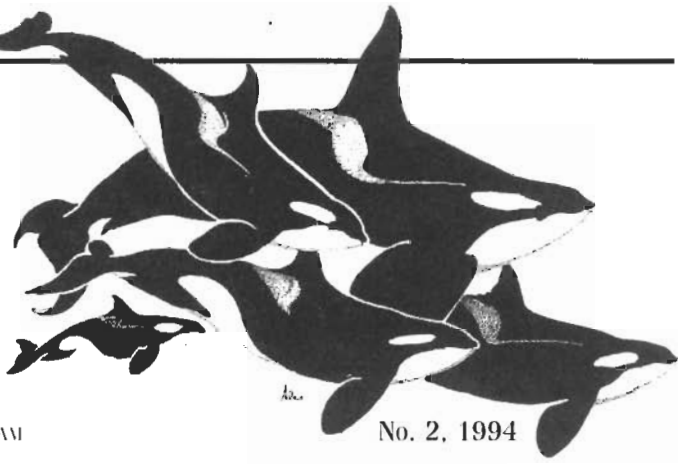
The Blackfish Sounder

THE NEWSLETTER OF THE VANCOUVER AQUARIUM'S KILLER WHALE ADOPTION PROGRAM

NO. 2, 1994



Where it all began . . .

Killer whale research was pioneered right here in B.C.

IT WAS MORE THAN 20 YEARS AGO — the summer of 1973 — when Michael Bigg and Ian MacAskie of the Pacific Biological Station first journeyed up to Johnstone Strait, a narrow channel on the northeastern coast of Vancouver Island, in search of killer whales.

It was the heyday of live captures of killer whales off the B.C. coast, and the Canadian government, concerned about the number of whales being captured, had asked the two biologists to find out as much as they could about the abundance and distribution of killer whales in B.C. waters.

The resulting study became a classic of its type and paved the way for research that has transformed our view of killer whales and their place in the ocean ecosystem.

The initial field study lasted only a few days, but it was enough time to learn that individual killer whales can be recognized by natural nicks, gouges and scratches on and around the dorsal fin and the whitish "saddle patch" at the base of the fin.

"A whale with unique markings, we quickly realized, was equivalent to having an individually tagged animal," Bigg later recalled. "All we had to do was obtain a good photograph of the whale, learn to recognize it, and follow its daily activities."

In 1974 the survey was expanded to include coastal areas from Bella Bella south to Juan de Fuca Strait. The research team, joined by photographer Graeme Ellis, diligently photographed and catalogued every whale they encountered.

In the process, they soon noticed that groups, or pods, were almost always made up of the same individuals and that when one member of a pod was located, other pod members could usually be found within a few kilometres.

To aid in field identification, each pod was given an alphabetical designation, and each whale was identified by its pod letter and a number.

By the early '80s an detailed portrait of killer whale life began to take shape. Thousands of hours of field observation yielded information on the sex and approximate ages of pod members, their movements, social behaviour, feeding habits, and birth and death rates.

Even the sounds that killer whales make

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GRAEME ELLIS PHOTO

Welcome to our second issue!

The Killer Whale Adoption Program is now in full swing and 1993-94 has been an excellent year for killer whale conservation and research. Last summer, our field team, sponsored in part by you, was able to encounter and photo-identify virtually every northern resident killer whale in B.C. This long-term census work is invaluable. Only by learning as much as we can about killer whales, can we take the necessary steps to protect them.

We have been pleasantly surprised by the number of adoption renewals we have received. This tells us you are just as committed as we are to the conservation of this fascinating species. Thanks to your continued support, we are planning a number of exciting projects in the coming year. In fact, one of them is detailed on the back page of this issue.

Through *The Blackfish Sounder*, we want to share with you what we've already learned about killer whales, and what we hope to find out in the future. In our first issue we introduced you to *Orcinus orca*. In this issue, we focus on the foraging behaviour of killer whales around the world, and some recent discoveries about killer whale echolocation. You may be surprised at what you read!

John Ford

Dr. John Ford
Marine Mammal Scientist
Vancouver Aquarium

Population Update

What's new among B.C.'s northern killer whales?

BRITISH COLUMBIA'S NORTHERN resident killer whale population climbed to 205 in 1993, with the addition of five new calves.

Fifer (C13) and *Cosmos* (C17) gained a new sister or brother when their mom, *Koeye* (C10), gave birth to C20 in 1993. The new calf is the fifth member of the C5 subpod, headed by 70-year-old matriarch *Kwatna* (C5).

