-stranding of Razorbills on the Dutch coast; and a considerable review of recent publications by Dutch seabird researchers as well as a compilation of research interests and upcoming projects and meetings in the Netherlands.

NEW PUBLICATIONS

John Piatt

4 VOLUMES ON SEABIRDS AT SEA

STUDIES OF HIGH-LATITUDE SEABIRDS. 1. BEHAVIOURAL, ENERGETIC, AND OCEANOGRAPHIC ASPECTS OF SEABIRD FEEDING ECOLOGY

First in a series of three Canadian Wildlife Service publications of the proceedings of the conference "Population Biology and Conservation of Marine Birds" held in St. John's, Newfoundland in April 1989, and sponsored by Memorial University and CWS. As suggested in the title, this publication includes papers on a variety of topics: maximum diving depths of alcids and penguins; trophic relationships in seabirds revealed by stable isotope analysis; distribution of seabirds in relation to oceanography and fish in the Chukchi Sea; spatial covariance in counts of seabirds at sea; seabird distribution and the North Pacific marine environment; and, marine birds and climatic warming. Upcoming volumes will deal with the status and conservation of Thick-billed Murres in the North Atlantic, and the seasonal and spatial patterns in energy demands of seabirds in eastern and Arctic Canada. Volume 1 available from CWS Ottawa as: Montevecchi, W.A. and A.J. Gaston (Eds.). 1991. Canadian Wildlife Service Occasional Paper Number 68, Ottawa. 56 pp. (Catalogue No. CW 69-1/68E).

AUKS AT SEA

Proceedings of an International Symposium of the PACIFIC SEABIRD GROUP, Pacific Grove, California, 17 December 1987. This volume focuses on the biology of alcids at sea, covers a wide range of topics, and includes a substantial amount of new data on at least eight alcid species. Subjects include auk distribution as a function of oceanography, aggregation behavior, feeding habitat selection, foraging time budgets and energy expenditure, adult-chick interactions at sea and movement from colonies, diets in relation to prey resources, and factors affecting auks at sea (gill-netting, ENSO's, oil pollution and overfishing of prey stocks). Available as: Sealy, S.G. (Ed.). 1990. Studies in Avian Biology No. 14. 180 pp., from The Cooper Ornithological Society, c/o Jim Jennings, Assistant Treasurer, Suite 1400, 1100 Glendon Ave., Los Angeles, CA 90024 for $16.00.

SEABIRD DISTRIBUTION WEST OF BRITAIN

A thorough report on the distribution of seabirds off the west coast of Scotland and in the Irish Sea. Based on data collected by the "Seabirds at Sea" team from 1986 to 1992, comprising 215,000 bird records and covering over 19,000 km of ocean. Summary accounts are given for 31 species or species groups, providing information on distribution and abundance (including seasonal maps), and conservation implications. Prepared by Webb, A., Harrison, N.M., Leaper, G.M., Steele, R.D., Tasker, M.L., and Pienkowski, M.W. 1990. Available from the Nature Conservancy Council, 17 Rubislaw Terrace, Aberdeen, Scotland ABI IXE.

WHAT DETERMINES THE DISTRIBUTION OF SEABIRDS AT SEA?

Proceedings of a Nordic workshop held near Trømso, Norway in October 1988 and sponsored by the Trømso Museum, University of Trømso. Most of the 12 contributed papers deal with oceanography, fish, and seabirds of the Barents Sea (BS). Topics include: remote sensing of sea surface temperatures (SST); SST's of the BS; seabirds and fronts- an overview; distribution of Dovekies in relation to fronts; fronts and auklets in the Bering Sea; variability in herring and capelin abundance and distribution in the BS; distribution of seabirds in a heterogeneous environment (overview); distribution and diel movements of Thick-billed Murres in the BS; seabird distribution in relation to the ice-zone in the BS; distribution of Puffins off north Norway; correlations between murres and their prey in the BS; and spatial autocorrelation in marine birds. Edited by Erikstad, K.E., R.T. Barrett, and F. Mehlum. Published in: Polar Research 8(1), June 1990, Oslo, Norway. 97 pp. Or contact the Norwegian Inst. for Nature Research, Trømso Museum, Univ. of Trømso, N-9000 Trømso, Norway.

The Island of South Georgia, by Robert Headland (Cambridge University Press), 1984.

According to Frank Todd, "South Georgia is where God goes when She takes a vacation." Without engaging in the theological debate, I think most visitor would agree with the penguin man; South Georgia is one of the most beautiful and intriguing of all sub-Antarctic islands.

Robert Headland's book is splendid, containing virtually everything one would ever want to know about the island. The author is intimately familiar with South Georgia, having spent several years there as a member of the British Antarctic Survey. He was also personally involved in the events of 1982 when South Georgia was "put on the map" after being invaded by Argentina at the outset of the Falklands War. Headland was serving as deputy postmaster at the time, and despite being taken prisoner by the Argentines, he managed smuggle the last mail off the island.

South Georgia was probably first seen in 1675 by a hapless London merchant vessel blown far off course rounding Cape Horn. The island lies over 1000 miles southeast off Cape Horn, and some 2400 miles southwest of Cape Hope, hardly astride major shipping lanes. In 1775 the first landing and detailed description was made by the world's greatest explorer of the time, Capt. James Cook. Cook named and charted the island, brining home reports of the vast numbers of seals to found in the area. This opened the door for two centuries of exploitation. South Georgia became the gateway to the South Sandwich, South Orkney, and South Shetland islands, and the Antarctic peninsula. Hundreds of thousands of seals and whales were taken from the region, and for a time South Georgia was the center of the world whaling industry.

The island has also played a key role in the history of Antarctic exploration, serving as the jumping-off spot for voyages by Filchner, Shackleton, Weddell, and many others. For much of this century, over 1000 whalemen called South Georgia home, but since 1965 the island has been inhabited only by a handful of scientists and a small British garrison. Other visitors include the crews of fishing vessels working the South Atlantic, and a few hundred tourists each year, on board ships bound for the Antarctic peninsula.

Over half of the book is devoted to the island's history, from Capt. Cook right through to the removal of the Argentine invaders in 1982. Early explorers, sealers and whalers, and more recent scientific expeditions are all reviewed with remarkable thoroughness. Bird enthusiasts will note that South Georgia was an early training ground for such notable ornithologists as Robert Cushman Murphy and Bernard Stonehouse.

The chapters dealing with the physical sciences and natural history provide a very good overview of the extraordinarily rich life found on South Georgia. The island is home to thousands of such magnificent birds as King and Macaroni penguins, Wandering and Light-mantled Sooty albatrosses, as well as numerous prions, diving petrels, and storm petrels. Mr. Headland briefly reviews the status, distribution, and basic life histories of each species, without duplicating more detailed information readily available in other sources.

This is certainly not a seabird book, per se. However, any birder who plans to visit South Georgia should be prepared to become enchanted by the place, and once enchanted, you will want to read Headland's book. The audience for such a specific work is admittedly small, but for those with a passionate interest in Subantarctic islands this is an essential volume.

--Matthew P. Drennan

TRIVIAL PROCEEDINGS

John Piatt and others

As of this issue of the PSG Bulletin, we are beginning a new column that will deal exclusively with seabird trivia, i.e., all those tidbits of information you talk about over a few brews but never seem to get reported. This may include serious or humorous anecdotes about any aspect of seabird life, unusual events you may have observed, any weird reports you may have come across in recent or old obscure literature, or even original prose and poetry that focuses on seabirds. Please send all your trivia to John Piatt, Associate PSG Editor for Gray, Secondary, and Downright Obscure Literature and Seabird Trivia, AFWRC, 1011 E. Tudor Rd., Anchorage AK 99503, or just call (907) 786-3549.

