COASST

COASTAL OBSERVATION AND SEABIRD SURVEY TEAM

Reports 03–04

SEPTEMBER 2004

Breaking News

This was a massive year for COASST. Pardon the pun, but the heavy fulmar *fall*-out last autumn pushed our annual totals higher than ever. Thanks to your record-breaking accuracy (over 90% correct to species!) and higher-than-average deposition rates—we identified almost twice as many birds as ever before (2,696). What did it take to accomplish all of that? The number of COASST volunteers increased by more than 10% this year. Together COASSTers completed nearly 1,200 surveys across 111 sites, clocked over 3,000 hours, and walked nearly 6,000 km round-trip. Kudos to everyone!

Puget Sound

With our first full year of data from the host of Puget Sound beaches added in spring of 2003, the norm continues to be infrequent finds for most volunteers. Many, like Laurel Cook and Ronalee Kincaid of Squalicum North, only encountered Glaucous-winged Gulls this year. Doug and Ann Stark recorded just two birds on Locust Avenue North, a Pelagic Cormorant and Large Immature Gull, *both* on September 14. Sally Pytel and Joseph Deegan's only measurable bird was a juvenile Glaucous-winged Gull located on February 22, the same day that they recorded a riding lawn mower as a vehicle along their Birch Bay beach!

Even fulmars found their way into Puget Sound during the large fall dieoff. Following the passage of "more than 100 fulmars flying into Puget Sound" on November 11, Vic and Sharon Nelson noted the region's first fulmar carcass on Point No Point two days later. The region's other fulmar was found at Semiahmoo Spit by Kym Fedale and Morgan Rohde on December 21.

Dead American Crows made appearances across some of the Sound's more urban sites this year. Megan Pool and Asta Sestrap found one at Locust Avenue South in Bellingham, while Discovery Park's Max Woods and Jane Dolliver located two others. The only other crow occurred on Vashon Island. With West Nile virus spreading westward, we will continue to pay particular attention to trends for this species. And while we're at it, we want to remind you that COASST's crow measurements continue to suggest that our beach-cast crows fall on the diminutive size of the species' range… could this be a vestige of their "Northwestern Crow" heritage?

On April 11, Amy and Doug Webb discovered two gulls that had washed ashore "tightly wound" in heavy

Linda Bierma

Linda Bierma and Chuck Blight had this unusual find on April 1. family = shenanigan; species = aprilicus fuliu.

plastic–the Sound's only entanglement report. Asta Sestrap and Megan Pool noted an "oil-soaked log (not creosote)" in early December. Newcomers Robert Mauri and Cheryl Tinaves documented a sheen of oil extending across the length of Brackett's Landing near the Edmonds ferry dock in late May. Witnessing an excessive amount of trash near the Canadian border at Blaine Marine Park, Linda Streitfeld and Joyce Clark took it upon themselves to pick up and remove two bags full of garbage in April.

San Juan Islands

Zeros, zeros, and still more zeros…and then an influx of birds. On August 16, after two years of finding no birds, Mike Kaill found *three* adult Common Murres on Eagle Cove. He located the last one while investigating a Turkey Vulture that was probably scavenging the carcass. In November, he logged the region's only Northern Fulmar for the year—a very fresh bird found at the water's edge by his dog, Arlo. As in past years, Mike also noted a number of beached harbor seals on his sites.

Despite conducting numerous surveys, long-term volunteers like Ken Arzarian and Darlene Wahl (both rangers with the San Juan Islands' National Historic Park) and Ginger Ridgway of Orcas Island came up empty on birds for the year. Bev and Larry Leyman found their first carcass, an adult Brandt's Cormorant in March. Twenty-six surveys on Jackson Beach and Grandma's Cove yielded just one find, a Glaucous-winged Gull, for Judy Chovan.

In May, while training newcomer A.R. Weisbrod, Kim Sundberg and Debra Clausen discovered a 20 cm tar patch on a False Bay boulder—the region's only oil report. Their only beached birds this year were two immature Bald Eagles—one in July 2003 and another in May of this year. This follows their find of a Bald Eagle chick on this beach last year. There is an eagle aerie on False Bay, and repeated annual finds of Bald Eagle chicks may bode ill for the reproductive success of this pair.

Because human impact on the Islands' ecosystems is on the rise, and residents are increasingly interested in preserving the natural heritage around them, it has been easy to recruit volunteers to aid our efforts. We're pleased to report that following our refresher visit in May 2004, COASST recruited seven new volunteers to the region, and extended coverage to Lopez and Waldron Islands—we look forward to seeing the region's new reports and perspectives next year!

Pam Sanguinetti

Unlike the speculum of the similar-looking Green-winged Teal, the inner wings of this female (or immature) American Wigeon feature a mottled gray shoulder and a bold white stripe.

Strait of Juan de Fuca

As we all know, the Strait marks the middle ground (or water really!) between the outer coast and greater Puget Sound. So, not surprisingly, the region's beaches exhibited a moderate fulmar fallout, with six sites reporting a total of 20 fulmars between October and December. Bill and Barbara VanderWerf found two on Dungeness Spit—singles in October and November. Although the total of 20 is significantly lower than the huge masses found along the outer coast, it is markedly higher than the total of three found in Puget Sound and the San Juan Islands, highlighting the Strait as a geographic transition zone.

On the other hand, the prevalence of gulls in the Strait mirrors their ubiquity in the inside waters of Puget Sound and the San Juans, where gulls are almost always the predominant species group found by COASSTers. As in previous years, gulls were quite cosmopolitan, occurring on a great array of sites and in most seasons in the Strait—save surprisingly, summer. In January, Ron Frisch even found a young Glaucous-winged Gull

on Lyre River beach that had been shot. Rick and Kathy Bush found a recently scavenged Glaucous-winged Gull on Travis Spit. Large Immature Gulls were found on eight different sites.

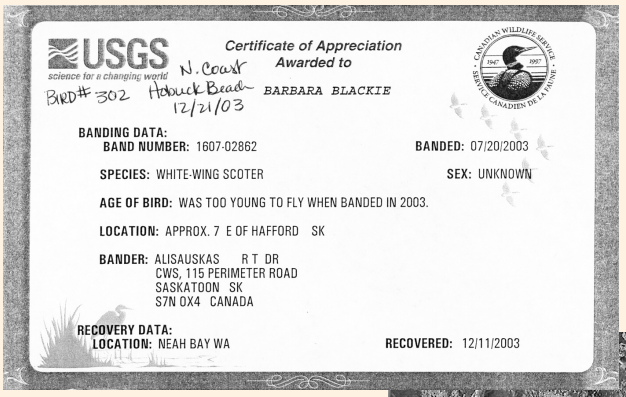
Quite a few of COASST's unusual species showed up in the Strait this year. In January, Beth Winslow and Tom Golding identified COASST's first Common Goldeneye. Although this species is not in *Beached Birds*, it will be included in the upcoming Atlantic version of the guide. In March, another COASST rarity washed up in the Strait—a female American Wigeon found by Pam Sanguinetti on Dungeness Spit 3–4. Finally, Carrie Wooten and Nancy Newman discovered a Barred Owl at Beckett Point in September.

Paul Blake and Martha Ellul's action-packed survey in late September featured an adult Glaucous-winged Gull with a hook in its beak. Thankfully, the region's only report of oil was from Tongue Point, where Carol Volk and Gary Korb noted a small sheen patch next to a high log.

North Coast

The North Coast region showed huge site-to-site variability this year, exemplifying the adage "when you're hot, you're hot—when you're not, you're not." For example, observers at Sand Point South—Bill Baccus, Shelley Hall, Scott Gremel, and Sanny Lustig—found dozens of murres and gulls in September, but nary a fulmar between October and December. The situation on Third Beach was very similar: Katherine Beirne, Shelley Hall, Patti Happe, Gay Hunter, William Ritchie, and

Roger and Cat Hoffman dug up tens of murres in September, but only discovered one fulmar a month in October and December. On the other hand, Second Beach's Ian Miller never saw a murre all year, but his site collected three fulmars in November.



USGS
science for a changing world

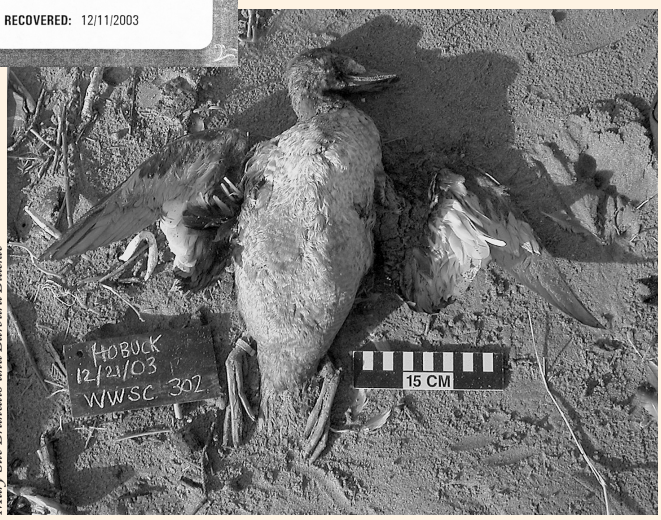
Certificate of Appreciation
Awarded to

N. Coast
BIRD# 302 Hobuck Beach
12/21/03
BARBARA BLACKIE

BANDING DATA:
BAND NUMBER: 1607-02862 BANDED: 07/20/2003
SPECIES: WHITE-WING SCOTER SEX: UNKNOWN
AGE OF BIRD: WAS TOO YOUNG TO FLY WHEN BANDED IN 2003.
LOCATION: APPROX. 7 E OF HAFFORD SK
BANDER: ALISAUSKAS R T DR
CWS, 115 PERIMETER ROAD
SASKATOON SK
S7N OX4 CANADA

RECOVERY DATA:
LOCATION: NEAH BAY WA RECOVERED: 12/11/2003

Hatched in Canada just a few months earlier, this banded White-winged Scoter appeared on Hobuck Beach in December.



Mary Sue Brancato and Barbara Blackie

During a brief break from processing fulmars in December, Sue Nattinger and Coleman Byrnes of Shi Shi spotted a live Sea Otter swimming off of Petroleum Creek. The shorter tail and flipper-like hind feet distinguish this species from River Otters, also prevalent in the area. Want your chance to see one? Check out the Rotating Beach section on page 17.

The region documented some long-distance migrants—both alive and dead. While crouched over the masses of beached murres in September, Mary Sue Brancato and Ed Bowlby heard a trumpeting call and looked up to see 14 Sandhill Cranes migrating south over Hobuck. In December, the same beach had a first-year White-winged Scoter that had been banded 1,000 miles away, near Saskatoon, Saskatchewan in July while still "too young to fly"—according to the US Geological Survey.

Although the region saw no oil this year, there were several bird entanglements. Sand Point North had a hooked murre in mid-September. Later the same month, Sharon Pia and Janet Bruening found another murre on Rialto Jetty, its neck ensnared by monofilament. Perhaps the most graphic death was described by Wolter van Doorninck of Copalis Rocks, where he witnessed an adult gull with fishing line binding its left wing to its left leg. Unfortunately, before Wolter realized that the bird was flightless, his neighbor's dog had killed it.

South Coast

Washington's South Coast was chock full of tubenoses late last fall. Although hundreds were fulmars, a smattering of less-expected species showed up. Two Buller's Shearwaters were found—one by Susan Clark and Barbara Campbell on Ocean Park South in November, and the other by Linda Bierma and Nancy Houtzel on South Surfside in December. Long-time COASSTers Dianna Moore and Kathleen Wolgemuth found a Leach's Storm-Petrel in October.