We missed one last year — *Tatchu* (G52) is the newest calf of *Harlequin* (G16), joining sibling *Shushartie* (G39). The calf was probably born in 1992 but its subpod wasn't seen until August 1993.

And 1993 was a eventful year for I pod whales. Three females — none of them on our adoption list — were seen with new calves.

In the 115 subpod, 26-year-old 116 was seen with her third calf, 172. And in the I1 subpod, 26-year-old 119 became a mother — and a grandmother. She gave birth to her third calf, 170, while her daughter, 154, produced her first baby, 171. 154 was 10 years-old at the time — a particularly young age to be a first-time mother.

For those of you interested in adopting new youngsters amongst our adoptee whales, we ask that you wait until 1995. Studies have shown that up to 45 per cent of calves die in their first year, so to be cautious, it is best that a new calf not be "up for adoption" until it has been sighted two years in a row.

Researchers are equally as cautious about reporting mortalities. A death is "confirmed" when a whale has not been seen with its natal group for two years in a row.

JOHN FORD PHOTO

Northern residents C3, C6, C9 and C8

After only one year, they are considered "missing." There are currently nine whales that weren't seen with their families in 1993; researchers will be on the lookout for these individuals in the 1994 field season. ♦

Where it all began: a history of killer whale research in B.C....from p. 1

proved to be significant. A landmark study by John Ford, now with the Vancouver Aquarium, revealed that each family group of killer whales shares a set of similar calls which, together, form a "dialect." These dialects can give important clues about the relationships between groups of whales; the more calls two pods have in common, the closer the family relationship.

Next came genealogies, or family trees. For resident killer whales, this was made easy because of two unusual features of their society: pods are matrilineal, that is, centred around adult females; and each whale stays in its family group throughout its life. Transients have a much looser social structure, but maternal lineages can sometimes be presumed through association.

By consulting historical records and photographs, Bigg and his associates determined that killer whale lifespans are very similar to those of humans. By studying who each whale was most closely associated with, they were able to figure out who was born to whom and estimate the age of that individual.

To date, genealogies have been compiled for approximately 350 killer whales seen along the B.C. coast. The ID program continues on an annual basis, and is very much a collaborative effort, involving a network of researchers from B.C. and northern Washington State, as well as experienced observers from points all along the coastline.

More than 100,000 ID photographs have been taken since the program began. All films are sent to Graeme Ellis, now a biological technician at the Pacific Biological Station, who assigns IDs, grades the negatives and files them. Adjustments are made to this central "catalogue" when a whale is born, or dies.

Sadly, Mike Bigg died in 1990, but his legacy to killer whale research lives on. The study he began in the early '70s has paved the way for similar work by other scientists around the world, in areas such as Alaska, Argentina, Norway, Iceland, and the southern Indian Ocean.

And here in B.C., a small, but growing group of dedicated researchers continues to study many aspects of killer whale biology, including: natural history, distribution and movement patterns, echolocation, genetics, foraging ecology, diving patterns, acoustics, and the effects of whalewatching on whale behaviour.

JIM BORROWMAN PHOTO

In this and future editions of *The Blackfish Sounder*, we'll keep you up-to-date on some of the exciting discoveries in these areas. See the next page for our first instalment! ♦

GOOD VIBRATIONS

New research suggests killer whales use echolocation because they want to — not because they have to

FOR MANY YEARS SCIENTISTS HAVE believed that killer whales, and all other members of the dolphin family, rely on echolocation to catch their food and see where they're going.

But a new study suggests that although killer whales are good at echolocation, they don't depend on it, and if there are good reasons not to use it, they won't.

The study, conducted by Lance Barrett-Lennard, a graduate student at the University of British Columbia and Vancouver Aquarium research associate, is the first systematic look at echolocation behaviour in wild killer whales. Most studies to date have been on captive dolphins, but these offer little insight on the use of echolocation in the wild.

Barrett-Lennard began his work intrigued by a question no-one seemed able to answer: why do so many dolphins accidentally tangle in nets?

"There was an accepted assumption within the scientific community that dolphins and killer whales are like marine bats; that they use echolocation to find their prey," he says. "But if that's the case, then dolphins wouldn't get caught in nets so often. It suggests that they're not using echolocation the way we think they do."

Frustrated fishermen have tried to ward off the dolphins by putting acoustic reflectors — usually disks of plastic or steel — on the nets. "It's a great idea, but it rarely works," says Barrett-Lennard. "But why not? Why aren't the dolphins echolocating? They have the ability to do it anytime, and it costs them nothing to do it, so if they're not using it, there must be a reason."

