

NEWSLETTER OF THE PUGET SOUND CHAPTER
OF THE AMERICAN CETACEAN SOCIETY

VOLUME 6, ISSUE 1

WINTER 2005

Next Meeting Feb 16th

**Why Are Killer Whales
Black and White?**

a presentation by Uko Gorter,
Natural History Illustrator

(please see back cover for more info)

**Vashon Hydrophone Project
Achieves One Year Milestone—In Style!**

By Ann Stateler, VHP Coordinator

Vashon Hydrophone Project (VHP) associates were busy in the field during the holidays. As we have done for many winters, Mark Sears and I devoted numerous hours to verifying Southern Resident killer whale IDs and observing the orcas' behavior in Central Puget Sound.

On December 21, Mark found 30-year-old Samish, J14, with a newborn off the northeast side of Vashon. What makes this even more endearing is that Mark has been the first person locally to see all three of J14's surviving calves.

Event Information

All speaker series events meet on the 3rd Wednesday of the month at the Phinney Neighborhood Center, Room 6, 6532 Phinney Ave. N., Seattle, (just north of the Woodland Park Zoo).

Doors open at 7pm and the program starts at 7:30pm. Plenty of free parking is available in the upper and lower parking lots. Admission is free—donations to offset the room rental costs are gratefully appreciated of course, but completely voluntary.

For nearly thirty years, Mark Sears has been the first responder to fall/winter orca sightings in lower Puget Sound. He is privileged to often be the first researcher to document newborn orcas here. In December 2004, Mark discovered the latest additions to J and K Pods in Vashon—Maury Island waters.

80-something Granny, J2, the grand matriarch of J Pod, is J14's grandmother and the baby's great-grandma. 53-year-old Ruffles, J1, the eldest male in the Southern Resident Community, is the calf's great-uncle. The baby has a nine-year-old brother, Riptide, J30, and a three-year-old sister, Hy'Shqa, J37.

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**Long and short-term acoustic behavioural
reactions of *Orcinus orca* to noise pollution**

Researcher; Andy Foote

Collaborators; Rich Osborne, Rus Hoelzel

Killer whales or orcas are a cosmopolitan species, found in all of the world's oceans and although there are no precise figures on the worldwide population size of orcas, they are believed to be plentiful and not at risk as a species. However orcas form small populations which do not interbreed with other orca populations that have overlapping home ranges. There are several well-studied populations of orca that have declined in numbers recently and these include Washington State's Southern Resident population.

Conservation issues facing this population are many, but include subjection to prolonged periods of background noise, which may interfere with their acoustic communication. There has been a progressive increase in the number of boats impacting this population over the last decade, with up to 80 whale watching vessels following a group during daylight hours. The core area of Haro Strait is also a major shipping lane and freight vessels, cruise ships and recreational boaters are commonplace.

(Continued on page 5)



Chapter Currents

by Uko Gorter, ACS/PS President

So far this winter, we've been blessed with very mild spring-like temperatures as well as many visits from our resident killer whales near our Vashon Hydrophone Project.

Unfortunately, we also endured another oil spill in Dalco Passage on January 28. Although touted as a 'small' spill, it is a disconcerting trend. How many so-called "wake up calls" do we need?

On a more cheerful note, on behalf of the group, I'd like to thank all of our members and friends who answered ACS/PS's call for donations. Thank you for your contributions to the Vashon Hydrophone Project and to the Grants Fund to continue funding important research. In this issue of the Whulj, we are delighted to share an article by Andy Foote, a past grant recipient, who is doing very important and timely orca research.

We hope that in these challenging times, that all of you stay interested in cetacean conservation. We urge you to come to our highly interesting and educational Speaker Series, every third Wednesday of the month. If you would like to be more involved and would like to volunteer, just let any board member know. This chapter is all of us collectively, and we have many events where we could use your help, such as the Aquarium Ocean Career Day (February) and the Penn Cove Water Festival (March). These, and similar events occur every year, and are well worth attending. We'll look forward to seeing you.

Vashon Hydrophone Project Special Appreciation

ACS/PS is grateful to Brad Hanson and Linda Jones of NOAA Fisheries and Rich Osborne of The Whale Museum for providing us with a \$2,000 grant for the Vashon Hydrophone Project. Furthermore, we are thankful to Senator Maria Cantwell for her tireless efforts in securing vital funding for Southern Resident orca recovery.