In contrast to almost all other sites in the region, Ocean Park North, and surveyors John Epler and Clem Hoerner, witnessed very few birds, including *only five fulmars* during their monthly surveys. Despite their beach's traditionally low deposition, they have had some unique finds, including COASST's first Glaucous Gull in two years, found in January.

Susan Clark and Barbara Campbell encountered an oiled Ancient Murrelet on January 19 at Ocean Park South. The region's only other sighting of the species, by Linda Bierma and Nancy Houtzel, occurred during a surprising season—summer. Bill Tweit, a Washington Department of Fish and Wildlife (WDFW) Biologist, is using this important August 6 sighting (and many live-bird records) to build a case that the species may be breeding in Washington State.

North Surfside was COASST's Tufted Puffin hot-

spot, with two of three finds occurring there in late summer. Anne Chiller and Ellen Jenkins noted an adult in early August, and Pete Seidel and Caroline Harding encountered a juvenile in mid-September. Ken Warheit, a WDFW Senior Research Scientist, reports that WDFW will begin a study in spring 2005 to document the abundance and distribution of Tufted Puffins in Washington waters, and hopefully contribute to an understanding of why this species has experienced a serious decline in numbers.

All of COASST's oiled birds for the year occurred on the South Coast—a Double-crested Cormorant on North Jetty in October, a Large Immature Gull on Twin Harbors in December, and an Ancient Murrelet on Ocean Park South in January. Dianna Moore and Deanna Skewis found the only incident of entanglement on the South Coast—a Common Murre ensnared in fishing line. Mary Goff documented COASST's largest hunting find—four American Wigeon and a Greater Scaup with their necks tied together with rope at Twin Harbors on November 19. We presume that a duck hunter either lost his catch, or exceeded his limit and dropped the "extras."

Oregon

To all of our intrepid Oregon COASSTers who braved the fall and early winter months of massive fulmar numbers, we extend our gratitude for your time and effort. We wish to particularly commend the team on Mile 327 (Jann Luesse, Patrick Reynolds, Jim Scheller, Lori Sinnen, and Jim Towell), our northernmost site in Oregon, for contributing such excellent supporting details for all of their sightings. It sure helped having more people on the beaches during the fall deposition peak—the 327 team managed to process a total of 47 carcasses in just 3¼ hours during one of their November surveys.

A Surf Scoter found in December by Jerry Gibson, Bert Johnstone, Martha Holmberg, and Betty Sparks on Mile 196 was part of a broader pattern, as three of four scoters found in Oregon occurred in that month—all Surfs. A winter peak in abundance is hardly surprising, as scoters generally breed in the far north and migrate to lower latitudes to spend the winter. Although past beached bird data showed a higher incidence of White-winged Scoters, Surfs outnumbered White-wingeds in both states this year.

With only ten beaches (less than 10% of all COASST sites), Oregon had almost half of the entangled carcasses this year. In August, Elaine Cramer, Myryra Molkentine, and Pennie Cramer discovered a dead Pelagic Cormorant with a line and 3-inch lead weight wrapped around its wing on Mile 286. The only oil encountered by Oregon's COASSTers occurred in March, when Paul and Janet Raffensperger noted a sheen on Mile 241. On three consecutive surveys, the Agate Beach volunteers noted a "blackish residue" on their beach during August and September and thought it was due to a significant sewage spill by the City of Newport on July 27.

At year's end (now May, for COASST), Mollie Peters submitted an observation of a Black-footed Albatross on Mile 300 and observers near Agate Beach reported three more carcasses later in the month, although not on an official COASST survey. Black-footed Albatrosses end up on West Coast beaches after the long journey from Hawaii to our waters in search of food. We'll continue to monitor the situation, as this species is on the Audubon Society's WatchList, with the largest threat to the population being interactions with commercial fisheries, specifically entanglement in the Hawaiian and Japanese longline fisheries. Check out the Partner Profile on page 26 to learn more about seabird bycatch.

Linda Bicma

Seeing is believing...COASST's first woodpecker, a Red-breasted Sapsucker, surprised us in September.

What's Washed In?

New Species

Just like last year, COASST documented more than 60 species this year! But it's definitely getting harder to add new ones to the list. Only five made their debut in '03-'04, and none of them were "ordinary" marine birds. At this point, all species from the 1st Edition of *Beached Birds* have been recorded. In fact, even two of the fifteen species added in the 2nd edition have materialized—the Parasitic Jaeger and Heermann's Gull.

Of the five new species this year, two were waterfowl: a single Common Goldeneye and a pair of American Wigeon. This brings the total number of duck and geese species recorded by COASST—but *not* included in the field guide—to seven; a signal that we may have to consider additional waterfowl entries in future editions.

Our master list also continues to expand as some of the more common landbirds make appearances. So far, we've added eight that don't appear in *Beached Birds*. COASST documented its first thrush, an American Robin, at Discovery Park in February. Two months later, Mary Goff photographed a gorgeous pair of Varied Thrush wings at Twin Harbors. Perhaps the biggest surprise came in September, when COASST's first woodpecker washed up on the Long Beach Peninsula. The addition of Red-breasted Sapsucker establishes a brand new foot-type family for COASST: 4 Free, 2 Forward, and 2 Backward-facing toes

Beached Birds Identified to Species

SPECIES	YR 5 #	YR 5 %	YR 5 % (Adjusted)	YR 4 %	YR 3 %
Northern Fulmar	**1536**	**57.0**	**25.0**	**23.6**	**8.5**
Common Murre	**480**	**17.8**	**31.0**	**24.0**	**26.1**
Large Immature Gull	**207**	**7.7**	**13.4**	**10.1**	**17.9**
Glaucous-winged Gull	**55**	**2.0**	**3.6**	**3.3**	**3.2**
Pelagic Cormorant	35	1.3	2.3	2.6	1.3
Brandt's Cormorant	32	1.2	2.1	2.0	2.6
Cassin's Auklet	28	1.0	1.8	1.5	2.1
Rhinoceros Auklet	27	1.0	1.7	1.3	1.9
Western Grebe	**26**	**1.0**	**1.7**	**2.9**	**7.2**
Sooty Shearwater	**24**	**0.9**	**1.6**	**2.1**	**7.4**
Western Gull	23	0.9	1.5	1.8	2.4
Surf Scoter	19	0.7	1.2	1.6	0.5
Double-crested Cormorant	17	0.6	1.1	0.6	0.5
California Gull	13	0.5	0.8	1.3	1.8
Pigeon Guillemot	13	0.5	0.8	0.9	0.2
White-winged Scoter	13	0.5	0.8	0.9	1.0
Caspian Tern	11	0.4	0.7	0.8	0.6
Red Phalarope	**11**	**0.4**	**0.7**	**10.6**	**0.3**
Common Loon	10	0.4	0.6	0.3	0.5
Fork-tailed Storm-Petrel	8	0.3	0.5	0.1	0.5
Mallard	8	0.3	0.5	0.2	0.3
American Crow	7	0.3	0.5	0.2	1.0
Black-footed Albatross	6	0.2	0.4	0.4	0.8
Black-legged Kittiwake	6	0.2	0.4	0.4	1.8
Heermann's Gull	6	0.2	0.4	0.4	0.3
Northern Pintail	6	0.2	0.4	0.2	0.3
Red-necked Grebe	5	0.2	0.3		0.2
Brown Pelican	4	0.2	0.3	0.4	0.3
Canada Goose	4	0.2	0.3	0.4	0.5
Rock Dove	4	0.2	0.3	0.1	
Short-tailed Shearwater	4	0.2	0.3	0.4	1.3
Ancient Murrelet	3	0.1	0.2	0.2	0.5
Bufflehead	3	0.1	0.2		0.3
Herring Gull	3	0.1	0.2	0.3	0.3
Leach's Storm-Petrel	3	0.1	0.2		0.5
Tufted Puffin	3	0.1	0.2		0.3
American Wigeon	2	0.1	0.1		
Bald Eagle	2	0.1	0.1	0.1	0.3
Buller's Shearwater	2	0.1	0.1		
Greater Scaup	2	0.1	0.1	0.2	0.2
Horned Grebe	2	0.1	0.1		0.2

SPECIES	YR 5 #	YR 5 %	YR 5 % (Adjusted)	YR 4 %	YR 3 %
Pacific Loon	2	0.1	0.1	0.9	0.6
Red-breasted Merganser	2	0.1	0.1		0.2
Sanderling	2	0.1	0.1	0.1	
American Coot	1	0.04	0.1		0.6
American Robin	1	0.04	0.1		
Band-tailed Pigeon	1	0.04	0.1	0.1	
Barred Owl	1	0.04	0.1	0.1	
Black Oystercatcher	1	0.04	0.1		0.2
Black Scoter	1	0.04	0.1	0.1	0.2
Bonaparte's Gull	1	0.04	0.1	0.1	
Common Goldeneye	1	0.04	0.1		
Glaucous Gull	1	0.04	0.1		0.2
Great Blue Heron	1	0.04	0.1	0.1	
Green-winged Teal	1	0.04	0.1	0.1	
Marbled Murrelet	1	0.04	0.1	0.2	0.8
Mew Gull	1	0.04	0.1	0.2	0.8
Red-breasted Sapsucker	1	0.04	0.1		
Red-throated Loon	1	0.04	0.1	0.2	0.3
Ring-billed Gull	1	0.04	0.1	0.1	0.2
Varied Thrush	1	0.04	0.1		
Black-bellied Plover				0.1	0.2
Brant Goose				0.1	0.2
Chicken				0.1	
Common Merganser				0.1	
Dunlin				0.1	0.2
European Starling				0.1	
Franklin's Gull				0.1	
Lesser Scaup				0.1	
Marbled Godwit				0.1	
Parasitic Jaeger				0.1	
Pink-footed Shearwater				0.1	
Whimbrel				0.1	
Clark's Grebe					0.2
Greater White-fronted Goose					0.2
Mottled Petrel					0.3
Ring-necked Pheasant					0.3
Western Sandpiper					0.2
TOTAL	**2,696**				

Species totals, excluding unknowns and refinds. Year 5 % (Adjusted) reduces fulmar numbers to the three-year average of 25%. Note that major species—accounting for greater than 5% in any year—are in bold type.

(aka, "zygodactyl" for the ornithologists out there). Its coloration and back pattern suggest that it belongs to the northern form, *Sphyrapicus ruber ruber*, rather than the California type, *daggetti*.

Conservation Concerns

Seventeen species, comprising almost one quarter of this year's carcasses, are of conservation concern. For more on the conservation categories (what's a *Candidate*, compared to designations like Endangered and Threatened), please refer to the Species Profile on page 18. This year, we've also included members of the National Audubon Society's WatchList in our Species of Concern Table on page 8. Like the state and federal registers, the Audubon list attempts to provide scientists and the public with an early-warning system that identifies species at risk. The WatchList synthesizes assessments by Birdlife International and Partners In Flight to convey different species' vulnerability to extinction at the global and national level, respectively.

As usual, the alcids—Common Murres, Cassin's Auklets, and Tufted Puffins—accounted for about 80% of the conservation concern total. Murre numbers increased absolutely by more than 30% over last year (338 to 480). Even accounting for the increase in survey effort, there was still a 15% relative rise. The juvenile-to-adult ratio over the whole program didn't change much (50:50 in

'02–'03 and 45:55 in '03–'04), therefore the increase isn't due to a glut of young-of-the-year birds. However, there was a spike in murre numbers along the North Coast in September—probably the Oregon colony denizens migrating north and into the Strait of Juan de Fuca for the winter.