To find some answers, Barrett-Lennard headed for the waters of Prince William Sound in northern Alaska and the central coast of B.C. — areas with killer whale populations that have been actively studied for 12 and 20 years respectively.

"Wild killer whales are a good test species for this study," he explains. "Unlike dolphins, they're relatively easy to find, are fairly predictable, are very acoustically oriented, and live in small social groups."

Barrett-Lennard spent three summers following the whales, listening to their sounds and watching their behaviour. In total, he logged 111 'encounters,' averaging five hours each.

"We recorded them every hour for five minutes no matter what they were doing," he reports. "We also measured the water clarity and background noise levels, so we could correlate them with echolocation clicks."

Once analysed, the data yielded some surprises. For one, fish-eating resident killer whales use echolocation in a very different way than their mammal-eating transient cousins. "Residents echolocate frequently, loudly and very conspicuously," he says. "In fact, they echolocate 27 times more than transients."

Residents make a series of sounds Barrett-Lennard calls a "click train," in which the number of clicks are evenly spaced, lasting an average 6.8 seconds in total. A similar sound can be created by passing your finger evenly along the edge of a comb.

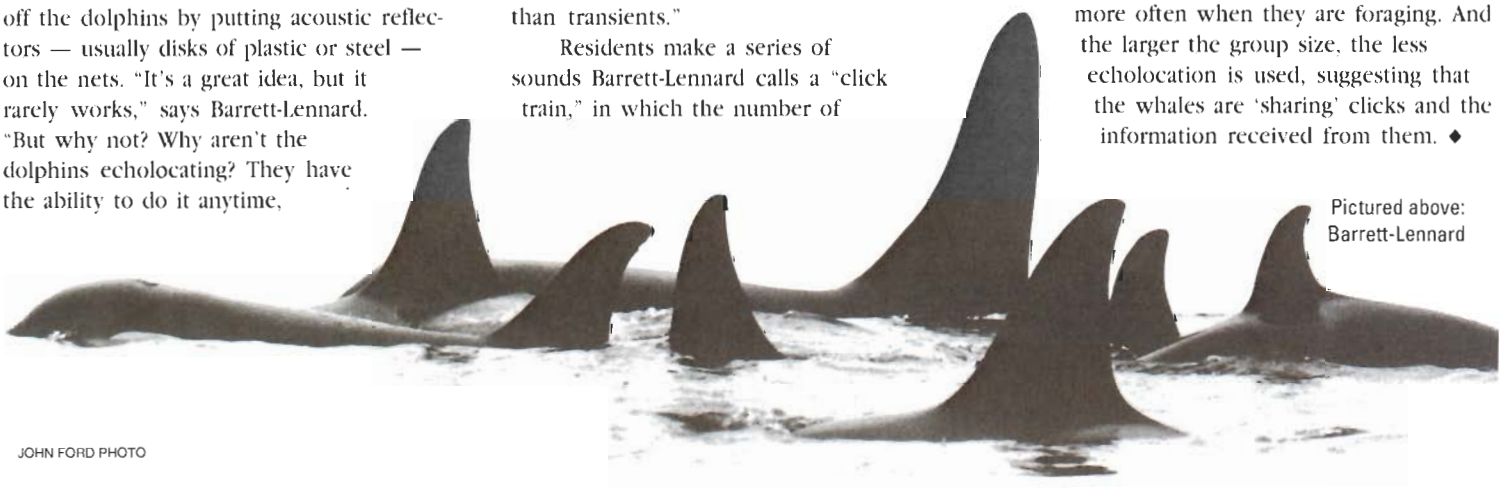
By comparison, transient click trains, lasting an average 0.86 seconds, are short and irregular — as when you jerk your finger along the comb.

"The net effect is that transient click trains blend in with background noise," says Barrett-Lennard, pointing out that the ocean is a surprisingly noisy place even when there are no boats around. But perhaps the most intriguing feature of transient echolocation is what he terms the "cryptic click" — isolated pulses sent out every now and then.

"I suspect these cryptic clicks give them a snapshot view of their surroundings, whether it's to see where they're going, or to detect prey," he says. "My hunch is that they use it most often to see where they're going, but don't want to give themselves away to potential prey."

And their prey does indeed have ears. Most clicks are in the 4 to 18 kiloHertz range, well within the hearing range of a harbour seal, for example. Fish, however, can only detect sounds up to 3 kHz, which perhaps explains why resident killer whales are so 'click-happy.'