THICK-BILLED MURRES PRODUCE TWO CHICKS! And they said it couldn't be done. Tony Gaston reports that last year on Coat's Island, Canada, Leah Deforest and Dave Noble observed a fight between two adjacent pairs of Thick-billed Murres that resulted in the egg of one pair being knocked off the breeding ledge. Apparently, the pair that lost their egg retaliated by stealing the egg of the offending pair. The victims of this egg-napping (the eggnapees) then laid another egg. Both the eggnappers and the eggnappees then went on to rear and fledge chicks! Thus, one pair of murres actually produced two chicks in one year. The moral of this story is not clear.

MARBLED MURRELETS GO Errqh! Marbled Murrelets, undoubtedly the most romantic Alcids, seem to do everything in pairs. In February, 1991, Gus van Vliet and I observed murrelet pairs swimming about and diving for fish (herring?) near the dock in Auke Bay, Alaska. Pairs always remained very close (<0.5m) to each other while swimming about. Agitated calling often preceded apparent courtship behavior as both members of the pair pointed their bills into

the air and rapidly swam side-by-side, partially lifting their breasts out of the water in the manner of grebes (all this in winter plumage!). Diving was almost always synchronized such that one bird followed the other within a split second. Surfacing was slightly less synchronized as one bird usually surfaced 1-3 seconds later than (but next to) the other; suggesting that the birds remain together even under water. Most intriguing, however, was the observation that just as one bird motions to dive, it gives a faint call to its mate: a sort of nasal sounding "Errgh"! Presumably this means "Follow me my love"! Ah, those marvelous, monogamous Marbled Murrelets!

CORMORANTS CAN'T POOP AND FLY AT THE SAME TIME! Doug Siegel-Causey reports that he was observing a cormorant flying about one day and noticed that it stopped flapping its wings when it defecated. Doug decided to investigate this further, and spent the day confirming that, yes indeed, cormorants can't poop and fly at the same time. Doug has since moved on to more esoteric research, but this phenomenon obviously requires some physiological explanation. We hope to see some NSF grant proposals soon.

AUDUBON STEALS FROM CAPTAIN COOK! It is well known that Audubon was not responsible for all the art that appears in his famous Double Elephant Folio edition of the Birds of America (1827-1838). Havel actually engraved the plates for the printing, and often composed the plates by using bird portraits painted by Audubon and superimposing them on a variety of background settings. One of the more popular paintings is the "Seabirds of Alaska" print which portrays the Ancient Murrelet (with yellow instead of blue feet), Kittlitz's Murrelet (mistakenly identified as a juvenile Ancient Murrelet), Least Auklet (in winter plumage?), Crested Auklet (without white eyes) and Rhinoceros Auklet, with a magnificant vista of ice and snowy mountains in the background. However, Audubon never actually visited Alaska, and he painted the birds from specimens at the British Museum (hence the mistakes). Furthermore, the background image of ice and mountains was apparently lifted from the print "A View of Snug Corner Cove in Prince William's Sound" in the Folio edition of Cook's Voyages that was published in 1784. Ironically, none of the prints in "Cook's Voyages" were painted by anyone who had actually been on the voyages! (taken from sketches, etc.). So much for truth in advertising. Thanks to Mike McAllister (who first noticed this), Gus van Vliet, and Dick Wood for this fabulous art-alcid-Audubon trivia.

TRIALS AND TRIBULATIONS OF AUKLET CENSUSING. Crested Auklets are notoriously difficult to census, and this was particularly true of the colony at Yukon Harbor on Big Koniuji Island, Alaska. U.S. Fish and Wildlife Service volunteer Leslie Pulcher had a few eloquent words to say about her efforts to census auklets:

"ODE TO THE AUKLET CENSUS"

Auklets, auklets, on the rocks,
I'm damp and cold, despite wool socks.
I scaled a mountain for many days,
To count these birds and record their ways.
"Count them," he says "it's easy as pie".
But they hop and they jump, and then they all fly!
Their swarms of thousands are truly a sight,
They sound just like jets when they all take flight.
I can almost forget the freezing cold air,
When they buzz by so close, their wings ruffle my hair.
But when they're all gone, I ask one more time,
Why can't these birds live in a tropical clime?

RED LEGGED BLACK-LEGGED KITTIWAKE. Dave Nysewander and Bay Roberts observed a kittiwake on Middleton Island, Alaska in 1984-85 which in every respect was a Black-legged Kittiwake except that it had RED LEGS! (actually sort of orange-red). This bird appeared to be an outcast, however, as it nested on the fringes of the colony and could not seem to attract a mate. Scott Hatch passed on this trivia to me with the comment that it supports the "punctuated equilibrium" theory of evolution. Bob Furness also observed a Red Legged Black-legged Kittiwake once in the Shetlands. Perhaps we are witnessing the beginning of a new fashion trend?

ERRANT ALCIDS. The Royal Navy Birdwatching Society Bull. No. 123 reports an Ancient Murrelet sighted off Lundy Island in May 1990. Apparently, British birdwatchers went wild (so what else is new) and the bird got good press coverage. – In one of the most "off the wall"sightings of the 1980's, a Marbled Murrelet was observed on the west coast of Newfoundland in July of 1989 by Stu Tingley et al. (reported in Vol. 4, No. 4 of "The Bullbird", a Newfoundland birdwatching journal). Apparently the first MAMU observed in the Atlantic!

ABSTRACTS

1
ACTIVITY OF CALIFORNIA BROWN PELICANS AFTER EXPOSURE TO OIL AND SUBSEQUENT VETERINARY REHABILITATION. Daniel W. Anderson, D. Michael Fry and Franklin Gress (Departments of Wildlife and Fisheries Biology (DWA and FG); and Avian Sciences (DMF), University of California, Davis, CA 95616)

California brown pelicans (*Pelecanus occidentalis californicus*) exposed to severe oiling during the American Trader oil spill near Huntington Beach, California (Los Angeles and Orange Counties) in February 1990, were rehabilitated by de-oiling and veterinary care. Twenty-one adults of the 141 pelicans rehabilitated were fitted with radio transmitters, and most of the remainder (72 birds) were color-marked and released for individual identification. 11 added adult brown pelicans from the same population, but from an unaffected area (Ventura Co.) were captured and marked in the same way to serve as controls. At the time of the oil spill, about 1000-1500 pelicans were estimated to have been in the affected portion of the coast or nearby. About 15% of these birds became heavily oiled and either died or were rehabilitated. Another approximately 3% lightly-oiled pelicans avoided capture. Therefore, about 20% of the population present was visibly oiled. From band returns and sightings of brown pelicans marked in other studies, most of the affected population here was comprised of the endangered, locally-breeding "Southern California Bight" (SCB) population. After release, rehabilitated pelicans ("rehabs") survived at a lower rate, but encouragingly high in light of data on other species. 1990 was a below-average year for reproduction in the SCB due to natural environmental variability, but control pelicans were significantly more active at or near the SCB breeding colonies. Controls undertook the normal northward migration after breeding; sooner and at higher rates than rehabs. Yet, now many rehabs have begun to disperse northward in a normal pattern. Despite extensive surveys in Mexico, no controls or rehabs were found in the Sea of Cortez, where other, larger populations of *P. o. californicus* nest. Studies are continuing, so findings reported here must be considered as interim.

2
DIET OF MALE AND FEMALE BROWN BOOBIES ON ISLA SAN PEDRO MARTIR, GULF OF CALIFORNIA, MEXICO. Alejandra Angeles-Perez (Dept. de Biologia Marina, Universidad Autonoma de Baja California Sur, A. P. 219, La Paz, B.C.S., Mexico), Bernie R Tershy (Section of Neurobiology and Behavior, Seeley G. Mudd Hall, Cornell University, Ithaca, NY 14853) and Dawn Breese (177 Burns Road, Broodtondale, NY 14817)

Eastern Pacific Brown Boobies (*Sula leucogaster brewsteri*) are sexually dimorphic in size and plumage, and there are anecdotal reports of intersexual differences in foraging location and behavior. To test for intersexual differences in diet we collected > 150 regurgitations between 21 March and 3 July during the 1990 breeding season. All samples were collected from different individuals and we attempted to balance the number and ratio of male to female samples collected over ten day intervals. Male and female regurgitations were similar in species composition. There was a seasonal change in the diet of both sexes from chicks hatched. During both periods female regurgitation weights were heavier than male's. During the first period male and female regurgitations had equal size prey but females had more individual sardines and anchovies. During the second period male and female regurgitations had equal numbers of flying fish but females had larger fish. It is unclear if these dietary differences are a cause or result of sexual dimorphism.