The Species of Concern showing the largest increase from last year was the Common Loon. COASSTers found ten, more than doubling counts from the prior two years. Seven of those occurred in inshore waters—a surprising number for this low-deposition area. On the brighter side, Western Grebes dropped by almost 40%. Hopefully, this is an indication that grebe mortality is dropping, and not that grebe populations are smaller.

Species of Concern

SPECIES	WA	OR
Common Murre [10]	325	155
Brandt's Cormorant [10]	15	17
Cassin's Auklet [3,10]	18	10
Western Grebe [10]	22	4
Common Loon [8]	8	2
Fork-tailed Storm-Petrel [9]	6	2
Black-footed Albatross [11]	4	2
Heermann's Gull [11]	3	3
Brown Pelican [1,4,5]	2	2
Bufflehead [9]	3	
Tufted Puffin [3,10]	3	
Bald Eagle [2,6,7]	2	
Buller's Shearwater [11]	2	
Horned Grebe [9]	2	
Band-tailed Pigeon [11]	1	
Black Oystercatcher [11]	1	
Marbled Murrelet [2,6,7,11]	1	

Federally Endangered (1), Federally Threatened (2), Federal Species of Special Concern (3), WA State Endangered (4), OR State Endangered (5), WA State Threatened (6), OR State Threatened (7), WA State Sensitive (8), OR State Sensitive (9), WA State Candidate (10), Audubon WatchList (11)

An entangled Common Murre chick.

Shelley Hall and Bill Ritchie

Oil and Entanglement

Fortunately, COASST continued to document relatively few oiled and entangled birds on Northwest beaches. The totals were three and 13, respectively. While the numbers were low, nearly one third of the entanglements involved Common Murres and Western Grebes—both species of conservation concern—showcasing this group's vulnerability to anthropogenic stressors.

The Northwest's largest oil spill in '03–'04 (4,800 gallons) occurred near Point Wells, Puget Sound in late December. Despite having five sites within 20 km of the spill, COASST found no oiled dead birds. However, personnel from Discovery Park did recover two live, oiled grebes on the Discovery Park North site in January. If we include these recovered grebes in our calculations (assuming that they may well have died on the beach and been found by COASSTers), deposition for the five near-spill sites in January 2004 was about double that of all Puget Sound sites in the same month (0.5 birds per km versus 0.3 birds per km). Is this a spill effect, or a "site" effect? After all, both Discovery Park sites seem to attract higher numbers of birds than many of the other Puget Sound sites. To check, we compared just the spill sites in January 2003 versus January 2004. After adjusting for interannual differences, we found no difference in these rates. Therefore, we conclude that although our "near spill" sites saw an elevated deposition relative to other places in the Sound, this was NOT a spill effect, but a site effect. Many thanks go to the region's volunteers for nearly quadrupling their survey frequency in the weeks following the spill, allowing us to better quantify the spill's impact.

Mortality Related to Human Activities

SPECIES	TOTAL	BEACH (# FOUND)
OILED BIRDS		
Ancient Murrelet	1	Ocean Park South
Double-crested Cormorant	1	North Jetty
Large Immature Gull	1	Twin Harbors
ENTANGLED BIRDS		
Common Murre	3	Sand Point North [1]
		Marine View Drive [2]
		Rialto Jetty [2]
Pelagic Cormorant	2	Hobuck Beach [2]
		OR Mile 286 [2]
Northern Fulmar	2	OR Mile 300 [2,3] (2)
Large Gull	5	Locust Ave South [4] (2)
		Island View Beach [1]
		Copalis Rocks [2]
		Agate Beach [2]
Western Grebe	1	Agate Beach [2]

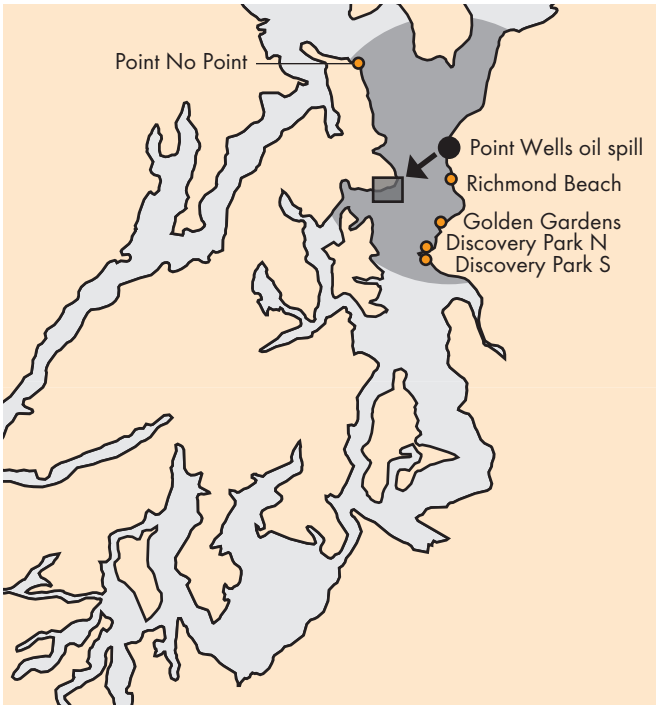
Hook (1), Line (2), Net (3), Plastic (4)

Major Species

In contrast to last year, no minor players entered the majors (defined as 5% or more of the total). Remember the phalaropes' climb from #36 to #3 in '02–'03? Instead, as we've come to expect, COASST's typical top three—murres, fulmars, and gulls—remained at the top, with a simple re-shuffling of their rankings. But don't let the rankings fool you, there *were* more birds out there—and almost *all* of the "extras" were Northern Fulmars.

In our analyses each year, we scrutinize the relative percentages that different species contribute to the total count of birds and compare that to the percentages from previous years. This approach allows us to standardize for counting effort and compensate for COASST's considerable growth from year to year. However, the overwhelming preponderance of fulmars this year makes it hard to make the same cross-year comparisons. If we examine the shifting trends in percent composition between years, the *relative* contribution of the less common species (*i.e.*, anything besides fulmars) will probably appear to have fallen off in '03–'04, simply because fulmars are swamping the total.

To compensate, our species table (pages 6–7) provides two breakdowns: one that includes fulmars in the total, and one that *reduces* their numbers to the average over the last three years (25% of the total). With fulmars adjusted, our total carcass count for the year drops to 1,546, very close to last year's total of 1,405. In fact, if we adjust for last year's Red Phalarope wreck (by subtracting 140 of the 150 carcasses recovered, bringing this species back down to "normal"), this year's adjusted total is only about 20% higher than last year—exactly paralleling the 20% increase in survey numbers. But there is one more twist; almost all of the increase in survey effort came in the low deposition inside regions of the San Juans and Puget Sound. Thus, these numbers



The darker gray area depicts a radius of Puget Sound waters found within 20 km of Point Wells. Most oil washed ashore on the Doe-kag-wats marsh (rectangle) in Kitsap County.

(20% increase in birds and 20% increase in surveys) actually *don't* match. Even accounting for the fulmar wreck, it looks like more birds, on average, washed up relative to last year.

What's most amazing is how "typical" this year was in terms of who landed on the beach. With only minor adjustments, the distribution of Year 5 adjusted percentages is virtually identical to last year. As mentioned, murres were up a little, as were Large Immature Gulls (from 10.1% last year to 13.4% this year). However, juvenile gulls constituted almost 18% of the total in '01–'02. Therefore, this year's uptick is well within the previously determined range. Even the host of minor species fell pretty much in line with previous trends in relative abundance. In sum, with the exception of the fulmar wreck, '03–'04 was a typical COASST year, helping us determine the baseline against which unexpected mortality spikes can be assessed.

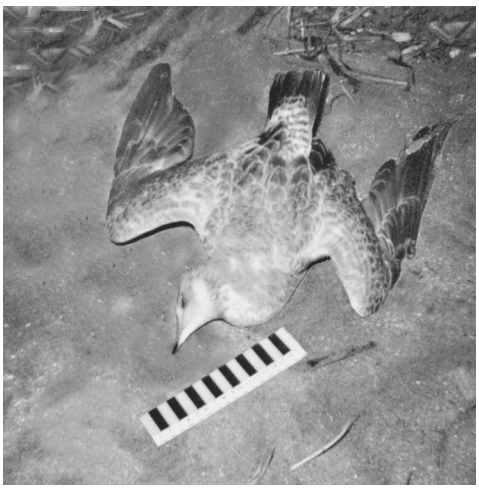
Deposition Rates

COASST characterizes a site's average deposition by adding up all the new finds plus the refinds discovered in the same month, and dividing by the number of surveys to give us "average new finds per survey." Then we divide this figure by the beach length—each is different—to get new finds per kilometer for each individual site. This measurement is actually an *index* of deposition, an approximation of how many birds per kilometer, on average, would be found on any given survey month, rather than a deposition rate. This is an *important* point; it means we can't assume the index is the number of birds washing up on the beach each month. That number—carcasses per month—is only obtainable from repeated daily surveys. However, we can use our monthly deposition index to compare across regions, as well as to compare across years within a region. We can also make some assumptions about rate of beaching and persistence in order to bracket a likely range of total annual deposition.

The most obvious trend on this year's graphs (facing page) is the continuing disparity between outer coast and inside waters deposition: high on the outside where many species of birds breed, forage, and migrate; and depressed on the inside where human activities and disturbance are much higher. Note that the Y-axis scale on the outer coast graphs is *ten times* the value on the inside waters graphs. The second pattern to notice is the elevated beaching during the fall and winter months, clearly visible in all of the outer coast sites, and even discernible in the Strait of Juan de Fuca. A large part of these elevated numbers is due to the fulmar wreck (see Focus on Fulmars on page 14), but there were other birds washing up as well. For instance, in the North Coast, the spike in September is due to murres and gulls, *not* to fulmars.

Because COASST has multiple years of data, we can also look at inter-annual patterns. For these analyses, we restrict the comparisons to the outer coast regions, as deposition is too low (and variation is too high) to pull out clear patterns in the inside waters regions. Also, we only use data from regions in which multiple beaches were surveyed during every month of the year. As a result, our dataset is three years old in the South Coast—the first region to initiate COASST surveys—and two years old in Oregon and the North Coast. We use the data in two ways: to compare the annual beaching index (the sum of the average monthly indices over all 12 months, by region) from year to year; and to look for consistent seasonal patterns across years and regions.