From his study, Barrett-Lennard concludes that echolocation in killer whales is a very flexible — and optional — behaviour. Residents use it frequently, apparently more often when they are foraging. And the larger the group size, the less echolocation is used, suggesting that the whales are 'sharing' clicks and the information received from them. ◆



Pictured above: Barrett-Lennard

JOHN FORD PHOTO

LIFE AT THE TOP

Intelligent and versatile, killer whales are well-adapted for life as the top predator of the ocean

THEY ARE SCENES that to us, may seem shockingly brutal — a squirming harbour seal clenched in a killer whale's jaws, a live sea lion pup being tossed like a rag doll from whale to whale, or an exhausted gray whale mother and calf succumbing to a relentless killer whale attack.

They're not pretty images, to be sure, but they are realistic ones. This is life as the top predator of the ocean.

The killer whale is certainly equipped for the job, with a hydrodynamically perfect body shape, up to eight tons of muscle power, 46-50 conical, interlocking teeth for grabbing and tearing, and a sophisticated sonar detection system — all fueled by an appetite that requires at least 40 to 65 kilos of animal protein daily.

The form that this animal protein takes varies widely, although most killer whale populations studied to date appear to have a preference. Some seek out fish, others hunt mostly marine mammals, and still others may eat both. Even other forms of sea life are fair game.

The result is an astonishingly broad menu. Worldwide, known foods to date have included 24 species of cetaceans (porpoises, dolphins and other whales), 14 species of pinnipeds (seals and sea lions), 31 species of fish, nine species of birds, squid and octopus, a leatherback sea turtle and a sea otter. Killer whales have even been seen feeding on a deer carcass.

In the following three pages, we'll introduce you to the foraging behaviour of fish-eating killer whales, and of their enigmatic cousins who specialize in the pursuit of small marine mammals. In our next issue, we'll feature the killer whales of marine legend — those that feed on other whales.

FISH

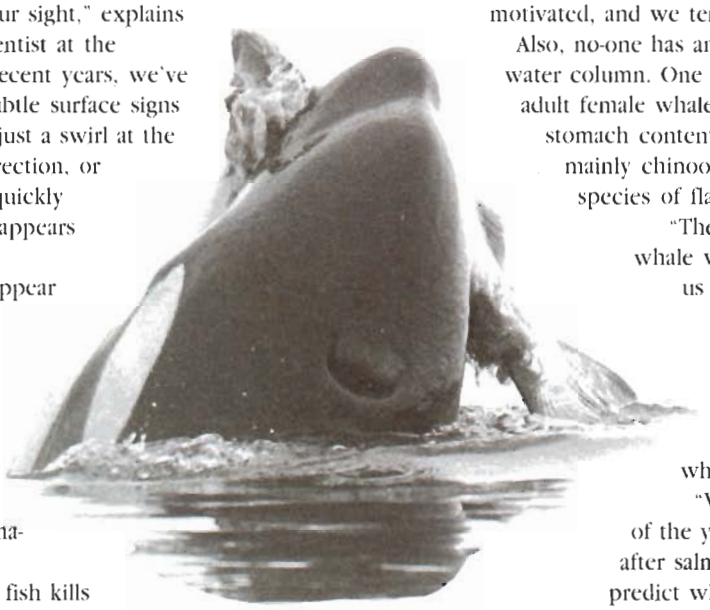
B.C.'s resident killer whales like their salmon big

FISH-EATING KILLER WHALES, such as B.C.'s resident pods, tend to travel in large groups, sometimes numbering up to 50 individuals. But when foraging, they quite often spread out over a large area as each individual chases a fish or school of fish.

It has long been known that the travel patterns of B.C.'s resident whales closely match the migratory routes taken by Pacific salmon. Nevertheless, getting 'solid' proof of the whales' predilection for salmon is not easy.

"The trouble is that most fish kills take place below the surface and out of our sight," explains John Ford, marine mammal scientist at the Vancouver Aquarium. "But in recent years, we've learned to identify the really subtle surface signs of a chase or a kill. It's usually just a swirl at the surface, a sudden change in direction, or jumping out of the water and quickly diving. You can see the whale appears intent on something."

Sometimes, a whale may appear with a fish sticking out of its mouth, making identification easier. But more often, researchers must look for leftovers — usually fish scales — which are scooped up in a net and analysed for information on species and size.



Since the early 1970s, 150 fish kills have been recorded in this way, many of these in the last four years by Ford and colleague Graeme Ellis of the Pacific Biological Station in Nanaimo. Although the sample size seems small, it is enough to indicate that the fish of preference is salmon — all types, but especially chinook, the largest of the salmon, reaching weights of up to 25 kilos.

"They definitely like their chinook," confirms Ford. "Even when there are millions of sockeye around, most scales we tend to see are chinook. Then again, the chinook is a big fish, the whale is more motivated, and we tend to see the chases more."