3
VARIATION IN CHICK GROWTH AND PRODUCTIVITY OF RED-LEGGED KITTIWAKES AND BLACK-LEGGED KITTIWAKES IN THE BERING SEA. Colleen M. Baggot (Dept. of Fisheries and Wildlife, University of Minnesota, 1980 Folwell Avenue, St. Paul, MN 55108)

Chick growth and productivity of Red-legged Kittiwakes (*Rissa brevirostris*) and Black-legged Kittiwakes (*R. tridactyla*) were monitored on Buldir Island and St. Paul Island, Alaska in 1988 as an index to marine resources. Phenology was earlier and overall productivity lower for both species on Buldir Island versus St. Paul Island. Black-legged Kittiwakes on Buldir had a larger mean clutch size and slower chick growth than their counterparts on St. Paul Island. No Red-legged Kittiwakes were weighed on St. Paul but Red-legged Kittiwakes on Buldir exhibited slower growth rates than Black-legged Kittiwakes on either island although differences were not significant. Overall, kittiwakes on buldir fledged fewer and smaller chicks whereas St. Paul fledged more and larger chicks. differences in prey base and availability may account for these results.

4
COMPOSITION OF PELAGIC SEABIRD FLOCKS IN THE EASTERN TROPICAL PACIFIC. Lisa T. Ballance and Robert L. Pitman (Department of Biology, University of California, Los Angeles, CA 90024 (LTB); and Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038 (LTB and RLP))

We analyzed data on composition and distribution of pelagic seabird flocks observed during a 12 year period (1979-1990) in the eastern tropical Pacific. Flocks (defined as a group of > 4 birds) were multispecies aggregations, comprised of up to 30 species, typically with one or two species numerically dominant. All flocks were facultative commensals with predatory fish and dolphin schools but the composition of flocks differed with geographical location in a way that did not reflect distribution of breeding colonies. Certain oceanographic parameters appear to correspond to flock composition such that species composition mirrors biological productivity on a large scale. We suggest that energetics may be an important factor in determining species composition and hence, seabird community structure, for flocking birds in the relatively unproductive waters of tropical latitudes.

5
GENETIC DIFFERENTIATION IN THE WESTERN/GLAUCOUS-WINGED GULL (*LARUS OCCIDENTALIS/L. GLAUCESCENS*) HYBRID COMPLEX. Douglas A. Bell (Museum of Vertebrate Zoology, University of California, Berkeley, California 94720)

Starch-gel protein electrophoresis was used to determine the extent of genetic differentiation between Western and Glaucous-winged gulls and their hybrids. Gull colonies were sampled in Baja California, California, Oregon, Washington, British Columbia, and Alaska. Thus, in addition to the hybrid zone, sampling covered nearly the entire breeding range of each species. Analysis of 32 presumptive genetic loci did not reveal any fixed differences in electromorphs between the two species. However, significant heterogeneity in gene frequencies exists across pure and hybrid colonies, as determined by contingency chi-square analysis and F-statistics. Average levels of genetic polymorphism across colonies ranged from 12-28%. Genetic distance estimates indicate that the northern subspecies of the Western Gull (*L. occidentalis occidentalis*) is more closely related to the southern subspecies of the Western Gull (*L. occidentalis wymani*) than to the Glaucous-winged Gull (*L. glaucescens*). Of the three groups of gulls, cluster analysis shows *L. occidentalis wymani* to be most distinct electrophoretically. The Western and Glaucous-winged gull are not one panmictic unit.

6
BREEDING POPULATIONS OF SEABIRDS IN THE SAN FRANCISCO BAY AREA. Harry R. Carter and Gerard J. McChesney (U. S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center, 6924 Tremont Road, Dixon, CA 95620)

In June-July 1990, we conducted the first complete survey for breeding seabirds in the open-water areas of San Francisco, San Pablo, and Suisun Bays. By collating and adding recent data from other researchers (especially for terns nesting in adjacent salt ponds), we determined that

17,304 birds of 10 species bred at 205 known nesting areas, accounting for 3% of all breeding seabirds in northern and central California. Most colonies were located on artificial structures such as salt pond dikes and islands, bridges, pilings, breakwaters, etc. since few natural nesting islands exist. Five species accounted for 99% including: California Gull (4,764), Forster's Tern (3,550), Western Gull (3,246), Caspian Tern (2,818), and Double-crested Cormorant (2,724). In 1979-1980, five species totaling less than 3,000 birds were reported breeding at 13 nesting areas. Higher estimates in 1989-1990 reflect: more thorough censuses, population increases for Western Gulls, colonization and rapid increase by California Gulls and Double-crested Cormorants, and increases and recent declines by Forster's and Caspian terns. Least Tern numbers have remained similar. Small numbers of Brandt's and Pelagic cormorants, Black Oystercatchers, and Pigeon Guillemots now nest in northern San Francisco Bay.

7
FORAGING ENERGETICS OF PENGUINS AND PINNIPEDS: SIMILAR SOLUTIONS TO PHYSIOLOGICAL CONSTRAINT. Daniel P. Costa (Long Marine Laboratory, Institute of Marine Science, University of California, Santa Cruz, CA. 95064)

The recent availability of depth recorders has provided a wealth of information on the diving pattern of free ranging penguins and pinnipeds. When coupled with estimates of prey intake and energy expenditure data on dive pattern can provide insight into the potential physiological constraints and energetic cost and benefit of particular foraging patterns. Data on fur seals and penguins suggest that deep diving is only energetically beneficial while foraging on large prey. These large prey can supply a significant fraction of the energy requirement of the predator with each dive. In contrast, predation on small prey, where many individuals must be captured per dive, appears to be limited to shallow depths. Several possible explanations for these patterns rely on differences in transit time and rate of oxygen utilization during the dive.

Intrinsic differences in the physiological capabilities of penguins, seals and sea lions may enable or constrain them to different diving patterns having different energy costs and benefits. The available data on diving pattern and energetics of these diving vertebrates will be reviewed and potential hypotheses for the observed patterns presented.

8
REPRODUCTIVE AND FORAGING ENERGETICS OF HIGH LATITUDE PENGUINS, ALBATROSSES AND PINNIPEDS: IMPLICATIONS FOR LIFE HISTORY PATTERNS. Daniel P. Costa (Long Marine Laboratory, Institute of Marine Science, University of California, Santa Cruz, CA. 95064)

Pinnipeds and seabirds feed at sea, but are tied to shore to rear their young. Such a fundamental life history constraint should lead to convergent adaptations in foraging and reproductive ecology. However, intrinsic differences in mammalian and avian reproductive biology may limit the potential for convergence. In this paper I examine both reproductive and foraging energetics of pinnipeds and seabirds. This is done in an attempt to identify traits that might be considered convergent adaptations to life in the marine environment and to to show how divergent life history patterns are optimal for different reasons. From this analysis we find that seabirds invest a greater total amount of energy and protein into the offspring than pinnipeds, but this comes at the cost of making more trips to sea. Whereas pinnipeds forage in a manner more consistent with the predictions of central place foraging theory and exhibit a greater ability to compensate to the shortened breeding season typical of high latitude environments.

9
PHENOLOGY AND POPULATION SIZE OF BREEDING BLUE-FOOTED BOOBIES ON NORTH SEYMOUR ISLAND, GALAPAGOS ISLANDS, ECUADOR. Malcolm C. Coulter (Savannah River Ecology Laboratory, Drawer E, Aiken, SC 29802), Eliecer Cruz, Jr. (Depto. de Biologia, Univ. de Guayaquil, Guaquil, Ecuador) and Carlos A. Valle (Dept. of Biology, Princeton University, Princeton, NJ 08544)

Blue-footed Boobies (*Sula nebouxii*) breed throughout the year in Galapagos Islands. The breeding phenology is similar for adjacent colonies (~10 km apart) but may differ substantially

among more distant colonies. The colony on North Seymour Island has been studied since 1982. During the early years of the study, the birds bred in throughout the year with fewer than 350 pairs breeding at any one time. During the last few years, the birds have become very synchronous, breeding once a year in April and May. The population has increased to over 1000 pairs. This suggests the importance of long-term studies, and that colony dynamics may vary considerably over as few as ten or more years.