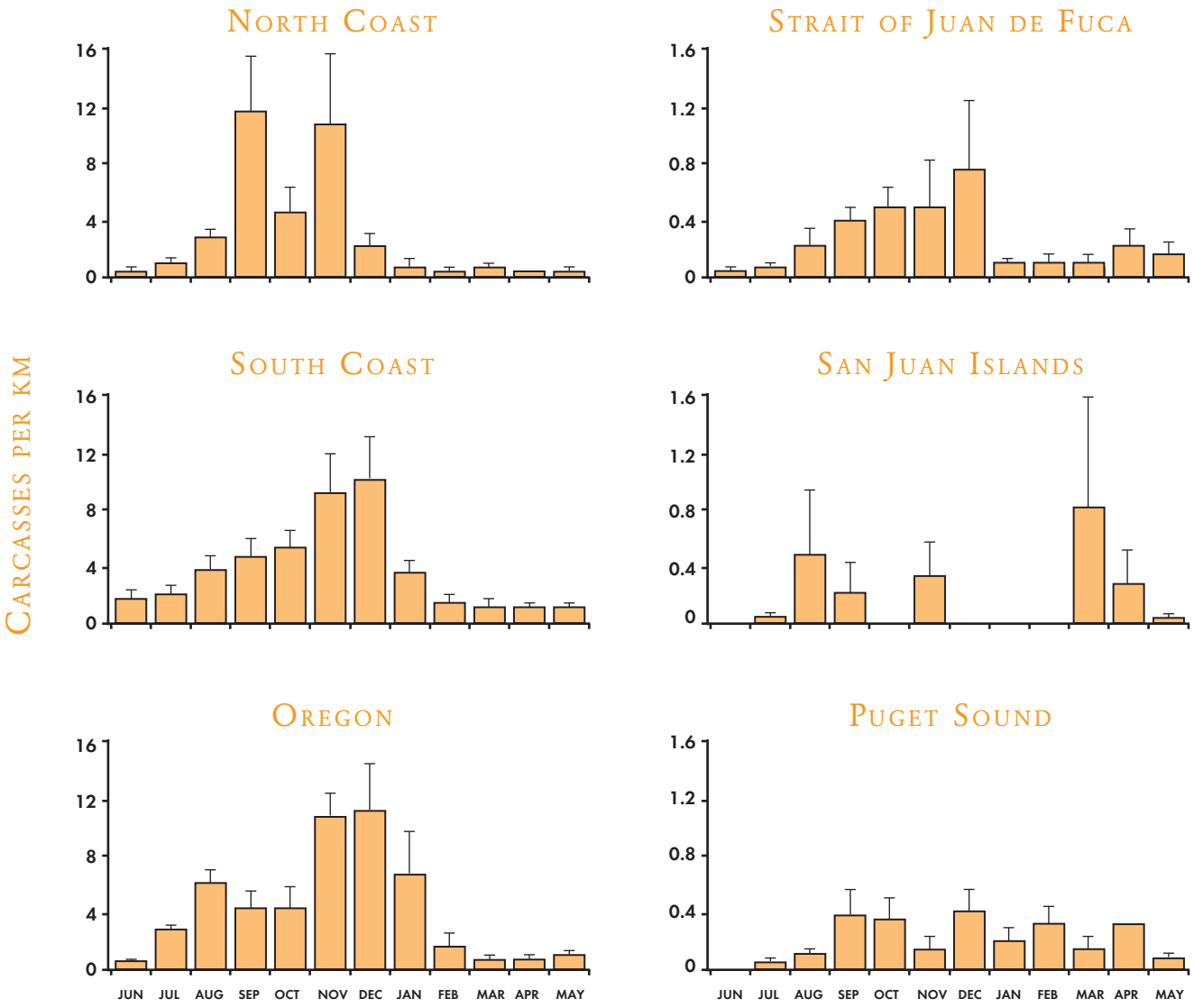
Across all three outer coast regions, annual beaching was much higher this year than last. The North and South Coast beaches captured an additional 17–20 carcasses per km during '03–'04. Oregon beaches saw almost 25 additional carcasses this year. In the South Coast, where we have three years of data, the story is



Wilma Sale and Edi Leonard

Large immature gulls make the COASST major species list every year.

Deposition Rates by Region



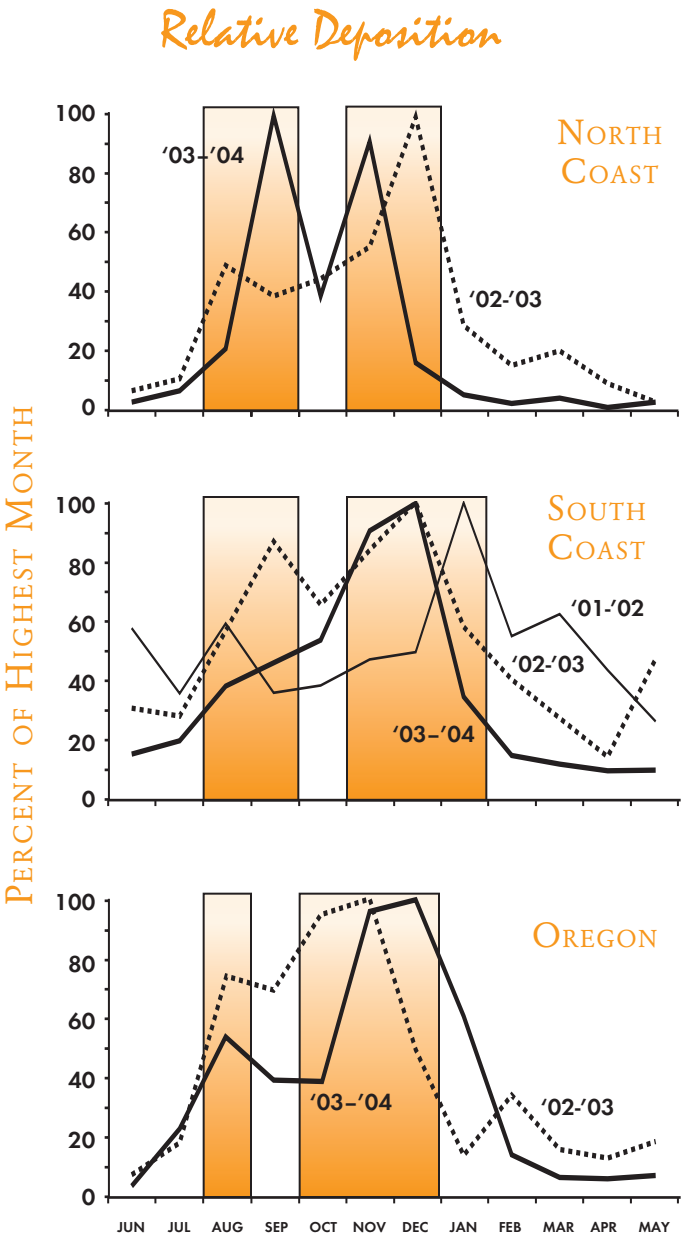
COASST's outer coast beaches showed higher deposition rates than ever (left side), and exceeded inshore levels tenfold (right side). Error bars represent one standard error.

more disturbing. The annual deposition index in '02–'03 was approximately eight birds per km higher than in '01-'02, suggesting that more birds are washing in every year. We're sure this increase isn't an artifact of the way we collect data or the increasing proficiency of our volunteers, but instead reflects real trends in beaching rates.

Another way to compare inter-annual patterns is to examine the relative timing and amplitude of deposition peaks within and across regions. To do this, we take each region in each year, and rescale deposition on a percentage axis as you can see on the graphs on page 12. The peak deposition month in each region–year becomes 100%, and all other months will be somewhat, to a lot, less. For instance, in '03–'04 Oregon's peak deposition month was December (11.0 carcasses per km). Rescaling this as 100%, the November value (10.6 carcasses per km) becomes 96% of that, and the low in June (0.4 carcasses per km) squeaks in at just over 3%. The process is repeated for each region and year. Thus, even though the 4.8 carcasses per km Oregon "peak" in

November of '02–'03 may be much lower than the 11.0 peak this year, it also gets rescaled to 100% *for that year*. This type of standardization allows us to ask questions about the timing of peaks and troughs without worrying about their relative size across years.

Plotted in this way, the data from each region show very consistent patterns. First, deposition is higher in the fall–winter and lower in the spring–summer. The fall–winter deposition is further divisible into two peaks shown as shaded boxes on the graphs (at left): one in early fall (August–September), and the other in late fall–early winter (mostly November–December). The month(s) in which the spikes occur varies from year to year and region to region; however, both spikes are *almost always present*.



What do they represent? The first peak coincides with post-breeding mortality—the dieoff of young and adult birds as they disperse from breeding colonies. Murres, gulls, and other coastal breeders make up much of this peak. In Oregon, this peak is often earlier than farther north, because coastally breeding seabirds finish several weeks earlier there. The later, and usually *taller* peak, reflects another type of dieoff, termed winterkill. Unlike post-breeding mortality, winterkill involves local breeders as well as species that are transiting into our waters for the winter—like fulmars, phalaropes, shearwaters, and albatrosses.

One specific phenomenon often associated with winterkill is a wreck—a massive mortality event usually restricted to a single species or localized in time and space. Since we started, COASST has witnessed wrecks of Rhinoceros Auklets ('99–'00), Northern Fulmars ('00–'01; '03–'04), Common Murres and immature gulls ('01–'02), and Red Phalaropes ('02–'03). Although we cannot predict exactly where or when any species will wreck, COASST *can* anticipate a period of elevated mortality every fall or winter. Increasingly severe or prolonged wrecks, exemplified by this year's fulmar dieoff, are largely responsible for the year-to-year elevation in deposition reported above.

What precipitates a wreck? Bad weather, poor body condition, and changing food availability are likely causes. Even harmful algal blooms have been blamed. We can't intuit the cause of every pulse of mortality. What we can say is that wrecks appear to be getting worse.

Annual Estimated Deposition

Because COASST surveys a subset of all Pacific Northwest beaches, we can use our data to extrapolate the total number of beached carcasses for the

coastline. To estimate how many birds washed up on Pacific Northwest beaches, we've omitted COASST beaches that were surveyed in fewer than nine months this year (about 40% of surveyed beaches) to reduce any bias. Although many of the sites were omitted simply because they were added to our roster in the past six months and could not, by definition, qualify for inclusion—others had to be disqualified due to inconsistent coverage. We hope to bring the excluded percentage way down next year!

To estimate the total carcasses washing ashore, we aggregate all beaches of a similar substrate type—sand, cobble, rock, mud, man-made—and calculate an average number of carcasses per kilometer for each month. We pay attention to substrate because last year's analysis (and this year's) suggests that different beach types collect beached birds at different rates. Once we have a monthly, substrate-specific average, we simply multiply by the number of kilometers of that substrate type in that region (data provided by the Washington Department of Natural Resources).

Unfortunately, COASST doesn't have beaches that cover all of the substrate types found in multiple-substrate regions. Rather than "erase" those kilometers from our calculations, we use the overall average across the region as an estimate. For example, in the North Coast, COASST beaches have sandy or cobble substrate, but not rock or mud, the two additional substrates in the region. Throughout the region, sandy beaches predominate (104 km), followed by cobble beaches (27 km), and all others (39 km). In August, our index of carcass deposition was 2.5 on sand and

Annual Carcass Deposition by Region

REGION	SUBSTRATE	# OF COASST BEACHES	KM	LOWER BOUND[1]	UPPER BOUND
Oregon	sand	10	480	59,118	105,754
South Coast	sand	12	84	8,361	16,416
	other		6	612	1,236
North Coast	sand	17	104	7,274	16,450
	cobble	1	27	1,242	1,478
	other		39	2,256	4,136
Strait of Juan de Fuca	sand	12	161	516	2229
	cobble	6	112	291	1,256
	rocky	4	33	155	668
	other	1	23	81	348
San Juan Islands	cobble	11	69	269	1,163
	rocky	1	160	0	0
	mud	1	11	7	29
	other	7	112	168	726
Puget Sound	sand	13	604	1,148	4,961
	cobble	14	196	411	1,774
	man-made	1	99	376	1,625
	other		305	793	3,426
ESTIMATED TOTAL				**83,077**	**163,673**

[1] with adjusted Northern Fulmar numbers

7.5 on cobble. So, our regional deposition is 658 carcasses:

sand:	2.5 birds/km x 104 km	=	260 birds
cobble:	7.5 birds/km x 27 km	=	203 birds
rock & mud:	(2.5 + 7.5)/2 =		
	5 birds/km x 39 km	=	195 birds

Then it's only a matter of adding things up across regions.

The final figure needed for our calculations concerns how often birds are washed onto shore. The answer could be daily, weekly, or monthly, and depends on geographic, physical, and temporal factors. COASST is working diligently toward a better assessment of this value, but we'll have to wait a few years until we can conduct daily surveys over all major beach types, regions, and times of year. For now, we simply assume a range, as follows.