Also, no-one has any idea what is happening deeper in the water column. One clue came in 1990 when the carcass of an adult female whale, A9, washed ashore. An analysis of her stomach contents revealed 13 species of fish: salmon, mainly chinook; ling cod; greenling; sablefish; seven species of flatfish; and sculpins.

"There were things in there you'd think a killer whale wouldn't bother with," says Ford. "It makes us wonder how much they are feeding at depth, and whether this is typical."

These are more than just idle questions. The answers could help researchers solve the mystery of where British Columbia's resident killer whales go in winter.

"We know they're after salmon for six months of the year. If we can find out whether they're also after salmon in the winter, we should be able to predict where they are." ◆

LEFT: KARL SOLOMAN PHOTO

SMALL MARINE MAMMALS

B.C.'s transient killer whales rely on stealth and speed

WHEN SMALL MARINE MAMMALS — such as seals, sea lions, dolphins and porpoises — are the main menu item, as with B.C.'s transient killer whales, hunting tactics can be very dramatic.

Stealth and bursts of speed are the first line of attack.

"Typically, a killer whale will be travelling along and suddenly begin high-speed swimming," says Simon Fraser University researcher Robin Baird, who studies foraging behaviour in transients off Victoria, B.C. "Next you may see shaking of the dorsal fin, which is characteristic of a kill, and then blood and bits of blubber. Or they may not kill it right away; they'll carry it around, or hit it with their tail, head or pectoral fins while making high-speed passes."

Attacks usually last anywhere from one minute to two hours, says Baird, with the whales hunting as a team and sharing the kill. Typically, these transient groups are small; three seems to be the most efficient group size.

EVA SAULITAS PHOTO

A transient chasing a Dall's porpoise

The odds of a prey animal escaping depends on the species and the circumstances. Once spotted in the water, a harbour seal's chances are slim. In one attack off Victoria, a pursued seal was so frantic for sanctuary that it leapt onto the stern of a nearby whalewatching zodiac. The doomed seal returned to the water several minutes later.

Even hauling out has its risks. If a seal is close to the water's edge, killer whales may breach repeatedly nearby in an attempt to wash or scare it into the water. In the Antarctic, killer whales have been seen tipping over small ice floes carrying seals. And one report off Washington State tells of a pod ramming a log boom to knock off hauled-out seals.

Adult sea lions pose a bigger challenge, literally. These animals — which can weigh up to 1,000 kilos — have formidable teeth and strength.

"Sea lions near shore or in a large group have a high chance of escaping, and the whales know this," says Baird. "We've seen transients swimming under a group of sea lions without attacking. An adult male Steller sea lion weighs twice as much as a grizzly bear. It's just too dangerous to attack when there's easier prey around."

Alexandra Morton, who has been studying transients off northeastern Vancouver Island for the past 10 years, agrees. "I've seen several attacks on sea lions and the whales definitely prefer to outnumber them," she says. "In one successful attack I saw there were 11 whales and three sea lions. In another engagement of three against

...Continued on p. 6

Transient T31 patrolling a harbour seal haulout

ROBIN BAIRD PHOTO

Herring round-up

Norwegian killer whales are herding specialists

Not all fish-eating killer whales are as 'secretive' with their winter dining habits as B.C. residents.

Every year between October and January, an estimated 500 killer whales follow vast schools of overwintering herring into the fjords of northern Norway. There, each family group hunts and feeds in a dazzling display of coordinated teamwork.

Using what researchers term the "carousel method," the whales surround the frightened herring, which instinctively form into dense schools, or balls. Like cattle herders, the whales swim around and under the seething ball of fish, forcing it toward the surface. Vocalizing continually, the excited whales frequently lobtail and 'porpoise' on the surface, and flash their white undersides at the startled fish.

During feeding, the whales continue to herd, often releasing large air bubbles close to the fish. Individual whales then slap the edge of the school with their flukes — creating a loud banging sound — and eat the stunned fish, one by one.

This remarkable behaviour was first documented in killer whales in the late 1970s, and similar feeding patterns have been seen off Iceland and in the western Atlantic. But a 1993 study by Finnish researcher Tiu Similä is the first detailed *underwater* observation of the phenomenon.

"The killer whales observed in this study area seem to live in stable groups," writes Similä. "In stable groups, useful learned traditions, like the use of certain hunting techniques, can be effectively passed on from generation to generation and could be one explanation for the adaptive success of killer whales." ♦

WAVE OF DEATH

Life's a beach for these bold hunters

PERHAPS THE MOST BRAZEN — and certainly dramatic — hunting technique can be seen on the beaches of Patagonia in northern Argentina, where killer whales prey on young elephant seals and sea lions.