In December 2004, the Ripley Family of Vashon also made a generous donation to the VHP — Thank You!



ACS/PS is looking for a LCD (powerpoint) projector for our meetings. If you have one to donate please contact us.

Thank You to SOS Printing in Port Townsend, an EnviroStar printer—www.sosprinting.biz— for both great service and the nonprofit discount!

Whulj
"the saltwater we know"

The Newsletter of
the Puget Sound Chapter
of the American Cetacean Society



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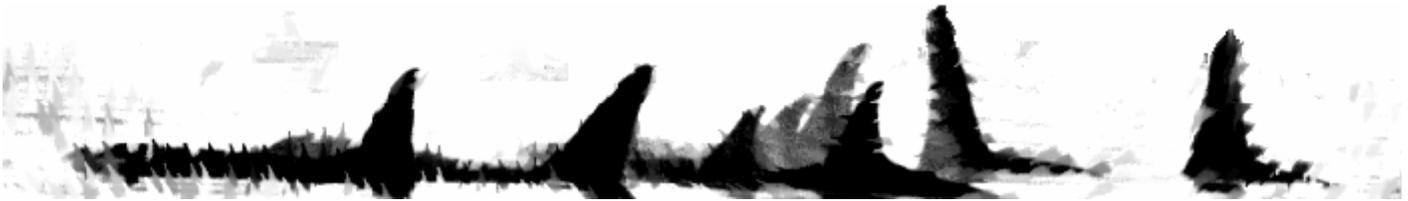
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April 20th meeting—Peter Fromm Whale Tales: Human Interactions with Whales

From earliest recorded history, cetaceans have fascinated humans. Petroglyphs from the Stone Age, Minoan mosaics, and Roman vases clearly depict whales, dolphins and porpoises. Today, after hundreds of years of commercial whaling and the extinction and near-extinction of many species, cetaceans still grab our attention - witness the millions of people who go whale watching each year, the monthly television specials and frequent newspaper and magazine articles about whales, dolphins, and porpoises. Since 1994, Peter J. Fromm has been documenting human encounters with whales. He shares these stories of human/whale interaction in a slide and video show presentation and asks the audience to relate their own experiences with whales. Fromm also gives examples of the changing relationship between humans and whales, and discusses the natural history of cetaceans.

For nearly 30 years, Peter Fromm has been sharing his passion for the sea through photography, writing, and storytelling. He earned a Bachelor of Fine Arts (majoring in photography) from Ohio University and a Masters of Science from the University of Oregon, where he designed an Interdisciplinary Studies Program that combined audio-visual communication with environmental education and recreation programming. Fromm is also a U.S. Coast Guard 100-ton licensed Master and has served as captain and naturalist aboard whale watching boats in the San Juan Islands since 1973. Fromm has self-published two volumes of "Whale Tales: Human Interactions with Whales," unique anthologies of oral histories regarding human encounters with whales.

May 18th meeting —Pat Weyer Sacred Vessels and the "Vesica Piscis", the Cosmic Story of the Human-Dolphin Relationship

Dr. Patricia Weyer's graal glass vessels create a mythical watery world, and reflect her doctoral research on dolphin mythology and the ancient Minoan ritual vessel known as rhyta or rhyton. A desire to study these artifacts adorned with naturalistic images of dolphins led Dr. Weyer to research Bronze Age excavations throughout the Greek Islands. And asking the question, "What is the nature of the human-dolphin relationship?" led to the identification of an all-encompassing metaphor, the "vesica piscis" (vessel of the fish), as a valuable source for the origins of the cosmic story of the human-dolphin relationship. In pagan and Christian traditions alike, the vesica piscis metaphor embodied the feminine aspect of sacred vessels. This form in pottery has been used to conjure and celebrate fertility, as well as the place of creation. Pat will discuss how examining this metaphor through the lens of delphinology (myths and legends about dolphins).

Vashon Hydrophone Project report (cont.)

Orca Nursery ?

(Continued from page 1)

Hy'Shqa (pronounced Hish-ka) is a Coast Salish word for "blessing" or "thank you." A few years ago, Mark attended the naming ceremony for J37 with Samish Nation tribal members and Whale Museum staff.