The conservative, or low end, estimate assumes that carcasses arrive infrequently and stay a long time—in this case monthly. Thus, the deposition index becomes the monthly rate. Yet we know that the monthly index is bound to be an underestimate because COASSTers often find new carcasses during subsequent surveys in the same month. So, our upper bound must assume a more frequent deposition rate. We've chosen weekly, or just over four times the monthly index value. Using these low and high deposition rates, and adjusting for wrecks where deposition is more frequent, we obtain an estimate between almost 83,000 and 164,000 birds washing up in Washington and Oregon for the year. Using the same rules (substrate-specific deposition indices, bracketing deposition as monthly to weekly, adjusting for the phalarope wreck), last year's projection would have fallen between 72,000 and 119,000 birds, roughly three quarters of this year's total.

A Focus on Fulmars

As most of you know, fulmars belong to the group of birds known as tubenoses. Members of this group are long-lived birds of the open ocean, and are typically found many miles from shore. While fulmars are rarely seen from dry land, hundreds can be viewed on pelagic birdwatching trips off the Pacific Northwest coast. The species is gregarious at sea, and assembles in huge numbers around fishing vessels where processing discards provide a free lunch. Given this habit, it's no surprise that the species otherwise obtains its food by seizing prey at the water's surface or scavenging on floating carrion rather than by diving for fish like murres or cormorants.

As its name implies, the Northern Fulmar is a bird of the high latitudes. The Pacific population, numbering in the millions, breeds on islands from northern British Columbia to Alaska. After the nesting season concludes, the species wanders southward from its arctic haunts. The first wave of fulmar deposition detected by COASST this fall started in October and extended from the north coast of Washington through Oregon (see graph at

Susan Clark

Photos of multiple fulmars became the norm on many beaches as observers tried to conserve time and film.

right). Farther north, according to Tasha Smith, Project Coordinator for the British Columbia Beached Bird Survey, there was no fulmar spike at all. However, by November, the dieoff in COASST territory was truly extraordinary, with all three outer coast regions reporting eight to nine birds per km. In Oregon and southern Washington, deposition continued at or above this pace through the month of December, finally tapering off in January.

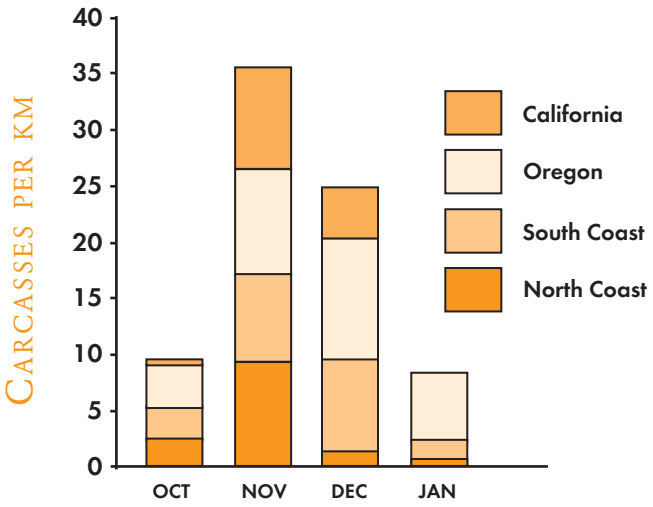
This noteworthy wreck extended south of our reach as well. Beached bird surveys conducted by two California programs, BeachCOMBERS, associated with Moss Landing Marine Laboratories and the Monterey Bay National Marine Sanctuary, and BeachWatch of the Gulf of the Farallones National Marine Sanctuary, also documented peak deposition in November, recording more than 12 and five fulmars per km, respectively. In "normal" years, the programs record far fewer than one fulmar per km each month. October deposition in California showed no hint of the fulmars to come, and by December, deposition had begun to decline. January information was not available.

With the help of California Department of Fish and Game, BeachCOMBERS volunteers collected 186 fulmar carcasses from Monterey Bay beaches and dissected them to determine cause of death. They found that 96% were young-of-the-year (aka, juveniles in our lingo). Nearly all were grossly underweight and possessed atrophied flight muscles and no fat—indications of poor body condition and starvation as the cause of death.

To the north, in Clatsop, Oregon, COASST volunteer Mike Patterson aged another 46 individuals by molt pattern. At least 85% of these birds appeared to be juveniles as well. If disease had swept through the population, both adults and juveniles would likely have been affected. If the cause of mortality was ocean-derived, such as poisoning from a harmful algal bloom (a red tide), it is likely that many more species would have been affected.

Therefore, because this mortality event principally affected juveniles, and only fulmars, we suspect that these youngsters were in poor shape coming into the Pacific Northwest, and just couldn't gain the weight necessary to make it through the late fall and winter.

Northern Fulmar Deposition



Pronounced deposition of Northern Fulmars was sustained for nearly three months in Oregon, about two months along Washington's South Coast and California, and for just over one month on Washington's North Coast.

So, how bad was it—how many fulmars died? Like previous fulmar wrecks documented in 1976 and 1995, this one was truly big. But unlike in past events, beached bird surveys were in prime position to quantify it—temporally, geographically, and with regard to affected populations. Adding up the numbers, COASST estimates that about 63,500 fulmars washed up on outer coast beaches in Oregon and Washington between October and January.

Like last year's phalarope mortality assessment, our extrapolation rests on several considerations and assumptions. First, we used only the outer coast beaches that were surveyed during the fallout months, October through January. We didn't take substrate or orientation into account, because nearly all beaches are sand and almost all beaches face west (unlike in the Strait, San Juans, or Puget Sound where orientation is quite variable). Finally, we multiplied these values by the number of kilometers within each region.

But how often did the fulmars wash in? Once a month (the COASST standard deposition index), once a week, or every day? Last year we estimated that Red

The four major Northern Fulmar colonies in Alaska.

Phalaropes were coming in daily during the height of the wreck, mainly based on carcass size, freshness, and a two-day survey event in November. Fortunately, several COASST beaches were surveyed four times per month in November–December this year, helping us to examine how frequently pulses of fulmars came in, and how long the carcasses stayed around. So, what *can* we learn from the near-weekly surveys at South Coast sites Copalis Rocks and Twin Harbors? In November, lots of new birds appeared on each weekly visit. By December, observers were still finding several new birds on each visit but the proportion of refinds had grown, indicating that the 'rain' of fulmars was slowing.

Overall, November had nearly identical, heightened deposition indices for all three regions, so we elected to assume weekly deposition for this month. By December, the deposition index was still very high in the South Coast and in Oregon, but down to more "normal" levels in the north. Therefore, we assumed monthly deposition along the north coast, and weekly deposition to the south. After the new year, deposition was only elevated in Oregon, and even that was declining (10.6 fulmars per km in December versus 5.6 per km in January). Therefore, we split the difference and multiplied the January Oregon total deposition by two (assuming bi-weekly deposition). To be conservative, we used monthly deposition for all other months in our calculations.

All of this calculation and multiplication adds up to 63,500 fulmars. Actually, we think our estimate is probably low, because birds beached more often than weekly at the height of the wreck and seemed to disappear quickly—especially on those outer coast beaches where wind-blown sand can quickly cover a beached bird. It's also true that we didn't include the California data, because we have much less information about the extent of the wreck there, so the real beaching total is bound to be higher. Finally, it's certainly true that many fulmars died at sea and never washed in.

What does this mean for fulmars? With a population numbering in the millions, and fulmars' low adult mortality, a one-year spike in juvenile mortality shouldn't pose a threat to the species because the adults will go on to produce young in future years. In other words, once mature, fulmars are like Vulcans—they live long and prosper. As we've seen before in murres and phalaropes, some years aren't too kind to young or delicate birds trying to find limited food resources at sea.

However, with fulmars, we have an additional piece of information to let us guesstimate area of origin. Fulmars occur in a continuum of color types, or "morphs," from dark gray to nearly all white, a genetically determined trait that doesn't change with age. Researchers have studied the proportions of light and dark morphs breeding in various Alaskan regions to see if there are differences between populations. In fact, the regional differences are stunning. Nearly 100% of the Bering Sea's breeders are light morphs, whereas nearly all of the Aleutians' fulmars are dark.

What did *we* find? Of the hundreds of fulmars confirmed with good photos, 85% were dark and 15% light. California biologists documented a similar proportion. Does this mean that we saw almost nine Aleutian birds for every Bering Sea individual? Probably not…another significant population of fulmars occurs in the Gulf of Alaska and is known to disperse to our waters. That population's stronghold lies in the Semidi Islands, where 440,000 birds nest annually. There, dark morphs constitute 85% of the population and light morphs 15%. What a coincidence! Given that no other colonies in the Gulf of Alaska number in the thousands, and that

none of the populations to the north or west is known to winter at our latitude, the evidence suggests that the bulk of our fulmars probably came from the Semidis.

According to Scott Hatch of the US Geological Survey in Alaska, the fulmars' breeding effort in the Semidis was no more (or less) successful than usual in 2003. Assuming that reproductive success was about normal this year (a 37% average fledging rate per pair according to Scott), 220,000 pairs would have raised 81,400 young.

Roughly nine out of ten beached fulmars were young-of-the-year, so we estimate that more than 57,000 juveniles beached in Washington and Oregon. Although this estimate doesn't include the birds that must have sunk before reaching shore, or the masses beaching in California—its sheer magnitude suggests that the fall's offshore conditions probably erased all of the Semidis' breeding success for the year, and that some of these individuals probably came from Aleutian Islands colonies as well. It's definitely a serious dip, but fortunately not crippling to a long-lived population that appears otherwise healthy.

Shelly Ross

Rotating Beach Club

Sign up for a rotating beach to see the wilds of the North Coast! From Cape Flattery, the northwestern-most point of the contiguous US, to Copalis River, 135 miles to the south, is the North Coast region of COASST and part of the Olympic Coast National Marine Sanctuary.

The rugged and remote beaches in this region are exposed to the Pacific Ocean and many have beautiful vistas of sea stacks and crashing waves. The area abounds with wildlife—more than 29 species of marine mammals and 100 species of marine birds. It is not uncommon to see gray whales, sea otters, peregrine falcons, bald eagles, and several species of seabirds while walking the beach. Sound good?

Because the North Coast is a long distance for many of you to travel (~five hours from Seattle and two hours from Port Angeles), COASST would like to pilot the concept of a "Rotating Beach," allowing volunteers to conduct only two remote surveys per year. For every six pairs taking on this schedule, COASST would gain an additional beach on the North Coast. We would also like to rotate the beaches so that you survey a different beach each year, providing you the opportunity to view more of the gorgeous sites along the outer coast.

These beaches require hiking just to get to the start of the beach segment and you may want to make it an overnight stay—so we are looking for a hardy bunch of COASSTers to take on this challenge! Beaches will include sites like Ozette, Hoh River–Diamond Rocks, Chilean Memorial, Goodman Creek, Wedding Rocks, Hole in the Wall, and Point Grenville.

If you are tempted, contact Mary Sue Brancato at *mary.sue.brancato@noaa.gov* or (360) 457-6622, ext 20.

Species of Concern Profile: Western Grebe

Western Grebes, noted for their striking black and white plumage and dazzling courtship displays, are getting unfortunate attention for their dramatic population decline along the west coast. They are one of several COASST species considered a *Species of Concern*, the broad title encompassing both state and federal lists of species in trouble.

Species can be "listed" at the federal level as endangered or threatened. A listed species is given special protections on federal land (beyond those given to all migratory birds)—disturbing, harming, or killing individuals is illegal without special permits. However, making it onto the list is an arduous process. It means that extensive research into declining population trends has been conducted and then vetted by the relevant stewardship agency. For birds, that's the US Fish and Wildlife Service. In many cases, an official listing comes only after catastrophic population declines. There is also a tremendous backlog—more than 200 species are currently candidates for listing at the federal level. Most states also have their own endangered, threatened, and candidate lists, as well as additional listing levels, including the category "sensitive." The Western Grebe is a State Candidate Species for Listing in Washington.