10
REPRODUCTION IN THE COLD: PHYSIOLOGICAL ADAPTATION AND PHYLOGENETIC CONSTRAINT AMONG ANTARCTIC CHARADRIIFORM BIRDS. Z. A. Eppley (University of California, Irvine CA 92717)

Bird species invading a radically different climate must alter some aspects of their breeding biology to permit successful reproduction. Charadriiform birds have colonized Antarctica four times. I studied species representing three of these colonizations: South Polar Skua (*Catharacta maccormicki*), a member of a polar lineage; Kelp Gull (*Larus domincanus*), an Antarctic population of a temperate species; and Greater Sheathbill (*Chionis alba*), a member of a clade which has largely radiated in hot, arid regions. I compared the roles of behavior, morphology and physiology in adaptation to conserve reproduction in these antarctic species. I used a phylogenetically controlled design to examine evolution in parental behavior, nestling morphology and physiological development. I used Western Gulls (*Larus occidentalis*) as representative of the ancestral condition. Species' adjustments provided partial (1 young fledged/pair) to complete (2 young fledged/pair) compensation. Conservation of reproduction was achieved in different ways among the species, although all showed behavioral adjustments. (Supported by NSF Grant DCB85-02218 and DPP87-02115).

11
SPRING FORAGING OF SANDERLING, *CALIDRIS ALBA*, ON THE MOLE CRAB, *EMERITA ANALOGA*, AND ISOPODS, *EXCIROLANA* SPECIES. Veronica Estelle (P.O. Box 450, Moss Landing Marine Labs, Moss Landing, CA. 95039)

Sanderling, *Calidris alba*, are a common migrant to Monterey Bay. They pass through in greatest numbers in mid March. Concurrent with their migration is the aggregation of post-larval (megalope) mole crabs, *Emerita analoga*. This study examines the impact of flock-foraging sanderling on *E. analoga* and two isopod species, *Excirolana sp.*, on three beaches in Monterey Bay, California.

After a flock of sanderling has foraged, the abundance of *E. analoga* megalope is reduced significantly ($p=.004$) while the abundance of *Excirolana* remains unchanged ($p>.05$). These results were acquired using plywood boards (15.24 cm2) as exclusion devices to obtain "before" and "after" foraging samples. In areas where sanderling did not forage (i.e. control samples), there were no differences in megalope and Excirolana abundances. These results show a preference for megalope over *Excirolana*.

Megalope abundance is most often greater inside a sanderling feeding plot than outside. Additionally, variance associated with megalope abundance is less inside a feeding plot than outside it. These results together with those of the exclusion experiment indicate 1) a patchy distribution of *E. analoga* and 2) initial megalope abundance may be great enough that sanderling only deplete megalope patches with repeated foraging bouts.

12
BREEDING BIOLOGY OF THE BLACK STORM-PETREL AT ISLAS LOS CORONADOS, BAJA CALIFORNIA, MEXICO. William T. Everett (Western Foundation of Vertebrate Zoology, 1100 Glendon Avenue, Suite 1400, Los Angeles, CA. 90024)

Based on monitoring of approximately 50 nest burrows in 1989 and 1990, Black Storm-Petrels (*Oceanodroma melania*) return to the colony each year in March for courting and nest refurbishing, but generally do not remain in the burrow during the day until the egg is laid. Pair bonds are maintained and adults return to the same burrows. Laying begins in mid May and peaks in late May and early June. A few eggs continue to be laid as late as the last week of July. Incubation

lasts at least 40 days. Adults stay with the newly hatched chick for several days, thereafter returning to the burrow only at night. Chicks remain in the burrow for 60-70 days before fledging. At Islas Los Coronados, Black Storm-Petrels compete with Leach's Storm-Petrels, Xantus' Murrelets, and Cassin's Auklets for nest sites.

13
ACTIVITIES AND IMPACT OF NORTHWEST CROWS BREEDING NEAR SEABIRD COLONIES ON PROTECTION ISLAND, WASHINGTON. J. G. Galusha (Dept. of Natural Sciences, Loma Linda University, Loma Linda, CA 92350) and T. D. Lee (Dept. of Biology, Walla Walla College, College Place, WA 99324)

The numbers, activities and movements of Northwest Crows breeding on Protection Island, Jefferson County, Washington and their impact on several breeding seabird populations were studied. In 1987, 45 - 50 adult crows produced 60 young to fledging. Crow nests were consistently located 3-4 m in elevation in trees or shrubs within 15 m of the edges of cliffs or mowed roadways. More than 60% of crow flights to and from nesting areas stopped by a leaking watertower, used presumably as a source of freshwater. Crow activities in various parts of their foraging areas (seashore, gull colony, cliffs used for breeding by Rhinoceros Auklets) were appropriately different from those in the nesting area. Northwest Crows had little impact on the breeding success of Glaucous-winged Gulls on this island and they spent little time near areas used by breeding Rhinoceros Auklets. However, crows regularly took cormorant eggs and chicks, especially during times of general colony disturbance.

14
SEABIRD POPULATION AND PRODUCTIVITY AT CAPE PEIRCE/CAPE NEWENHAM, BRISTOL BAY, ALASKA. Lisa Haggblom (U.S. Fish and Wildlife Service-Togiak National Wildlife Refuge, P.O. Box 270, Dillingham, AK 99576)

Seabird population and productivity was monitored in 1990 at Cape Peirce, Togiak National Wildlife Refuge (TNWR), Bristol Bay, Alaska. Black-legged kittiwakes, common murres, and pelagic cormorants were most extensively monitored due to their high numbers and accessibility. Standardized methods were used, and data will be compiled with that from Bluff and Cape Thompson-- also Bering Sea mainland colonies--in a report for the Minerals Management Service (MMS).

Overall populations for these three species appeared similar to those of 1989 at Cape Peirce. Kittiwake production was two to three times higher in 1990 than in 1989, while murre and cormorant production was similar to past years. The breeding season began earlier in 1990 than in 1989 for all species.

Nearby Shaiak Island, Cape Newenham, and Bird Rock were photographed in June and July for population estimates. 1990 was the first year for documented population estimates for these three colonies. To date, Shaiak Island alone has an estimated 100,000 seabirds, consisting of kittiwakes, murres, cormorants, glaucous-winged gulls, tufted puffins, pigeon guillemots, and parakeet auklets. Cape Newenham and Bird Rock combined have approximately two to four times the number of Shaiak Island, dwarfing the Cape Peirce colony. Population and productivity trends at Cape Peirce may not be representative of the entire area, which consists of the four colonies. Cape Newenham is possibly the largest mainland seabird colony in the Bering Sea, and is subject to significant impacts from intense fisheries and potential offshore oil and gas drilling in Bristol Bay.

15
HABITAT RELATIONSHIPS AND DISTRIBUTION OF MARBLED MURRELETS IN WESTERN WASHINGTON. Thomas E. Hamer and Eric B. Cummins (Washington Department of Wildlife, 600 Capitol Way N., Olympia, WA. 98501)

A survey for marbled murrelets was conducted at 41 different observation stations located randomly within a 753 sq. km study area. The study area included the entire South Fork Stilliguamish River Basin in northwest Washington, from the Cascade Crest, 85 km to the Puget Sound. Murrelet abundance was examined using a 2-way Analysis Of Variance which compared 4

different regions (west to east) to 4 different cover types (rock/talus, clear-cut/meadow, small saw/pole, old growth/large saw). An analysis of the correlation between seen-only and heard-only observation types reveals a correlation coefficient of only 27%. These detection types are therefore 2 very different kinds of data and must be analyzed separately to obtain unbiased results. Old growth/mature cover had significantly more detections than any other cover class for seen-only observations (mean=3.6). No significant differences were found for heard-only observations. Murrelet abundance was highest in a narrow corridor 27 km wide, starting 32 km inland and ending 59 km inland from the Puget Sound. Although 23 inland lakes were surveyed for murrelet use, with a total observation effort of 141 hours, only 2 possible records were collected. Small higher elevation inland lakes in the North Cascades may not have characteristics suitable for murrelet use.