On December 22nd, J and K Pods were extremely active in Colvos Pass on the west side of Vashon, the site of our hydrophone. Mark and I saw a peachy, wrinkly newborn in K Pod who was not present the day before. Add "orca nursery" to the long list of attributes that make our Island a treasure!

Off the north end of Vashon, Mark determined that the K Pod calf's mom is 18-year-old Spock, K20. This is her first calf. Surprise! Until 2003, researchers thought K20 was male because she has a remarkably large dorsal fin for a female. The Southern Residents constantly humble us and challenge the limits of our knowledge.

K20 and her newborn belong to another distinguished matriline, headed by supreme matriarch Lummi, K7, who is believed to be the oldest Southern Resident orca. K7 is the baby's great-great-grandma. Earlier in the season, Mark videotaped one of the baby's young uncles, K34, Cali, playing with his food, a chum salmon.

The Center for Whale Research confirmed the births and assigned alpha-numeric IDs to the new arrivals: J40 for J14's calf and K38 for K20's calf. Visit the web sites of the Center for Whale Research (www.whaleresearch.com) and The Whale Museum (www.whalemuseum.org) to learn more about Southern Resident genealogy and orca names. The Whale Museum site also has photos of the new calves, taken by Mark's daughter and capable research assistant, Maya.

On January 8, ACS/PS Technology Chair Joe Olson and our skilled VHP diver Todd Gateman spent several hours doing essential repairs and upgrades on the hydrophone. A large, curious male California sea lion inspected Todd's underwater work, thereby enhancing his diving experience. Joe installed a high frequency interface, which would soon bestow huge rewards.

At 5:00 AM on January 10, the one-year anniversary of VHP installation, K Pod validated the success of our hydrophone improvements. The orcas woke us up with a breathtaking, hour-long symphony of calls and echolocation clicks!

Mark Sears photo-documented K Pod off the east side of Vashon-Maury Island later that day. Those busy killer whales were making the rounds.

(Continued on page 4)



NOAA Fisheries comment period for Acoustic Environmental Impact Statement closes March 14

NOAA Fisheries held a scoping meeting on Jan. 20 at NOAA's Sand Point campus in Seattle to gather public input on criteria to be addressed in an Acoustic Environmental Impact Statement (EIS). Board members Uko Gorter and Joe Olson, as well as science advisor Dr. David Bain attended the meeting.

The EIS will look at the effect of applying these standards to the provisions of two federal laws (the Endangered Species Act and the Marine Mammal Protection Act) that forbid harming or killing marine mammals. The EIS will examine the effect on marine mammals of underwater noise from such sources as dredging, geological exploration, military operations, construction and research

The Federal Register notice is on the Web at: www.nmfs.noaa.gov/pr/acoustics/docs/fr70-1871.pdf

For more information on NOAA Fisheries' acoustics program, see www.nmfs.noaa.gov/pr/acoustics/

Contact: Patricia Lawson, 301-713-2322;
Patricia.Lawson@noaa.gov

The comment period ends on March 14th so please make your comments soon.

Vashon Hydrophone Project report (cont) — Foraging Recorded!

(Continued from page 3)

On January 12, we got an afternoon recording of K Pod as the orcas traveled north in Colvos Pass. The pod was actively foraging. We detected clicks and calls on the spectrogram and the hydrophone nearly fifteen minutes before blows or fins were visible.

We could barely contain our excitement about this splendid opportunity to match acoustic cues with observed behavior. Judging by the click trains, hungry killer whales were enthusiastically munching hapless fish. Check the ACS/PS website soon at www.acspugetsound.org to hear samples of what we recorded.

The VHP also acquired a digital camcorder this season. Video nicely supplements our acoustic data and aids significantly in documenting the Southern Residents when they are out of the hydrophone's range.

ACS/PS is proud of the VHP's contributions to Southern Resident killer whale research in Puget Sound. We are grateful for in-kind and financial support from donors, NOAA Fisheries, and The Whale Museum. We look forward to continued successful collaboration with our partners in orca recovery.

Taxonomy (cont.)

(Continued from page 7)

the last decades, there are still many shortcomings in cetacean systematics. To address this problem, a cetacean systematics symposium and workshop was held on April and May of 2004, in San Diego, California. Its report yielded many recommendations to increase the knowledge of cetacean taxonomy worldwide. These include:

- clearing up the species and subspecies concept,
- ranking the attention given to the different taxa, and
- a more efficient and better way of cataloguing and sharing osteological (skulls, bones, etc.) collections worldwide.