The largest of our local grebes, Westerns winter along the coast in large flocks from southern British Columbia to central Mexico. During the spring, they migrate to freshwater wetlands where they breed in dense colonies. Grebe nests float (!) and are constructed by the parents out of plentiful aquatic vegetation. After hatching, chicks regularly climb on their parents' backs to rewarm themselves after exposure to the water. With sinuous necks and long bills, these piscivorous birds are well adapted for spearing small fish such as smelt, perch, and even juvenile salmon.

Dennis Paulson

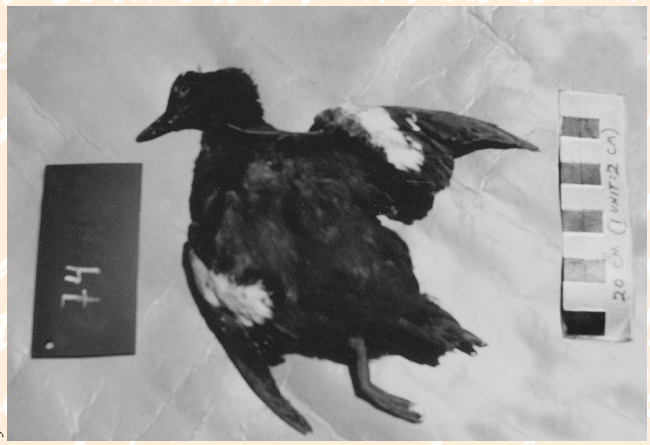
Since our surveys began in 1998, the Western Grebe has always been in the COASST top 10, cresting at 7% of the total identified carcass count in '01–'02. Unlike some species, such as murres, gulls, and fulmars that are documented frequently because of their relative abundance as live birds, finding Western Grebes on our top 10 list is alarming because the species is in severe decline in Washington, Oregon, and California. Declines of Western Grebes have been documented on their wintering grounds, particularly in the Puget Sound region where the Puget Sound Ambient Monitoring Project (PSAMP) and Washington Sea Grant Program have reported 71–95% declines in abundance indices since the 1990s. Significant nest loss and declines of up to 50% have also been documented at breeding colonies in California, Oregon, and British Columbia.

Why the low numbers? Western Grebes have had their share of interactions with humans. During the late 1800s, declines were the result of avaricious egging and feather hunting, which fell out of fashion by the 1900s. By 1950, significant dieoffs were attributed to pesticides. With the publication of Rachel Carson's *Silent Spring*, and the ban on DDT, mortality levels decreased, yet concern is still raised about elevated levels of pesticides and heavy metals in eggs. These days, most studies implicate habitat disturbance and loss as key threats to grebe populations. Unstable water levels (caused by high water use) leave nests high and dry during critical nesting periods. Recreational boating and other human-related disturbances cause parents to flush off eggs and chicks, leaving their young vulnerable to predators.

All told, COASSTers have found 130 Western Grebes, the vast majority from October–March, the post-breeding mortality and winterkill months. Because almost all of them were found on the outer coast, we cannot rule out the possible population effects caused by stressors in wintering habitat as yet another factor affecting this sensitive species. Hopefully, declines in Western Grebe populations can be reversed so that this State Candidate never makes it onto the List.

The ever-popular COASST quiz

A



John Haxton

vital stats

found 7/9/03

Oregon Mile 255

Bill: 31 mm

Wing: 17 cm

Tarsus: 34 mm, red in color

B

Jon Harwood

vital stats

found 12/28/03

Westhaven Beach (South Coast)

Wing: 28 cm

C

Barbara Patton

vital stats

found 5/18/04

South Butterclam (South Coast)

Bill: 34 mm, orange-tipped

Wing: 12.5 cm

Tarsus: 35 mm

answers on page 25

COASST People

Volunteers

For the fifth consecutive year, COASST grew. Surveys were conducted on 111 beaches compared to 89 in last year's report. Our two-page roll of volunteers grew by about 10% over last year, and now boasts 222 people. We had to use less space between lines to squeeze all of you onto the list this year! Our growth was also evident in the increase in total surveys (1,197; up 18%), survey time (3,034 hours; up 17%), and round-trip distance covered (5,770 km; up 16%).

And how did you perform? What else can we say—amazing, amazing accuracy. We're proud to report that volunteers were incredible with species-level identifications this year—even when finding just pairs of wings. The success rate was over 90%! With your measurement data and/or photographs in hand, COASST was able to bring the program's species-level success rate up to almost 97%!

Although some volunteers can only do short surveys because public access to their local beaches is limited, we still value *all* the time and effort you devote to COASST. However, because so many COASSTers exhibited marathon-level achievements across our regions this year, we'd like to point out a few examples. The South Coast's Mary Goff led all volunteers by logging (not *slogging*) 88 km one-way! Wolter van Doorninck of the North Coast and Vic Nelson of Puget Sound didn't lag too far behind, with totals of 79 and 69 km, respectively. In fact, COASST had nine volunteers near or above the 60 km mark—Sue Nattinger and Coleman Byrnes (who pull double-duty on Strait and North Coast beaches); John Epler and Clem Hoerner in the South Coast; and Wayne and Mary Ann Hanson in Puget Sound. In prior years, we've never had more than one person exceed the 60 km threshold—well done, everyone!

It's not surprising that most of the trekkers above also logged big-time hours on the beach. However, there are a number of folks who didn't walk as far and yet recorded much higher hour totals. Why the disparity…? Well, it's usually because people in the

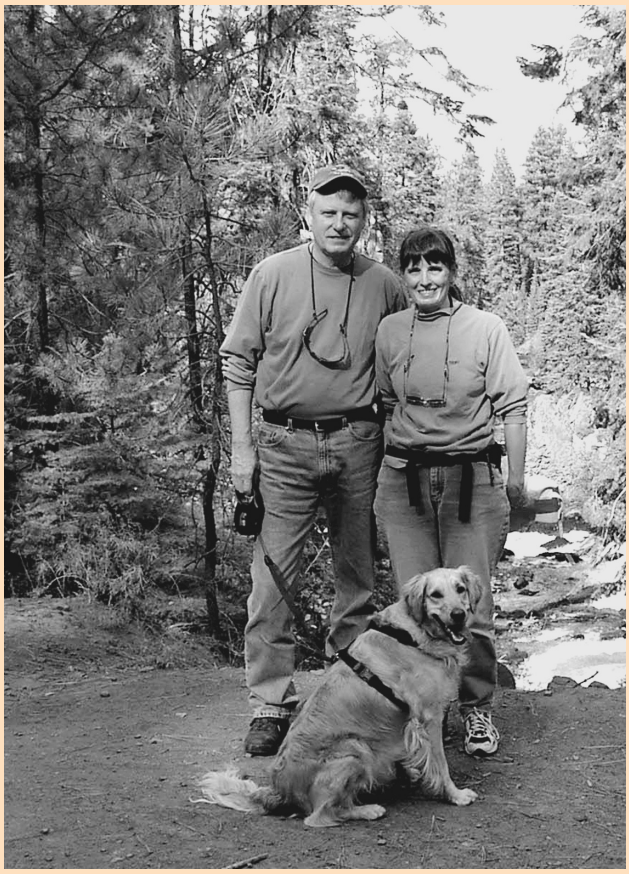
–continued on page 24

Volunteer Spotlight

Debbie and Tom Cox–North Coast

Deb Cox may have worked as an aviation safety inspector for the Federal Aviation Administration (FAA) for many years, but in her college days she was a biology major with an emphasis in ornithology. Deb, who recently retired, said she was first attracted to the COASST program because the "bird aspect allowed me to get back into biology without having to go back to work!" Although she volunteers with other conservation organizations, she has appreciated the opportunity that COASST provides to contribute to a long-term *scientific* effort. She likes the "structured aspect" of COASST—collecting the data, and then seeing it analyzed, and eventually contributing to "the bigger picture" of bird conservation.

Tom Cox, Deb's husband—also recently retired after a 34-year career with the FAA—had to admit that



Sandra Herold

Tom and Debbie Cox with their dog Abbey.

it was Deb's initial interest in COASST that got him going with beach surveys. But now, he says that it was "well worth it!" Both he and Deb appreciate the chance to experience the beauty of the outer coast. Tom says that their COASST surveys "insure that we have a day on the beach at least once a month." They find it relaxing and a good way to enjoy what their community has to offer in terms of natural beauty. Deb and Tom have been surveying Kalaloch North and Ruby Beach each month since November of 2001. To do this, they drive five hours round trip and often camp overnight at the Kalaloch Campground. "Ruby Beach is my favorite," Deb says. "When we get to the end of the beach, turn around and look back, we always say this is a GREAT place."

For the first few months of their COASST experience they didn't find any birds. "We felt like we weren't doing our jobs," Deb lamented. But because they have done their beaches for a while now, they see their own seasonal patterns and realize that they find birds mostly in the fall. By now they have even experienced some larger-scale mortality events. "It can be disconcerting to see dead birds, but on the other hand," Deb says "it is good to know we're helping to figure out long-term patterns."

They have also seen some unusual sights over the years. After one storm, they found more than a dozen Japanese glass floats on the beach, including one greater than 12" in diameter! One down side to their surveys is finding all the garbage, which Deb and Tom pick up as part of their surveys. To them, this is the "scary and discouraging part—where does all this garbage come from?" They find themselves asking, "What can we do as individuals?" For them, volunteering for COASST is a valuable contribution, providing a positive pay off for the environment in the long-term.

Vic Nelson—Puget Sound

Vic Nelson, of Point No Point, began COASST surveys way back in spring 2001 and was our *only* observer in the Sound for almost a year. Though he usually submits two surveys a month, in January, he boosted the count to 13. Why? As he is our only volunteer on the Kitsap

Courtesy of V. Nelson

Vic Nelson at Cape Flattery.

Peninsula, Vic felt it was his "duty to firmly ground the COASST baseline in my home county, where most of the oil from the nearby Point Wells spill washed up." And this is just like Vic—mobilizing, along with his wife Sharon, to contribute daily, post-crisis surveys to ensure COASST develops a strong, rigorously verifiable baseline.

As a former fisheries biologist (specializing in thermal and radiation ecology) at the University of Washington, Vic is accustomed to the often rugged and persistent fieldwork that long-term scientific monitoring requires. For the past 12 years, Vic has conducted systematic counts of Point No Point's *live* seabirds three to four times a month. Over the years, his beach has been a hotspot for birds migrating through on their way to and from Puget Sound. Not only has he documented the annual fluctuations in familiar species like Common Murres and Ancient Murrelets as they pass through, he's also seen incredible rarities like a Magnificent Frigatebird and Black-backed Wagtail. Vic's eventual monitoring goal is "to find a way to merge the live and dead bird datasets."

Last November, he came close—witnessing more than 100 fulmars fly by his beach, and several days later, locating his first fulmar carcass. Vic hopes that by tracking the numbers of live birds funneling between the Kitsap Peninsula and Whidbey Island, we'll be better able to explain the more subtle seasonal (and annual) patterns revealed by the dead birds that wash up farther south in central and lower Puget Sound.