16
NOTES ON THE NEST SITE CHARACTERISTICS AND NESTING BIOLOGY OF THE MARBLED MURRELET. Thomas E. Hamer, Charles Turley and Eric B. Cummins (Washington Department Of Wildlife, 600 Capitol Way N., Olympia, WA. 98501)

A 35 mm automatic infrared camera and time lapse video camera were mounted adjacent to the first 2 tree nests of the marbled murrelet discovered in Washington. The first nest was located 7 days before the chick fledged whereas the second nest was found 22 days prior to fledging. The frequency of feeding, adult behavior at the nest, food habits, chick development, and fledging behavior are discussed. The second nestling was radio-tagged 2 days prior to fledging and data was collected on dispersal. This information along with the nest site characteristics at the 2 sites are described.

17
SEABIRD ATTRACTION TO EPHEMERAL FOOD SOURCES: GEOMETRY OF RECRUITMENT DISTANCE IN EXPERIMENTALLY-INDUCED FORAGING FLOCKS. J. Christopher Haney (Marine Policy Center, Woods Hole Oceanographic Institution, Woods Hole, MA 02543), Kurt M. Fristrup (Dept. of Biology, Woods Hole Oceanographic Institution, Woods Hole, MA 02543) and David S. Lee (North Carolina State Museum of Natural Sciences, P.O. Box 27647, Raleigh, North Carolina 27611)

Using geometric relationships, we calculated theoretical upper (20 - 30 km) and lower (0.7 - 6.2 km) limits to horizontal distances over which volant seabirds can be visually recruited to join Type I flocks in the open ocean. These were compared to empirical estimates fro recruitment distances obtained from chumming experiments conducted in the western Atlantic Ocean off the southeastern United States. The product of arrival times and flight speeds for individuals (n = 164) joining 10 flocks indicated that potential recruitment distances were closer to the lower theoretical limits, with a mean distance of 4.5 km when flight time and ground speed were adjusted for detection lags, wind speed, and zigzag flight. Distances and time spans for mutual attraction among seabirds have important consequences for evaluating both intra- and inter-specific interactions at the community level as well as direct implications for sampling independence during distributional surveys that employ consecutive line transects or other sequential counting methods.

18
PUFFINS AS PREDATORS ON JUVENILE POLLOCK AND OTHER FORAGE FISH IN THE GULF OF ALASKA AND EASTERN ALEUTIAN ISLANDS. S. A. Hatch and G.A. Sanger (Alaska Fish and Wildlife Research Center, U.S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, AK 99503)

We sampled the nestling diets of Tufted and Horned Puffins at colonies from the north-central Gulf of Alaska through the Krenitzin Islands in Unimak Pass. Horned Puffins were sampled at one colony in 1985 and 1986 at at two colonies in 1987. Tufted Puffins were sampled at 1 colony in 1985, 12 colonies in 1986, and 6 colonies in 1987. Overall, Tufted Puffins consumed (by weight) 41% sandlance, 19% walleye pollock, 22% capelin, 13% other fish, and 5% invertebrates. The relatively uniform diet of Horned Puffins included 85% sandlance, 2% pollock, 4% capelin, 8% other fish, and <1% invertebrates. Puffins took mostly first-year sandlance, but fish in their

second year or older were also common at colonies near Kodiak. All of the pollock consumed were young of the year, whereas 4 year classes of capelin were present, from young of the year through spawning adults. The importance of juvenile pollock in the diet of Tufted Puffins varied geographically from little or no use in the north-central Gulf and Kodiak areas to moderate use (5-20%) in the Semidi and Shumagin islands to heavy use (25-75%) in the Sandman Reefs and Krenitzin Islands. The combination of sandlance, pollock, and capelin comprised a relatively constant fraction (80-90%) of puffin diets in all colonies and years. Concordant shifts in pollock use among colonies and years suggests puffins were drawing from a unit stock of this prey species. Puffins may thus provide a useful index of distribution and year class strength for first-year pollock, a species that currently supports a major commercial fishery in the Gulf of Alaska.

19

RHINOCEROS AUKLETS -- STAPLE DIET OF GREAT HORNED OWLS ON PROTECTION ISLAND, WASHINGTON. J. L. Hayward (Biology Department, Andrews University, Berrien Springs, MI 49104) and J. G. Galusha (Section of Biology, Department of Natural Sciences, Loma Linda University, Loma Linda, CA 92350)

Great Horned Owls are opportunistic feeders that prey on small to medium sized mammals and birds. Small mammals form the staple diet of most of these owls. However, analysis of the contents of 132 Great Horned Owl pellets from Protection Island, Washington, showed that birds, primarily adult Rhinoceros Auklets, constituted the sole diet of owls residing on the island during the summers of 1987 and 1988. Auklet wing and skull bones were notably scarce components of the pellets, whereas vertebrae, furculai, ribs, leg bones, keel fragments and pelvic fragments were common. Large numbers of auklet heads and wings scattered over the island indicated that these appendages were usually removed by the owls before ingestion of the auklet "fuselages." Fragmentation patterns of pelleted bones were determined and will be of taphonomic interest to paleobiologists who study avian fossil assemblages. Protection Island contains the largest breeding colony of Rhinoceros Auklets in the Puget Sound region. The impact of owls on the island's auklet population, while interesting, is probably not significant enough to warrant management concerns.

20

IMPORTANCE OF THREE COASTAL SYSTEMS FROM CHIAPAS, MEXICO FOR MIGRATORY AQUATIC BIRD POPULATIONS: PRELIMINARY RESULTS. Monica Herzig (Autonomous Metropolitan University-Xochimilco (UAM-X)), Rafael Acuna and Gilberto Binnq?ist (Center for Ecodevelopment (CECODES). Mexico)

In 1989 the Metropolitan University (UAM-X) began a series of studies, in collaboration with the Canadian Wildlife Service, on the populations of migratory birds along the coasts of the mexican states of Guerrero, Oaxaca and Chiapas. The field studies and aereal cencuses then performed where continued in 1990 for the coast of Chiapas, with the collaboration of the Center for Ecodevelopment and the Instituto de Historia Natural de Chiapas.

During these two years we censused during the months of February, May, July, September, October, and December all major wetlands in the region with over 45 hours of aereal flights and 24 days of ground surveys.

Our main objective is to inventory and monitor the populations of resident and migratoy aquatic birds in the region, and establish their permanence and use of the major coastal wetlands, for reproductive staging and overwintering purpouses.

We here present a preliminary analysis of our results, and a brief overview of the importance of these wetlands for the conservation of selected groups of aquatic migrants (Anseriformes, Charadriiformes, Pelecaniformes and Ciconiiformes) along the coast of Chiapas.

21
PREY STOCK STRUCTURE, FORAGING BEHAVIOR OF SEABIRDS, AND USE OF SEABIRD REPRODUCTIVE PERFORMANCE TO MONITOR PREY POPULATIONS. G. L. Hunt, Jr. (Department of Ecology & Evolutionary Biology, University of California, Irvine, CA 92717) and J. F. Piatt (Alaska Fish and Wildlife Center, U.S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, AK)

If seabird populations are limited by the availability of food, changes in the population size or reproductive ecology of seabirds may in some circumstances reflect changes in the availability of prey. The structure and dynamics of prey populations and the way seabirds locate prey will influence how changes in prey stocks are indicated by seabird reproductive performance. The structure of prey stocks is important because birds from a given colony rarely sample entire prey populations. The extent to which the portion of the prey population sampled reflects events in the prey population as a whole is thus relevant. The method by which birds find prey and their aggregative responses to prey patches are relevant because the behavior of foraging seabirds violates rules of sampling, and probably act to buffer fluctuations in seabird populations and reproductive ecology. Programs that monitor seabirds as an indication of prey stocks require information on the structure of local prey populations and how the seabirds in question sample prey.