In a spectacular display of strength and agility, the whales surge out of the surf to grab unsuspecting pups off the beach, partially stranding themselves in the process. With powerful strokes of their flukes, they then swivel and wriggle back into the waves, prey firmly clenched in their teeth.

Argentine researchers Juan Carlos Lopez and Diana Lopez were the first to document this behaviour: "Once grounded, the whale arched its body, with the head and tail lifted up, and rocked sideways," they wrote in a 1985 paper. "This motion usually oriented the whale parallel to the beach, and a subsequent wave helped to lift it off the bottom."

One in three of these attacks are successful, and at no time has a whale been seen to strand itself permanently.

That's not the case in the Crozet archipelago in the southern Indian Ocean, where similar beaching behaviour by killer whales has been observed by French researcher Christophe Guinet.

Because Crozet beaches slope much more gently than in Argentina, beaching is risky business for inexperienced whales. Five juveniles and one adult have been found stranded since the Crozet field station was created, reports Guinet, who notes that the whales spend hours perfecting their beaching skills. One female is seen regularly training young calves, and pod members have been observed playing and pushing each other sideways along the beach. On one memorable occasion, six pod members were seen beaching in unison.

These intentional strandings are probably critical practice sessions, especially for young whales, concludes Guinet. ◆

JOHN FORD PHOTO

A sea lion pup is grabbed off an Argentinian beach.

SMALL MARINE MAMMALS...continued from p. 5

three, there was a lot of splashing and commotion, but the whales gave up and left."

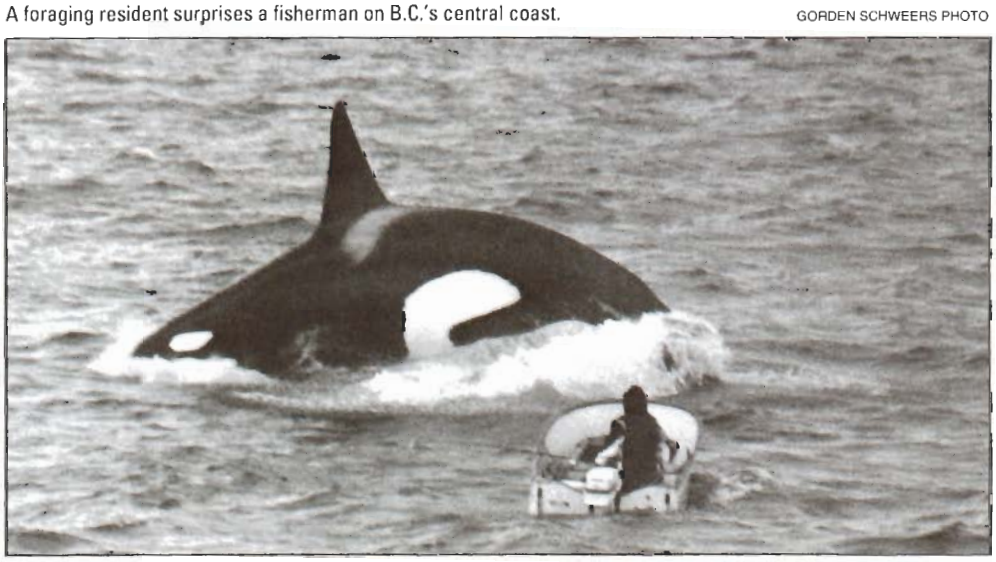
Killer whales are capable of tremendous bursts of speed. Baird once witnessed a high-speed pursuit of a Dall's porpoise by two transients. To increase their advantage, the whales were clearing the water by more than three metres. However, the porpoise kept altering direction and eventually escaped.

"A Dall's porpoise can usually outmanœuvre one or two killer whales," says Baird, "but a larger group lowers the porpoise's chances considerably."

But no matter what the prey, once it is captured, the end can be astonishingly quick. "Killer whales can kill and flense an animal within minutes," says Morton, who will never forget what she found after one kill. "It appeared to be a seal heart, and it was still beating. I don't know how they take these things apart, but they sure do it fast!" ◆

A foraging resident surprises a fisherman on B.C.'s central coast.

GORDEN SCHWEERS PHOTO



WANT TO KNOW MORE ABOUT KILLER WHALES?

Here are some recent books...

Guardians of the Whales, by Bruce Obee and Graeme Ellis, 1992, Whitecap Books, Vancouver.