VOLUNTEER*	HOURS	KM
4-H Environmental Club	1.3	0.5
Liam Antrim	6.1	3.1
Ken Arzarian	13.0	27.2
Bill Baccus	8.7	5.3
Phyllis Bales	1.9	1.6
Rob Banes	6.3	4.3
Tracy Beals	3.0	7.3
Katherine Beirne	1.6	1.6
Bryan Bell	1.0	2.0
Carol Bernthal	11.5	27.1
Linda Bierma	36.6	24.0
Beth Bierman	4.8	4.3
Barbara Blackie	29.5	14.4
Paul Blake	24.1	26.8
Chuck Blight	16.7	12.8
Ed Bowlby	19.2	12.4
Jane Boyden	19.4	16.1
Mary Sue Brancato	55.7	29.7
Janet Bruening	25.3	28.4
Kathy Bush	23.9	13.5
Rick Bush	26.2	15.0
Coleman Byrnes	75.1	64.6
Barbara Campbell	39.0	27.6
Betsy Carlson	22.5	38.0
Claire Carlson	0.8	0.8
Ricki Carlson	11.8	14.0
Maxine Centala	37.9	30.6
Anne Chiller	10.3	7.5
Judy Chovan	14.4	7.1
Sam Chovan	0.5	0.3
Gordon Clark	4.8	2.9
Joyce Clark	13.1	8.8
Susan Clark	52.3	40.6
Debra Clausen	20.0	38.4
Jane Comerford	4.1	3.2
Roger Contor	10.3	9.8
Susan Contor	10.3	9.8
Laurel Cook	11.1	8.8
Deb Cox	15.0	13.5
Tom Cox	14.0	11.9
Elaine Cramer	27.5	16.1
Pennie Cramer	4.1	1.6
Bob Davison	2.5	1.6
Joseph Deegan	6.0	7.6
Tristan Delahunt	1.0	0.8
Pam Dick	11.5	6.4
Paul Dinnel	16.7	26.4
Jane Dolliver	20.1	27.2
Carole Elder	2.0	1.0
Martha Ellul	22.6	25.6
John Epler	14.4	59.8
Kym Fedale	12.0	18.0
Rebecca Field	32.3	22.5
Sheila Fiepke	11.1	10.0
Joan Fitzjarrald	2.5	1.6
P. Flanagan	1.8	1.6

VOLUNTEER*	HOURS	KM
Steven Fradkin	2.4	2.1
Colin French	3.5	3.2
Carl Friedericks	9.8	11.3
Ron Frisch	19.6	27.3
Sue Gabriel	23.8	20.9
Carla Geyer	2.1	3.2
Jerry Gibson	17.5	12.9
Gordon Giersch	8.9	4.5
Barbara Giersch	8.9	4.5
Mary Goff	71.9	88.0
Nina Goff	4.8	7.0
Renee Goff	7.0	10.6
Tom Golding	16.0	17.1
Scott Gremel	2.0	2.1
Ron Groves	1.9	1.6
Andy Gruse	11.3	13.5
Guest	40.0	37.4
Shelley Hall	24.8	10.5
Mary Ann Hanson	24.1	60.0
Wayne Hanson	24.1	60.0
Patti Happe	7.9	8.0
Caroline Harding	8.0	9.0
Sandra Harold	4.8	4.7
Jon Harwood	17.2	14.0
Todd Hass	4.0	2.8
John Haxton	14.4	11.3
Kristin Hemmelgarn	1.2	2.5
Clem Hoerner	15.1	62.6
Cat Hoffman	2.8	1.6
Roger Hoffman	5.2	4.8
Trey Hoffner	0.5	0.3
Mary Holbert	5.8	3.2
Martha Holmberg	20.0	12.9
Nancy Houtzel	19.9	11.2
Gay Hunter	1.6	1.6
Ellen Jenkins	14.8	10.5
Kurt Jenkins	1.4	1.6
Ruth Jenkins	5.1	7.3
Dick Johnson	16.8	24.0
Bert Johnstone	53.5	37.1
Mike Kaill	23.9	24.2
Christina Kessel	1.0	1.0
Ronalee Kincaid	9.8	8.0
Dave Kirner	11.0	3.8
Rick Klawitter	2.0	4.5
Gary Korb	16.4	4.0
Khanh Le	2.7	3.2
Edi Leonard	8.0	4.0
Bev Leyman	4.1	2.4
Larry Leyman	8.0	5.6
Peter Linton	20.6	30.5
Jann Luesse	36.0	19.3
Sanny Lustig	14.1	8.2
Pat MacRobbie	7.7	11.0
Stuart MacRobbie	16.0	24.2
Kathy Malarkey	33.9	22.5

VOLUNTEER*	HOURS	KM
Dave Manson	3.5	4.3
John Maré	19.5	14.5
John Markham	6.1	9.7
Mary Marsh	15.9	9.7
Robert Mauri	4.8	4.5
Linda May	1.4	2.2
Melinda McComb	4.6	4.8
Jill McKay	2.8	3.0
Vicki McNeil	15.5	24.2
Bob Merrick	11.8	17.0
Bob Middleton	8.7	6.4
Lauren Middleton	8.7	6.4
Ian Miller	13.0	26.4
Myryra Molkentine	7.0	3.2
Dianna Moore	46.5	33.3
Sue Nattinger	75.1	66.8
Sharon Nelson	13.9	24.0
Vic Nelson	38.9	69.0
Wade Newbegin	18.0	12.9
Nancy Newman	23.9	19.2
Carolyn Ollikainen	1.9	1.6
Robert Ollikainen	8.9	4.8
Joyce Orr	4.3	4.4
Connie Owston	28.5	19.3
Pete Owston	28.5	19.3
Andy Palmer	2.8	4.1
Barbara Patton	21.9	12.0
Mike Patton	21.9	12.0
Heidi Pederson	12.8	15.6
Mollie Peters	6.8	4.8
Sharon Pia	26.1	29.3
Megan Pool	6.7	6.8
Mary Porter-Solberg	4.0	6.6
Jeanne Pumphrey	15.3	7.9
Sally Pytel	11.8	19.8
Susie Qasha	3.5	2.2
Drew Raffensperger	1.3	1.6
Janet Raffensperger	4.3	4.8
Paul Raffensperger	15.8	14.5
Michael Ramon	1.5	1.6
Donna Raven	2.8	5.4
Ron Raven	2.8	5.4
Barbara Reisman	1.8	3.5
Patrick Reynolds	27.5	22.5
Ginger Ridgway	5.8	2.2
William Ritchie	14.8	4.6
Casey Rodgers	1.5	1.6
Chrissy Rodgers	5.9	4.8
Morgan Rohde	12.0	18.0
Marilyn Ross	0.5	0.3
Wilma Sale	7.2	3.5
Pam Sanguinetti	2.3	1.6
Tim Saskowsky	10.0	8.3
Jim Scheller	5.3	4.8
Dave Schmalz	10.8	9.5
Robert Schwartzberg	0.5	0.3

VOLUNTEER*	HOURS	KM
Tricia Schworer	7.7	9.7
Pete Seidel	8.0	9.0
Asta Sestrap	6.7	6.8
Joanna Shields	1.0	0.8
Lori Sinnen	25.2	20.9
Deanna Skewis	32.8	16.8
Judy Sorrel	20.3	9.7
Betty Sparks	4.0	3.2
John Spiva	2.0	1.6
Ann Stark	4.4	4.8
Doug Stark	12.0	16.8
Bob Stavers	0.5	0.3
Wendy Steffensen	19.4	17.9
Jesse Stewart	14.8	22.0
Debbie Stoller	11.2	6.4
Linda Streitfeld	16.5	12.0
Eftin Strong	13.8	15.4
Ingrid Strong	13.7	12.4
Ed Strum	6.8	3.0
Stuart Island School	2.4	2.8
Kim Sundberg	16.6	28.8
Sue Tenny	1.7	1.6
Cheryl Tinaves	4.8	4.5
Jim Towell	7.7	3.2
Sue Trevathan	3.5	4.0
UW Field Trip	28.0	16.8
Cyndi Ulin	5.0	3.6
Ken Unger	1.4	2.4
Lisa Unger	6.4	6.0
Anneka van Doorninck	33.0	28.8
Wolter van Doorninck	93.0	79.2
Glenn VanBlaricom	16.2	11.0
Kristina VanBlaricom	16.2	11.0
Barbara VanderWerf	29.3	20.9
Bill VanderWerf	29.3	20.9
Carol Volk	16.4	4.0
Pamyla Wadsworth	3.4	3.2
William Wadsworth	3.4	3.2
Darlene Wahl	13.0	27.2
Hank Warren	2.0	2.0
Raedell Warren	15.8	11.7
John Warrick	4.4	5.7
Amy Webb	10.8	6.8
Doug Webb	8.6	5.3
Joanne Wester	0.7	1.0
Jerry White	4.5	2.2
Ken Wiersema	4.5	3.8
Beth Winslow	9.3	9.5
Beth Wolgemuth	3.0	1.9
Kathleen Wolgemuth	56.0	35.1
Max Woods	3.5	4.8
Carrie Wooten	23.9	19.2
Tina Wyllie-Echeverria	3.7	1.6
Robert Zimmerman	2.1	2.9
TOTAL	**3,034**	**2,885**

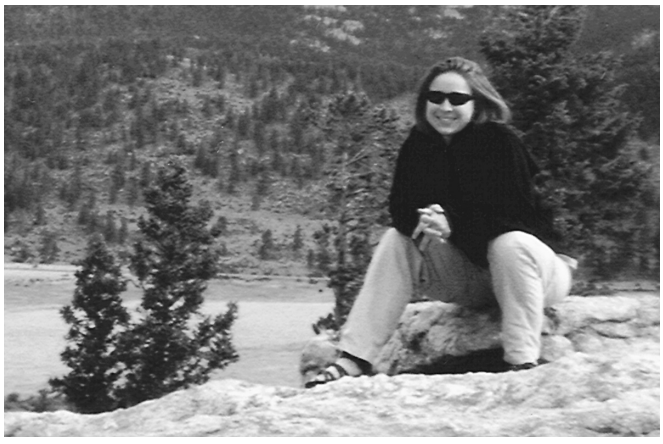
*Volunteer effort June 2003–May 2004

—continued from page 20

latter group find lots of birds and spend lots of time processing them. Volunteers like Kathleen Wolgemuth, Dianna Moore, and Susan Clark from the South Coast and Bert Johnstone of Oregon Mile 196 all punched the COASST clock for more than 40 hours. For the record, many of Oregon's beaches are regularly surveyed by *teams* of three or four people—a strategy that keeps survey duration more manageable during times of high deposition. To be fair to all such participants, we added these "extra" team members' minutes and kilometers into our calculations and they will also count toward their COASST Rewards.

What other hard-core volunteers haven't we mentioned? Ah, yes, the zeros people…the intrepid beachcombers who monitor several beaches monthly and usually get skunked. Three COASSTers—Mike Kaill, Peter Linton, and Larry Leyman—combined to survey seven beaches every month and contributed 121 surveys this year! What did this get 'em?—*six* birds—but one of them was the San Juan Islands' only fulmar!

Although we certainly appreciate all of your on-the-beach achievements, we'd also like to recognize the time you spent entering data, and traveling to and from your beaches. This year, over half of the 1,197 surveys were entered online by observers at their home computers. We thank you, because these efforts reduced the need for data interpretation (blanks to be filled, or handwriting to be analyzed), sped up data verification, and allowed our office interns to attend to other tasks. In the coming year, we will be introducing *Travel Time* as an entry blank on your datasheet—allowing us to gain an even better estimation of the total time all of you devote to COASST.



Aaron Ross

Staff

The demands on COASST staff continue to be varied and ever-expanding. Some duties are centered in Seattle; others are farther flung. Science Coordinator Todd Hass managed to verify the vast dataset from his computer in Seattle and also held training and refresher visits in 11 cities. Executive Director Julia Parrish, despite a nine-month sabbatical at UC Santa Barbara, took time to oversee general operations from afar. Our Office Manager Kate Litle successfully led our efforts to streamline and systematize our core office operations while also assisting at several COASST trainings.