22
SALINE LAKES AS STAGING AREAS: THE MIGRATION OF EARED GREBES THROUGH MONO LAKE AND THE SALTON SEA, CALIFORNIA. Joseph R. Jehl, Jr. and Robert L. McKernan (Hubbs Sea World Research Institute, 1700 South Shores Road, San Diego, Ca. 92109 (JRJ); and San Bernardino County Museum of Natural History, 2024 Orange Tree Lane, Redlands, Ca. 92373 (RMcK))

In autumn, hundreds of thousands of Eared Grebes (*Podiceps nigricollis*) stage at Mono Lake, California, remaining until food supplies fail. Most then move to the central Gulf of California, overflying the Salton Sea, which later in winter will become the major staging area for the northward migration. Because the Eared Grebes' distribution in the much of the nonbreeding season is concentrated at a small number of highly saline lakes, censuses at the major staging areas could, in theory, be used to monitor the status and productivity of the New World population. But first the biology of the birds at the various staging areas needs to be established.

23
MECHANICS OF UNDERWATER LOCOMOTION IN FOOT-PROPELLED DIVING BIRDS. J. R. Lovvorn (Dept. of Zoology and Physiology, University of Wyoming, Laramie, WY 82071)

Data on buoyancy, hydrodynamics drag, and acceleration during swimming strokes are used to develop a biomechanical model of underwater locomotion in foot-propelled diving birds. Results indicate that buoyancy is far more important than drag in determining energy costs of diving. Power requirements for descent are three to four times higher than for bottom foraging, and this difference increases with decreasing body size. Maximum changes in body fat affect dive costs only slightly, and can probably be compensated for by adjusting air volumes in the respiratory system and plumage. This finding contrasts with the energetics of flight, which are strongly affected by body mass changes. Reduced buoyancy from compression of air spaces with depth substantially lowers costs of bottom foraging. Because plumage air volume decreases with increasing body mass and body tissues are incompressible relative to air, buoyancy decreases faster with pressure in smaller birds and they become negatively buoyant at shallower depths (about 43 m for Oldsquaws). Ducks such as eiders weighing over 1200 g and diving to less than 60 m probably never become negatively buoyant. Oldsquaws, which also dive to 60 m are probably the only seaducks that must actively propel themselves during ascent. This may explain why they are the only duck species to fully utilize wing propulsion.

24
THE DISCOVERY OF A MARBLED MURRELET NEST IN THE WALBRAN VALLEY, VANCOUVER ISLAND, BRITISH COLUMBIA. Irene Manley (Biology Department, University of Victoria, P.O. Box 1700, Victoria, British Columbia, Canada V8W 2Y2) and John Kelson (Western Canada Wilderness Committee, 20 Water Street, Vancouver, British Columbia, Canada V6B 1A4)

The first nest of the Marbled Murrelet in Canada was found on August 1, 1990, in the Walbran Valley on Vancouver Island, British Columbia. The nest was located 43 m above the ground and 3.4 m from the trunk, in the limb of a Sitka Spruce. The conspicuous ring of feces combined with the small downy feathers present at the nest suggest that the chick fledged successfully, especially since no birds were present when the nest was discovered. This paper describes in detail the nest, its discovery, and how it is affecting Marbled Murrelet management in British Columbia.

25
EFFECTS OF DISTANCE, SEA CONDITIONS AND WEATHER ON SEABIRD SURVEYS CONDUCTED BY LAND-BASED OBSERVERS. Sheri L. Miller and C. John Ralph (Redwood Sciences Laboratory, USDA Forest Service, Arcata, CA 95521)

The use of land-based survey techniques for seabird censusing provides the potential for an inexpensive method for identifying important nearshore habitat areas and developing baseline population data for many areas inaccessible by small boat. The technique would be most useful for inshore species, such as scoters and the Marbled Murrelet. An understanding of the effects of varied sites and viewing conditions on the number of birds seen is essential when the data are used as an index of abundance. We examined various factors we thought would influence detectability of birds from shore, and found that observer height and sea state were most important. However, the effect was relatively slight, indicating that within the range of conditions that we used for our survey, there was only a modest effect on numbers observed.

26
FORAGING HABITAT AND HOME RANGE OF AMERICAN WHITE PELICANS IN THE KLAMATH BASIN, CALIFORNIA. Leopoldo A. Moreno and Daniel W. Anderson (Wildlife & Fisheries Biology Dept., University of California, Davis, CA 95616)

For the past 25 years, the american white pelican (*Pelecanus erithrorhynchos*) has been declining in California and other western states, this decline has been attributed to breeding habitat destruction, as well as the loss of suitable feeding areas. Only two colonies are left in California, both occurring in the Klamath Basin. In the spring of 1990 a study on the foraging ecology of this species was started. The objectives of this study include aspects such as foraging behavior, habitat use, home range, reproductive success, and post-breeding dispersal. Adult and young white pelicans were fitted with radiotransmitters and their movements tracked from two fixed stations. The daily activities of white pelicans throughout the Klamath Basin were monitored. Special attention was given to foraging: flock size, foraging success, and foraging habitat characteristics. Results from the 1990 breeding season are discussed.

27
BROWN NODDIES IN CULEBRA: WHAT HAPPENED IN 1990? Ralph D. Morris (Dept. of Biological Sciences, Brock University, St. Catherine's Ontario L2S 3A1 Canada) and John W. Chardine (Canadian Wildlife Service, P.O. Box 9158, Stn. B., St. John's, Newfoundland A1A 2X9 Canada)

We have studies Brown Noddies (*Anous stolidus*) breeding near Culebra, Puerto Rico for the past six years. Prior to 1990 and in contrast to colonies elsewhere, several aspects of the breeding biology of Culebran Brown Noddies appeared unique to Culebra. These included a tightly synchronous arrival, compact egg laying period, a uniformly and consistently high reproductive success per pair each year and an unusually narrow range of food items. Patterns of adult departure from the colony suggested a predictable and productive foraging area to the northeast that explained the apparent absence of food limitation at this location. In 1990, several major changes were identified: a smaller proportion of colour-banded birds returned to the colony, numbers of

breeding pairs were reduced, and the peak of egg-laying was delayed. While body mass and body condition of adults, and egg volume were within the normal yearly variation, mate and nest site changes were more frequent than in earlier years. These differences may reflect those at colonies elsewhere.

28
THE EFFECT OF WEATHER AND TIDAL CYCLES ON THE BEHAVIOR OF MARBLED MURRELET BEHAVIOR AT INLAND SITES IN NORTHWESTERN CALIFORNIA. Brian O'Donnell and C. J. Ralph (Redwood Sciences Laboratory, USDA Forest Service, Arcata, CA 95521)

In recent years researchers have developed standardized census techniques to determine the distribution and behavior of Marbled Murrelets (*Brachyramphus marmoratus*) at inland sites. Census results indicate that murrelets are present at certain locations during most months of the year, with peak activity levels occurring during the summer months in association with breeding, and another, lower peak in early winter. Our understanding of murrelet behavior remains limited, however, and little is known about factors influencing their activity patterns in the forest. In spring 1989 we began monitoring the behavior of murrelets at inland breeding groves at several locations in the coastal, old-growth redwood forests of northwestern California. Some of these sites have been surveyed continuously to the present. We have found that the influence of cloud cover, moon phase, and tidal cycles have an effect on the activity levels and patterns of this species' activity in forest stands.