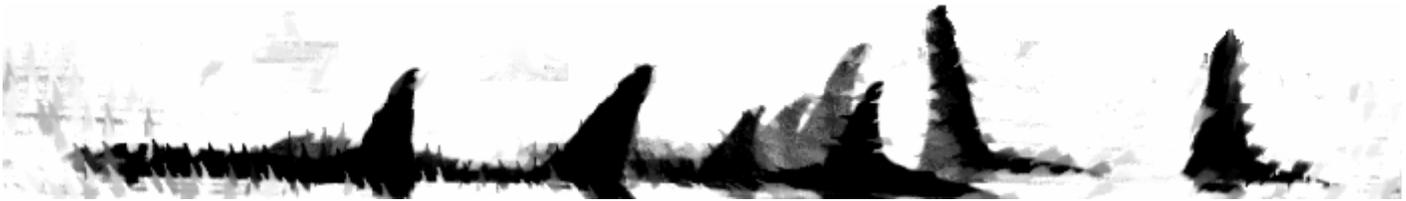
A big step in the right direction was the formation of 'Witness for the Whales'. This Auckland, New Zealand based online DNA bank for whale species identification was started in 2001.

Despite modern advances the Linnaean taxonomy has held up well. There seems to be merit in both approaches. What cetacean classification will look like in a few decades from now is anyone's guess. No doubt we will see many changes and perhaps even newly discovered species.



J34 & J22 — photo donated by Mark Sears © 1998

Sources and Bibliography on page 5 —



Long and short-term acoustic behavioural reactions of *Orcinus orca* to noise pollution (cont.)

(Continued from page 1)

The aim of my study was to compare call structure and call patterns from recordings made before the increase in vessel traffic to recordings from the present. I was generously donated archived recordings by Ken Balcomb of the Center for Whale Research and Rich Osborne of the Whale Museum and given access to the Whale Museums' state of the art hydrophone array situated at Lime Kiln lighthouse to make new recordings. I looked at the length of the main call of each of the pods (J, K and L), as increasing the duration of a signal is a good way to increase its detectability. I compared the duration of each call type from recordings made when no boat noise was detected with recordings when boat noise was present in the recording. I found that each pod was increasing the length of the call by over 10% in noisy conditions, but only in recordings made after the increase in vessel traffic during the past decade.

This suggests that the whales are trying to overcome masking by the boat noise by increasing the length of their call, but that this response has only developed over the past decade in conjunction with an increase in vessel traffic. My conclusions were that at some point during the 1990's the level of noise and the amount of time that noise was present in the whales environment had reached a threshold point beyond which the whales had to develop an anti-masking strategy to effectively communicate. It was not possible to determine if this strategy was effective in compensating for the current levels of background noise.

This work was published in the journal *Nature* and received worldwide press attention, raising public awareness of the threat of noise pollution to cetacean populations.

I also looked at behavioural correlates of call usage, focusing on the use of call types that contain both a pulsed low frequency component and a tonal high frequency component. We were

particularly interested in these calls as the different components have different sound transmission properties, the tone is more directional than the pulsed component and more intense therefore it propagates further, thus this could be used by the whales to coordinate group activity. Other orcas could do this by using the relative intensity of each component and the level of reverberation to judge the distance and direction of movement of the signalling orca.

Theoretical models have shown that the low frequency component is likely to be masked by boat noise and could therefore disrupt these possible functions of these call types. So it is important to understand how the whales are interpreting these calls to be able to assess what impacts boat noise may have on their behaviour.

We found a correlation of increased use of call types containing a high frequency tone during group direction changes, when all three pods coming together and by individuals or sub-pods which were separated from the pod. This suggests that these call types do act as a direction of movement cue and also maintain contact and initiate convergence between separated groups or individuals. Therefore masking of the pulsed component in these calls may interfere with pod coordination, cohesion and reduce the opportunity for social reunification between pods.

This work has just been submitted for publication.

I would like to take this opportunity to thank the Puget Sound chapter of the ACS for their generous support.