Our most significant staff happening was the addition of Outreach Coordinator Shelly Ross, a former Seattle Audubon staffer and long-time public relations professional. Welcome, Shelly! She gets all the credit for establishing *The COASST Line* newsletter—our timely means of communicating with you about new offerings and developments. Over the next year, with her help, we will refine our strategic plan and begin to diversify our funding as well.

Mary Sue Brancato and Barbara Blackie of the Olympic Coast National Marine Sanctuary (OCMNS) were incredibly active on all fronts this year—in and out of the office—holding trainings and refreshers, and giving presentations introducing COASST to various organizations. Their efforts brought in 32 new volunteers and eight new sites to the North Coast and Strait regions.

Interns and Office Help

Thanks to the steady involvement of interns recruited from the UW student body, staff, and general public, the COASST office hummed along smoothly. Our senior intern, Jane Dolliver, celebrated her third anniversary with COASST as well as her graduation from the University (see Intern Profile on the facing page). Congrats, Jane!

In January, Carla Geyer stepped in to assist Jane with volunteer phone calls and tracking. Anna Coles, a Tweeters devotee (the online community of bird-watchers in Washington), also joined us late last winter

We welcome Shelly Ross, our new Outreach Coordinator.

and continues to be our lead photo technician. Mary Sue and Barbara at OCNMS really appreciated the help of Jeanne Pumphrey, a new volunteer who helped them in the office with data entry and replenishing supplies for volunteers.

Our spring call for interns was answered first by Emily Slayton, who had been a student in the UW Marine Biology class that visited Ocean Shores in the fall. After processing 107 fulmars with her group, it was obvious that she had the requisite COASST chops. In fact, in 2003, she was one of the winners of the President's Environmental Youth Awards for her work in watershed and salmon protection—kudos, Emily! Also in spring, Rebecca Monti, a freshman in marine biology and an avid equestrian competitor from Texas, joined us—helping COASST achieve our most organized quarter in the office to date. Thanks to all!

Answers to the Quiz

A. The small, football-shaped body can only mean alcid. The blackish body, white upperwing patch and short wing chord point to one identity—a breeding-plumaged Pigeon Guillemot.

B. A contrasting white wing patch, but this time on the trailing edge of the 2°s (aka, the speculum). Such a prominent patch is typical of only one bird in our area, the aptly named White-winged Scoter.

C. A football-shaped body and three webbed toes means another alcid. The wings seem too short for the bird's body, perhaps due to molt or disintegration. Our best clue to determining species is the deep orange-hued bill—characteristic of Tufted Puffins.

Candace Church

Intern Profile: Jane Dolliver

When we think of long-time intern Jane Dolliver, several words come to mind: committed, enthusiastic, knowledgeable, and personable. Jane's love of ornithology, interest in conservation, and dedication to serving COASST volunteers have made her an invaluable member of our team for the past three years. What has kept Jane involved in the program for so long? The thrill of new finds, the sense of camaraderie among volunteers, and the value of the program inspire Jane on a daily basis.

"Given that most people think dead birds are disgusting, it's amazing that so many volunteers spend quality time with COASST," she says. "I love talking to the volunteers and learning about their finds; the surveys often become a treasure hunt. How many people can engage in a meaningful conversation about a dead albatross, puffin, or skate? I love that about COASST."

After three years with COASST, Jane is a true believer in citizen science. "COASST shows how dedicated volunteers can contribute valuable information even if they don't have a PhD," Jane explains. "As volunteers gain experience and knowledge, they start to correspond with us about issues that aren't related to data collection. They get involved with conservation in their communities, and that's always exciting."

COASST would like to congratulate Jane on her recent graduation from the University of Washington with majors in Zoology and Biology and a minor in Philosophy. We're happy to report that Jane will be joining COASST part-time as our new Program Assistant, allowing her to pursue her twin passions of ornithology and conservation, and to remain in touch with all of you!

A feeding frenzy forms around this fishing boat in Alaska.

Washington Sea Grant Program

Partner Profile: NOAA Fisheries

Beached Birds: A COASST Field Guide is now the definitive tool for identifying dead marine birds on land *and* water. Thanks to a partnership with NOAA Fisheries, *Beached Birds* is now among the reference materials used by observers aboard Alaska fishing vessels.

What's an observer? Observers are trained biologists aboard commercial fishing boats who collect catch and bycatch data and monitor fishery interactions with marine mammals and birds. Although no fishery targets birds, many birds congregate around fishing vessels in search of a handout. Seabirds, such as albatrosses and fulmars, drown when they snatch baited hooks from longline fishing vessels and are pulled under water.

The US Fish and Wildlife Service is primarily responsible for managing seabird populations, but NOAA Fisheries is leading the charge to address seabird bycatch. According to Kim Rivera, National Seabird Coordinator for NOAA Fisheries, "If fishery interactions are negatively impacting an ecosystem, it's our responsibility to identify the issues and work collaboratively with stakeholders to find solutions."

Partnering with COASST is one way NOAA Fisheries is addressing seabird bycatch issues. Bill Karp, Director of the North Pacific Groundfish Observer Program, says *Beached Birds* has been well received by the nearly 200 observers in his program, which is bigger than all other NOAA Fisheries observer programs combined. "We've never had a field guide like this to identify dead birds until now, and our observers say it's a very useful tool," he says. "It's easy to carry and use in the field, making identification simple."

According to Karp, seabird bycatch in the North Pacific groundfish fishery is uncommon, and observers usually encounter common species like Northern Fulmars when it occurs. Incidental take of less common species like albatrosses, including the endangered Short-tailed Albatross, can have negative impacts. Observer data helps Rivera and her colleagues at other agencies in the US and abroad understand the impact of seabird bycatch and take appropriate action.

"The good news is there are measures we can take to reduce seabird bycatch that can be easily implemented," Rivera says. "In general, fishers are very in tune with ecosystem management because negative impacts can result in fishery closures. The longline vessels in Alaska, for example, have been receptive to using devices (bird-scaring lines) that aim to reduce seabird bycatch."

Although the US has been proactive in addressing seabird bycatch, Rivera says international cooperation is critical to the success of current efforts. "Seabirds don't recognize national boundaries, so there is an important international component to this work," she explains. "Even if we improve the situation in the US, we have to look at the global picture. Part of my job is to work at coordinating some of these global efforts so we can effectively bring about change and reduce the fishery interactions with seabirds."

Helping natural resource management agencies and other stakeholders conserve our seabirds through long-term monitoring and through valuable products like *Beached Birds* is at the heart of COASST's work. We commend NOAA Fisheries for its efforts to work with scientists and industry representatives to reduce seabird bycatch.

Sponsors

COASST sincerely thanks NOAA Fisheries, The Russell Family Foundation, and the University of Washington School of Aquatic and Fishery Sciences for program support. We also thank Bird Studies Canada for contracting with COASST to develop a *Beached Birds* field guide for the North Atlantic.

In-kind support is vital for COASST operations, and we appreciate the many contributions of time, talent, supplies, and space for COASST activities. We express our gratitude to the University of Washington School of Aquatic and Fishery Sciences and the Olympic Coast National Marine Sanctuary for providing in-kind support in the form of office space, equipment, supplies, and staff time.

We thank Drew Smith of Cable Markers Co., Inc. in California, who continues to generously donate colored cable ties for beach surveys. We also thank the following people and organizations for supporting volunteer training and events: Ted Brancato, Neil Conklin and Alecia Hoyt of Bella Italia Restaurant, Feiro Marine Lab, Hatfield Marine Science Center, Olympic National Park Visitor Center, Olympic Peninsula Audubon Society, Orcas Island Senior Center, Port Townsend Marine Science Center, the RE Sources Store, Skagit Valley Community College, US Fish and Wildlife Service Portland Office, and the Washington Department of Natural Resources Complex in Tillicum Park.

Last, but not least, the timely and affordable printing of this report was made possible by Chuck Stempler, owner of AlphaGraphics on Cedar Street in Seattle.

COASST Funding

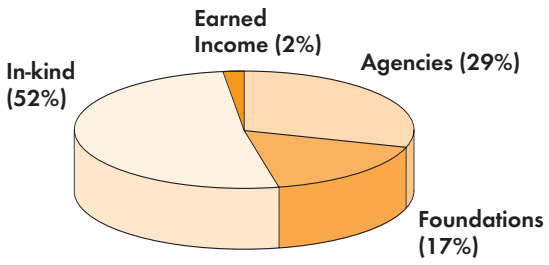
Do you know how much it costs to keep COASST going? We've added this section on COASST funding so everyone can see how we're doing. With over 1,000 surveys coming in, lots of new training sessions, new outreach materials for our West Coast volunteers, and the production of a new East Coast field guide, COASST isn't cheap! Our annual expenses run about $138,000. Program-related expenses account for nearly 80% of our budget, including training sessions and volunteer outreach; data entry, verification, and analysis; and special projects.

We are extremely fortunate to receive half of our funding as in-kind support. Additional sources of support include grants from private foundations, contracts from natural resource management agencies, and a small amount of earned income from sales of our *Beached Birds* field guide.

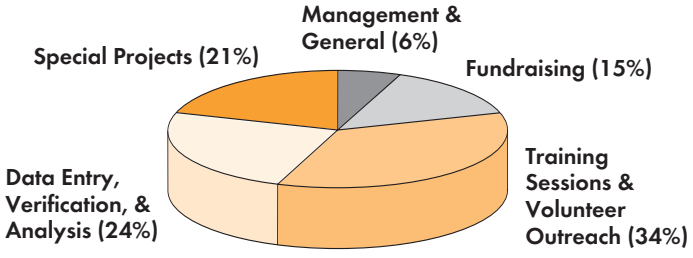
While COASST could not function without in-kind support and the commitment of our volunteers, we also need to raise a substantial amount of money each year to run the program. COASST is working to diversify its revenue sources and strengthen the organization's financials. Building a base of support from individuals who value a sustainable marine environment is a key strategy in our new fund development plan, and we gratefully accept gifts of any amount. Checks should be made payable to the University of Washington (with COASST on the memo line) and mailed to: COASST, UW School of Aquatic and Fishery Sciences, Box 355020, Seattle, WA 98195-5020. We appreciate the support!

COASST, July 2003–June 2004

Funding Sources



Expenses



COASST Mission

The Coastal Observation and Seabird Survey Team (COASST) is a citizen science project of the University of Washington in partnership with the Olympic Coast National Marine Sanctuary. COASST believes citizens of coastal communities are essential scientific partners in monitoring marine ecosystem health in the Pacific Northwest. By collaborating with citizens, natural resource management agencies, and environmental organizations, COASST works to translate long-term monitoring into effective marine conservation solutions.

COASST Reports Team

Writers	Todd Hass
	Barbara Blackie
	Mary Sue Brancato
	Shelly Ross
Editor	Julia K. Parrish
Analysis	Francis Wiese
Graphic Designer	Cathy Schwartz
Contributors	Jane Dolliver
	Kate Litle
Illustrations	Valerie Sloane

COASST Contact Info

Todd Hass	*Science Coordinator*
(206) 221-6893	*thass@u.washington.edu*
Mary Sue Brancato	*North Coast and Strait of Juan de Fuca*
(360) 457-6622	*Volunteer Coordinator*
ext. 20	*Mary.Sue.Brancato@noaa.gov*
Julia K. Parrish	*Executive Director*
(206) 221-5787	*jparrish@u.washington.edu*

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COASST Reports 03–04

Coastal Observation and Seabird Survey Team
School of Aquatic and Fishery Sciences
Box 355020
University of Washington
Seattle, WA 98195-5020