29
PREY DISPERSION, FORAGING STYLE, AND BODY SIZE IN THE ALCIDAE. John F. Piatt (Alaska Fish and Wildlife Research Center, U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, AK 99503)

Twenty-two extant species of Alcidae range in size over an order of magnitude and exhibit a wide range of morphological and behavioral adaptations for feeding. Foraging styles range between two extremes observed in many other taxa (e.g., ants, lizards, antelope); from species (e.g. *Aethia cristatella*, *Uria aalge*) that forage widely and in large groups on ephemeral, dense prey aggregations to species (e.g., *Aethia psitticula*, *Cepphus grylle*) that forage alone or in small groups on dispersed prey and over small foraging areas. Ecological theory predicts that coexistence is promoted when competing species specialize on different densities of shared prey. It appears this may be accomplished by differential selection between species for unique body size - foraging style combinations suited to particular prey dispersion patterns. As in other taxa, it appears that alcids of the same body size and foraging style do not coexist.

30
FOOD AND FORAGING HABITS OF SWALLOW-TAILED GULL AND IMPLICATIONS FOR PREDATION ON SQUID BY SEABIRDS. Robert L. Pitman and Lisa T. Ballance (Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038 (RLP and LTB)); and Department of Biology, University of California, Los Angeles, CA 90024 (LTB)

Swallow-tailed Gull (*Creagrus furcatus*) is a nocturnal foraging seabird endemic to the eastern tropical Pacific (ETP). We collected 9 specimens and observed foraging birds around our stopped vessel at night during several years of at-sea time in the ETP. Birds fed primarily on lanternfish (myctophids) and small squids chased to the surface by larger foraging ommastrephid squids. This appears to be an obligatory feeding association for the gull and parallels the relationship between diurnal-foraging seabirds with tunas in the tropics. We also observed gulls ripping parts off larger live squid whose calculated mass represented up to 60% of the gull's mass. This is the largest live squid (relative to the birds body mass) that has been reported taken by a seabird and we suggest that procellariiforms, with their much larger, heavier bills, may be taking larger live squid than has been previously suspected.

31
EXPERIENCE, AGE AND DEFERRED BREEDING IN THE WESTERN GULL. Peter Pyle, Larry B. Spear, Nadav Nur, William J. Sydeman, Steven D. Emslie and David G. Ainley (Point Reyes Bird Observatory. 4990 Shoreline Hwy., Stinson Beach CA 94970)

The independent effects of age and previous breeding experience were determined on both reproductive success and survival of Western Gulls (Larus occidentalis). Reproductive success increased with age of males but not females, and increased with experience of females but not males. These differences relate to sex-specific roles of reproduction. Survival increased with age of the male, and to a lesser extent the female, and decreased with experience of the female, and to a lesser extent the male, indicating a cost of reproduction that is greater in females than in males. By combining these success and survivorship data, lifetime reproductive success is calculated for four age of first breeding classes of each sex. Predicted optimal ages of first breeding compare favorably with actual age distributions in both sexes, suggesting that selection has been effective at moving this trait toward its fitness optima.

32
EFFECTS OF OBSERVERS, SEA STATE, AND WEATHER ON VISIBILITY OF SEABIRDS FROM BOATS. C. John Ralph and Sheri L. Miller (Redwood Sciences Laboratory, USDA Forest Service, Arcata, CA 95521)

While many studies have used censuses of birds from boats to determine status and movements of birds at sea, very few have examined the assumptions made in taking the data. These assumptions involve the variables impinging upon the number of birds recorded, such as observer variability, weather conditions, and swell and wave height and interval. Depending upon the distance at which a bird is assumed to be detected, the population can be several fold different. Using the average distance of the bird from a moving boat as a measure of visibility, we examined the effects of these variables. We found the most important factors involved sea state. We will discuss the implications of these data to population estimates, especially those of the Marbled Murrelet.

33
BIRD COLONIZATION AFTER CAT ERADICATION ON JARVIS ISLAND. M. J. Rauzon (Box 4423, Berkeley, CA 94704)

This paper presents a review of the effects of cats and a synopsis of bird populations both before and after eradication. In 1982, 120 feral cats were removed from Jarvis Island National Wildlife Refuge in the Central Pacific Ocean. In subsequent visits, no cats were found. However during a visit in April 1990, one cat was present as well as recovering populations of seabirds. Two species previously no0t recorded breeding were extant: Blue-grey Noddies established a colony of at least 25 birds and several pairs of Christmas Shearwaters were courting outside burrows. Populations of other seabirds appeared to have responded to the absence of predation pressures. The absence of cats permits vulnerable species to recolonize and residents to expand their populations. the apparent presence of an El NiÊo warm water even confounds interpretation of population numbers but increasing trends are noted.

34
MARBLED MURRELETS IN THE ELWHA VALLEY AND ADJACENT MARINE HABITATS IN WASHINGTON STATE. Fred A. Sharpe and Eileen McLanahan (Olympic National Park, Natural Sciences STudies, 600 East Park Avenue, Port Angeles, WA 98362)

Marbled Murrelet use on the lower Elwha Valley and adjacent marine habitats was studied from March to September of 1990. 105 terrestrial surveys (62 dawn, 43 dusk) were conducted between 13 stations, which resulted in 85 detections. This study suggests that the lower Elwha is used primarily as a flight corridor, and breeding activity is concentrated in the tributary valleys or further up the main valley beyond river mile 20. No detections were made at the six stations in the heavily cutover lowlands, indicating that movements of birds in this area was fairly high in elevation (600 feet or above). Murrelets were not observed utilizing two dammed reservoirs on the river. 120 visits to nine marine sampling stations resulted in 960 murrelets counted at sea.

The numbers of birds at sea remained low until a gradual influx occurred in early May, which loosely correlated with an increased attendance at inland stations. Distribution of murrelets at sea was positively correlated with increasing habitat complexity, such as the presence of embayments, points, and mixed rock-sand substrates. The Elwha Valley is the largest river drainage in Olympic National Park and occurs adjacent to productive murrelet foraging areas in northern Puget Sound. However, the valley was found to possess relatively low murrelet activity. An estimated 15 pairs distributed between widely dispersed stands utilized the valley and its tributaries during the 1990 breeding season. The limited activity is attributed to the valley's location in the dry northeast Olympics, which produces a mosaic of young forest stands with low productivity and active fire histories. Unlike valleys to the west, the Elwha is characterized by a V-shaped profile which lacks wide alluvial bottomlands where contiguous lowland forests can develop. Furthermore, the harvesting of timber to river mile 20, during the past century, has also limited available murrelet nesting habitat.

35

POPULATION STUDIES OF ALEUTIAN SEABIRDS. Douglas Siegel-Causey (Museum of Natural History, Univ. Kansas, Lawrence, KS 66045-2454)

I examined the morphological and molecular characteristics of selected species of shearwaters, fulmars, cormorants, larids, and alcids collected throughout the Aleutian Islands and the eastern coasts of Kamchatka. Multivariate analysis of geographic variation in morphology revealed evidence for discrete populations of cormorants, auklets, and guillemots, all having common boundaries between breeding stocks. Molecular analysis, using DNA fingerprinting and sequencing, indicates that there is strong genetic subdivision within the breeding range. The regions of population disjunction are centered on Kamchatka and imply that common biogeographic processes have been important in the population histories of Beringian seabirds.

36

WEST COAST OF NORTH AMERICA SEABIRD COLONY CATALOG - A DESKTOP ANALYSIS AND RETRIEVAL SYSTEM. A. L. Sowls (U.S. Fish and Wildlife Service, 202 Pioneer, Homer, AK 99603), E. D. Archer, M. S. Jacobsen, M. J. Shelby (NOAA, 6001 Executive Blvd., Rockville, MD 20852) and G. J. Divoky (Inst. of Arctic Biology, Univ. Alaska, Fairbanks, AK 99701)

A desktop system for the retrieval and analysis of information on west coast seabird colonies has been developed by the National Oceanic and Atmospheric Administration and the U.S. Fish and Wildlife Service. The Macintosh-based program developed by NOAA provides access to the colony totals compiled by the USFWS for all west coast states. British Columbia data was provided by the Canadian Wildlife Service. Information from Siberia and Baja California will be added at a later date. Data files contain recent colony censuses as well as information on regional breeding chronologies and nesting and feeding behavior. Queries can be made for specific colonies or for large scale distributions with the results presented in maps or tables. The program, a prototype of which was demonstrated at the last PSG meeting, is available for distribution in January 1991.