In the Company of Whales, by Alexandra Morton, 1993, Orca Books, Victoria.

Killer Whales, by J.K.B. Ford, G.M. Ellis and K.C. Balcomb, 1994, UBC Press, Vancouver.

For kids:

Killer Whales by Dorothy Hinshaw Patent, 1993, Holiday House, New York.

Videos...

Wolves of the Sea, National Geographic Society, 1993.

Island of Whales, National Film Board of Canada, 1990.

Field Notes

A collection of recent killer whale anecdotes from the field

Wild Kingdom -- Live!

Passengers on a whalewatching trip off northeastern Vancouver Island last September got to see far more than they bargained for. According to Jim Borrowman, co-owner of Stubbs Island Charters, the bizarre story began when a group of transient killer whales was spotted in Knight Inlet, 15 km from Telegraph Cove. Borrowman decided to follow the whales into the inlet, pausing to watch a young harbour seal resting in typical 'banana pose' on a slightly submerged rock. Says Borrowman: "I was just pointing the seal out when all of a sudden the water exploded and a big bull killer whale 'inhaled' the seal. In the blink of an eye, it was gone." Astonished passengers had barely caught their breath, when 10 minutes later, Borrowman slowed the boat to watch a rhinoceros auklet land ahead. "The water in front of us exploded again," recalls Borrowman. "The auklet tried to take off, but a killer whale swallowed it in mid-air." Borrowman, who has been running whalewatching charters in the Johnstone Strait area for 14 years, says he's never seen anything like it. "All the passengers were looking both times. I think these people took it for granted that we see these things every day!"

Net Loss

Victoria-based researcher Robin Baird got a big shock last August when he reached overboard to retrieve some killer whale leftovers. Baird, who has been studying the foraging behaviour of transient killer whales for his PhD at Simon Fraser University, occasionally collects tissue samples from prey animals for genetic and toxicological studies. On this particular day, he had been following transients T41, T41A and T44, a subadult male, who killed a harbour porpoise after a short chase. After several minutes, the carcass floated to the surface about 100 metres from the boat. "Transients have been observed leaving partial porpoise carcasses at the surface, apparently abandoning them," says Baird. "With this in mind, we moved toward the carcass, but T44 surfaced again, taking the porpoise down with him." Minutes later, part of the carcass re-appeared, this time closer. Baird decided to use a net to hold the remains next to the boat, while his assistant hunted for a knife and collection container. Meanwhile, T44 passed beneath the boat, first more than a metre down, and then only about half a metre. Baird was not overly concerned, since the whales tend to keep their distance from stationary boats, even when live prey is hiding next to or under them. But on his third pass, T44 had had enough. "He came up beneath the net and grabbed it, and the porpoise remains," says Baird. "I was left holding the net extension handle, and that's all. I was very surprised!" Neither the net or the porpoise were seen again.

Whales 1, Moose 0

From the believe it or not file comes this unusual story from the *Anchorage Daily News* in Alaska. Two fishermen were understandably surprised one afternoon to see two moose paddling from an island to the mainland. As the fishermen sat nearby in their skiffs, transfixed, a group of three or four killer whales appeared and attacked the two moose. After one moose was killed and eaten, the whales went after the second one, which had managed to swim into the middle of a dense kelp bed. The whales spent about an hour trying unsuccessfully to reach the moose, and finally left. Alas, there was no happy ending for the beleaguered moose; when the fishermen returned later to check on the animal, they discovered it had been unable to extricate itself from the kelp, and had drowned.

Just visiting

Killer whales can turn up in the strangest places. Vancouver commuters couldn't believe their eyes on April 7, 1994 when a group of six transients motored under the Lion's Gate Bridge, and did a six-hour tour of Vancouver's busy harbour, before heading back out under the bridge and into Georgia Strait. "It's typical behaviour for transients to poke into unusual places looking for unwary harbour seals to eat," says John Ford, marine mammal scientist at the Vancouver Aquarium, who followed the whales for several hours. The six whales included adult male T61, adult female T46 and a young calf....And earlier this year, on February 7, Donna and Bill Mackay, co-owners of Stubbs Island Charters whalewatching company, were enjoying a peaceful early morning coffee on their sundeck overlooking Telegraph Cove on northeastern Vancouver Island when they noticed a "huge swirl" in the waters below. "Then we saw the dorsal fins," remembers Donna. "We were absolutely astounded." They had good reason to be surprised; the tiny hamlet of Telegraph Cove is a very confined harbour, perhaps 100 metres across at its widest, and crammed full of dock fingers and small boats. Its entranceway is only about 45 metres across. "The two whales — a cow and calf — spent about seven minutes in the cove, and a third whale was waiting just outside the entrance," reports Donna. "I think they were chasing a seal we'd seen earlier, and since we didn't see it again, I assume it was breakfast. " For the record, photo IDs show that the whales were T108, T109, and T109A.