Editor's note:

Andy Foote was a 2004 ACS/PS research grant recipient

Taxonomy (cont.) - Sources and Bibliography:

(Continued from page 4)

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Taxonomy

by Uko Gorter, ACS/PS President

Most of us probably know that *Orcinus orca* is the scientific name for killer whale, or orca. Perhaps you may even know what a *Peponocephala electra* is. While we have come to accept these unpronounceable scientific names, much like power lines in today's landscape, we rarely take notice. Why are they there? Who came up with this stuff? Is it necessary?

In this article, we will take a look at this science, called "taxonomy". We'll look at its history, application, and recent developments. Of course, our focus will be with the whales, dolphins, and porpoises, and how it applies to them.

Taxonomy, it's Greek to me

Indeed, the word 'taxonomy' is Greek, from the word *'taxa'* meaning 'arrangement', and *nomos*, 'law'. Taxonomy is the science of classifying all known, living and extinct, organisms, and grouping them in a hierarchy of ascending categories. Basically, it is a way to organize the diversity of the natural world. Our dependency and curiosity towards the flora and fauna around us, made us give them names and catalogue them. While our modern system dates back to 1758, its roots go back thousands of years.

From Aristotle to Linnaeus

The earliest and most well known classification system is that of the famous Greek philosopher Aristotle (384 BC-322 BC). His system divided the natural world in plants and animals. Animals were in turn divided as having (red) blood and being bloodless. The animals with blood were then split in 5 groups:

1. four-legged land animals or quadrupeds, giving birth to live young (land mammals)
2. birds
3. egg laying, four-legged land animals (reptiles and amphibians)
4. fishes
5. whales

Aristotle observed the differences between fishes and whales, but did not make a connection with the viviparous (live young bearing) land mammals.

Aristotle's classification remained virtually unchanged until the mid 16th century. This was mostly because the church, which yielded a great deal of power in most of Europe during the middle ages, did not look favorably upon scientific advancement. But during the Renaissance and aided by the developments of the printing press, science was once again 'in'. This was also the time of discoveries of new continents, and science was eager to find new and exotic species of animals and plants.

steps forward in scientific classification, and is regarded as the father of modern zoology. His three-volume work of 'Historia Animalium' (1555-1558) is regarded as the most important work on zoology since Aristotle's writings. Gessner's books were richly illustrated with scientific engravings, and often copied in later works. However, whales were still depicted as savage sea monsters.



whale illustration from Conrad Gessner's, *Historia Animalium*

Latin became the language of scholars and academics. If you wanted to make your work immediately available to the whole learned world of the day, writing it in Latin was essential.

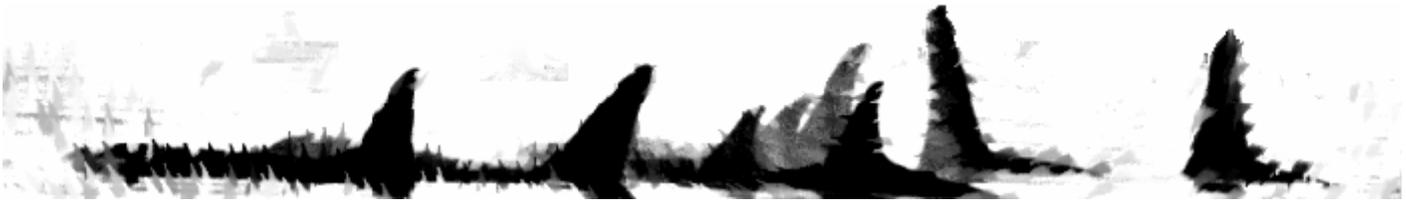
While many other naturalists and zoologists since Gessner have made their contributions to the science of taxonomy, it was John Ray (1627-1705) who advanced it to a new level. This deeply religious English naturalist published a number of works on flora and fauna, as well as natural theology. His classification system was devised according to shared similarities and differences, but always showing the Divine Order of creation. John Ray strongly believed species were fixed and did not become extinct. Although he expressed hints of doubt later in life, when he received fossils of unknown plant specimens.

Just two years after John Ray's death, Carl Linnaeus (1707-1778) was born in Stenbrohult, in the province of Småland in southern Sweden. He shared the same interest in plants, as his father Nils, an avid gardener, and quickly learned their names. It was hoped however, that young Carl would follow in his father's footsteps as Pastor in the Lutheran church. It was soon clear that he did not show any affinity in this direction, and a career as physician was recommended. Carl excelled academically at the Upsalla University, where teaching standards were dismal at the time.