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NEST SITE CHARACTERISTICS OF SYMPATRIC BROWN AND BLUE-FOOTED BOOBIES ON ISLA SAN PEDRO MARTIR, MEXICO. Bernie R Tershy (Section of Neurobiology and Behavior, Seeley G. Mudd Hall, Cornell University, Ithaca, NY 14853), Dawn Breese (177 Burns Road, Broodtondale, NY 14817) and Alejandra Angeles-Perez (Dept. de Biologia Marina, Universidad Autonoma de Baja California Sur, A. P. 219, La Paz, B.C.S., Mexico)

Brown Boobies (*Sula leucogaster*) and Blue-footed Boobies (*S. nebouxii*) breed at the same time of year in a large mixed colony on Isla San Pedro Martir. We tested the nest site preferences of both species (n = 50 nests each) against the available habitat as determined by randomly selected "pseudo nests" (n = 88). Within our three study plots Brown Boobies nested at lower densities (0.26 nests/10 m^2) than Blue-footed Boobies (0.41 nests/10 m^2). More than 65% of Brown and Blue-footed Boobies had conspecifics as nearest neighbors. Brown Boobies nested on

steeper slopes, closer to cardon cacti, in more shaded areas, and more often under overhead cover than did blue-footed Boobies. When compared to pseudo nests Brown Booby nest sites were more protected from sun and wind, while Blue-footed Booby nest sites had larger diameter nest platforms and were on more gentle slopes. These differences in nest site characteristics do not appear to be caused by current interspecific displacement competition. Rather, they appear to be preferences possibly related to interspecific differences in aerial maneuverability, thermal stress,and nest construction.

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NESTING SUCCESS AND FAILURE OF RED-TAILED TROPICBIRDS AT MIDWAY ATOLL. W. B. Tyler and M. T. Brown (Long Marine Laboratory, University of California, Santa Cruz, CA 95060)

From March through August 1988 and 1989, we studied the nesting biology of the Red-tailed Tropicbird (*Phaethon rubricauda*) at Midway Atoll. Midway supports the largest Tropicbird colony in the Hawaiian Island chain and is one of the northernmost (28^{O} N latitude) nesting sites of this tropical species. Nesting was distinctly seasonal, timed so that chick rearing coincided with the tropical oceanographic conditions that occur only during summer. Success varied with laying date; nests initiated in the middle of the laying period (February-August) were more successful than those begun early or late. Overall, colony success was about 37% in both years. The frequency of nest failure during incubation was twice that during chick rearing. In contrast to low latitude colonies, where intraspecific competition is the primary cause of nest failure, tropicbirds at Midway suffered from environmental stresses and predation by introduced rats. Rat predation on eggs was extensive, especially when food shortages led to more frequent nest abandonment and egg neglect. Relatively few nestlings, and none more than a few weeks old, were killed by rats. Starvation and thermal/osmotic stress were the primary causes of chick mortality. Avian pox and conflicts with nesting albatrosses also contributed to nest failure.

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PEREGRINE EATS ENDANGERED SEABIRD AND LIVES TO TELL ABOUT IT! Brian James Walton (Predatory Bird Group, University of California, Santa Cruz, CA 95064)

The Peregrine Falcon nearly became extinct in California by 1970. Populations of northern migrant peregrines also were reported as severely reduced. A recent recovery in population size may have impact on other marine-oriented bird populations; particularly terns and pelagic species like petrels, auklets, and murrelets. Because of its position as primary predator in the coastal marine environment, analysis of salvaged peregrine eggs and carcasses may be an important environmental barometer for seabird populations in the region.

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ADAPTATION OF THE SKELETAL WING IN THE SULIDAE AND OTHER SEABIRDS. Kenneth I. Warheit (Department of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118-4599)

To generate both lift and thrust, flying vertebrates must change the shape of their airfoils during each flight stroke. In birds, this change is facilitated through muscle action on skeletal joints, and is a function of the relative lengths of the wing elements. These features are conservative within species, but may vary even among closely related species. For example, within the Sulidae the humerus is longer than the ulna in *Morus* and shorter than the ulna in *Sula*. Several authors (e.g., Bourne, 1976) have considered these differences adaptations.

To test the hypothesis that the relative proportions of the wing elements in seabirds are adaptations, I measured the lengths of the humerus, ulna, carpometacarpus, and wing phalanx in 51 species of seabirds (including 4 species of fossil Sulidae). Based on the results from several multivariate analyses, I show that wing-propelled diving seabirds and Morus convergently evolved a long wing phalanx and a short ulna, while foot-propelled diving seabirds convergently evolved a short wing phalanx. The shape of the skeletal wing in the flightless Galapagos cormorant, however, is more similar to wing-propelled divers than to other species of cormorants.

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INCREASES IN THE BREEDING POPULATION OF ADELIE PENGUINS *PYGOSCELIS ADELIAE* AT WHITNEY POINT, WILKES LAND, ANTARCTICA. E. J. Woehler* and H. R. Burton (Australian Antarctic Division, Kingston, Tasmania, Australia; *Present address: Dept of Ecology and Evolutionary Biology, University of California, Irvine, CA 92717)

Breeding colonies of Adelie Penguins *Pygoscelis adeliae* at Whitney Point, Wilkes Land, Antarctica, have been counted at frequent intervals between 1959/60 and 1989/90. The population has increased from 1100 pairs to 3800 pairs, and the number of colonies has increased from 14 to 30. The colonies in the eastern part of Whitney Point are increasing more rapidly than those in the west. Attendance patterns of breeding adults were colony-specific, and it is postulated that these reflect intrinsic, rather than extrinsic, factors.

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THE DISTRIBUTION, ABUNDANCE AND STATUS OF ADELIE PENGUINS *PYGOSCELIS ADELIAE* IN THE WINDMILL ISLANDS, WILKES LAND, ANTARCTICA. E. J. Woehler*, D. J. Slip, L. M. Robertson, P. J. Fullagar and H. R. Burton (Australian Antarctic Division, Kingston, Tasmania, Australia (EJW, DJS, LMR, and PJF); and CSIRO Wildlife Canberra, ACT, Australia (HRB); *Present address: Dept of Ecology and Evolutionary Biology, University of California, Irvine, CA 92717)

The total breeding population of Adelie Penguins (*Pygoscelis adeliae*) in the Windmill Islands region was 93092 + 9300 pairs in 1989/90. Survey data indicate that the population has increased by 209% since a survey was conducted in the early 1960's, a trend that is shared with many other breeding localities where long-term data exist. Relict colony areas (former breeding sites) were identified at all but two localities presently supporting breeding colonies. The populations on Shirely Island, proximal to Casey Station, increased between 1961/62 and 1968/69, but has remained stable since then, coincident with the opening of Casey Station. It is believed that the lack of growth in the breeding population is a result of visitors to the island.

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MARINE BIRDS AND THE HIGH SEAS DRIFT NET FISHERIES IN THE NORTH PACIFIC. K. Wohl and P. Gould (U. S. Fish and Wildlife Service, 1011 E Tudor Road, Anchorage, Alaska 99503)

Drift net fisheries on the high seas are widely believed to be extremely wasteful of marine biological resources. There is mounting concern that their continued operation at present levels of effort will be detrimental to many animal species and to the ecosystem as a whole. The available information on the impacts of these fisheries is inconclusive. Current studies, including the High Seas Squid Drift Net Fisheries Observer Programs being conducted by the National Marine Fisheries Service and the U. S. Fish and Wildlife Service in cooperation with, Canada, Japan, Taiwan and the Republic of Korea should allow some reliable assessments to be made on the effects of these fisheries on marine organisms. We discuss the current status of these fisheries including political and scientific agendas with emphasis on the the incidental catch of marine birds.