JOHN FORD PHOTO

Transient T61 off downtown Vancouver

An A30 mystery

Something unusual happened in the A30 subpod on June 30, 1993, but we'll never know for sure what it was. The subpod — made up of matriarch *Tsitika* (A30) and her five offspring — were encountered near Johnstone Strait by researcher Alexandra Morton, who remembers they were in a "boisterous mood, with lots of breaching and splashing." But by the time Morton shut off her engines, the whales had stopped travelling and were clumped together in a tight ball against the shore. "Their behaviour was really unusual, and their dorsal fins were shaking," says Morton, who suspected a birth might be in progress. As her son, Jarret, began filming, the eldest male, *Strider* (A6), surfaced with a limp object balanced on his head, and *Tsitika* came up right behind him. "It looked a lot like a baby killer whale," says Morton, who waited in vain for it to reappear. The whales, still in a tight knot, eventually moved away from the shore in an erratic pattern and left the area. The videotape strongly suggests a stillborn baby killer whale, but is inconclusive, so researchers are left to speculate whether 46-year-old *Tsitika* gave birth to what was probably her last calf, or her eldest daughter, nine-year-old *Clio* (A50), gave birth at an extraordinarily young age. In either case, the calf did not survive.

Hello, killer whales calling. . .

No more wondering where the whales are. Pretty soon they'll be telling us

JUST THINK OF THEM as killer whale telephone booths.

That's the general idea behind the Killer Whale Acoustic Link, an innovative research project that combines a network of underwater microphones with cellular phone technology to plot the whereabouts of killer whales off the B.C. coast.

The project, also known as WhaleLink, is still in the early stages, but when fully operational, will enable researchers and the general public to listen in on "live" killer whale communication in the wild.

"I've been wanting to do this for years," says John Ford, marine mammal scientist at the Vancouver Aquarium. Ten years ago, a friend with a hydrophone placed in Johnstone Strait telephoned Ford to see if he could identify the sounds of a passing killer whale.

"He held the phone receiver up to the speaker, and I heard this creepy-sounding transient moaning to himself," recalls Ford. "I thought, wouldn't it nice to a have a feed from the Strait where we could measure how often a whale is being listened to, or better yet, have it automated to detect when the whales are on it."

At that time, the only telephone technology available was a dedicated line, and that was too expensive. So instead, Ford planted hydrophones at various lightstations along the coast.

"These relied on the keepers, who of course didn't want to listen all the time," he says. "Ships would go by and they'd turn the volume down. And, much as we tried to convince them otherwise, the lightkeepers would often sleep at night."

JIM BORROWMAN PHOTO

Then along came cellular phone technology. "That solved a big part of the prohlem," says Ford, who persuaded friend John Mair, an engineer at Vancouver radio station CKNW/CFMI to design the WhaleLink system. "But we also needed a device that would monitor sounds day and night, be able to distinguish killer whale vocalizations from other ocean noise, and automatically relay those sounds to a central location."

The challenge was accepted by the electronics technology group at the B.C. Institute of Technology, who, funded by the B.C. Ministry of Skills, Training and Labour, developed a "voice actuator" for killer whales.

The device is programmed to turn on for any killer whale sound.

"The actuator looks at three different sound frequencies," explains Ford. "Killer whales make sounds in the high and medium ranges, while boats tend to produce sounds in the low. Also, boat sounds tend to be continuous, whereas whales vocalize in little bursts. So this device is able to look for intermittent sounds in the higher bands, and 'recognize' them as a killer whale."

Once activated, the system will transmit the audio signals by cellular phone to a receiving station at Alert Bay off northeastern Vancouver Island, where it will be conveyed to the Vancouver Aquarium via a land telephone line.

"It will be rigged up to a special phone and tape recorder in my office so that we can identify pods and chart their movements," says Ford. "And it will eventually be part of an exhibit in the Aquarium's public galleries, so that everyone can listen in."

The prototype will be built in the coming year, partially funded by the Killer Whale Adoption Program. After testing at the Aquarium, it will be placed at a location in Johnstone Strait where killer whales are known to frequent.

Ford is hopeful that WhaleLink monitoring stations may one day dot the B.C. coastline. "This project is the first of its kind in the world," he says. "We'll know which whales are going by and how often — information that is crucial for the conservation of this species in British Columbia." ◆

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