Linnaeus received his doctorate at the University of Harderwijk in Holland, well known for their 'instant' degrees for which only a brief residence was needed. It was in Holland where he wrote his first edition of 'Systema Naturae' (1735), along with his

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Conrad Gessner (1516-1565), a Swiss naturalist, took major



Taxonomy (cont.)

(Continued from page 6)

Swedish friend Peter Artedi. However, Artedi soon died in a freak drowning accident, and it was left to Linnaeus to finish their work.

In 'Systema Naturae', Linnaeus recorded all known plants and animals at that time, and like John Ray, saw it as his duty to classify God's creations. More importantly, he used 'binomials' for the scientific names. Basically, each organism received two Latinized names, first the Genus and secondly the species or trivial name. The Genus is capitalized, the species all in lower case. Both underlined and italicized. Prior to Linnaeus, there was no single accepted method of naming species. Names were descriptive, but awkwardly long, unstable and inconsistent.

While 'Systema Naturae' ran twelve editions throughout Linnaeus' life, it was his tenth edition in which he consistently used the binomial nomenclature, which is now regarded as the official starting point of our modern zoological taxonomy. For plant species this would be Linnaeus' publication of 'Species Plantarum' (1753). Therefore, any species described before these dates are regarded as invalid. Linnaeus, distinguished 7,700 plants and 4,400 animals in his lifetime, and gave us 6 species of whales and dolphins.

Linnaeus had his critics of course, but dealt with this in his own way. He would simply name a newly described unpleasant little weed after one of his detractors.

Linnaeus too, thought that species were fixed, although he acknowledged later that they could evolve through hybridization.

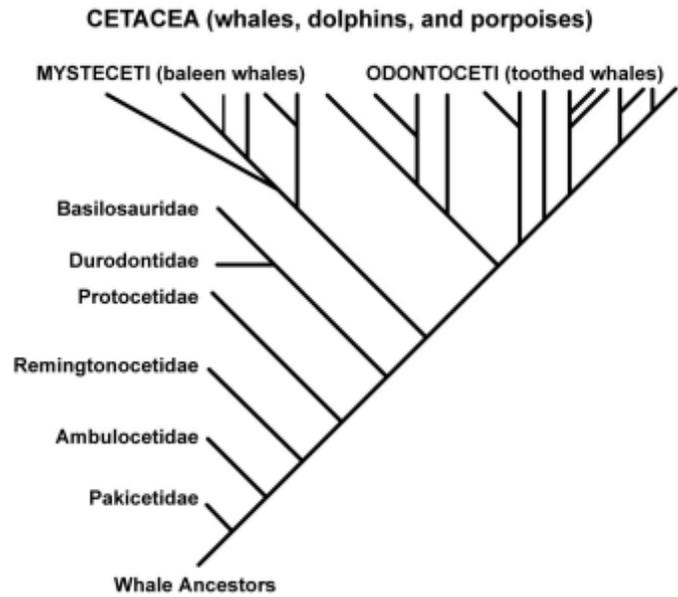
From Darwin to DNA

Approximately a hundred years after Linnaeus' tenth edition of 'Systema Naturae', Charles Darwin (1809-1882) published his controversial findings in 'The Origin of Species' (1859). This important work on the theory of evolution shook the scientific and religious world.

He was not the first person to ponder this theory, however. Before Darwin, it was George Cuvier (1769-1832), who questioned; "*Why has not anyone seen that fossils alone gave birth to a theory about the formation of the earth...*" This French scientist, who established the basis for vertebrate paleontology and created comparative anatomy, firmly established the fact of extinctions of past life forms.

The theory of evolution eventually gained more and more acceptance in the world of science. Taxonomy too, had to evolve to reflect the principle of common descent. In the 1960s, the new trend in taxonomy was cladistics or phylogenetic systematics. From the Greek, *clados*, meaning branch, this modern system seeks to group organisms by evolutionary relationships.

This is typically shown in what is called a 'cladogram', which is a tree like relationship-diagram branching off from a shared ancestor to different sister taxa.



cladogram of the order Cetacea (after Thewissen Lab).

As DNA (Deoxyribonucleic acid) sequencing has become more advanced, phylogenies are increasingly constructed with the aid of molecular data. The genetic data used for analyzing marine mammal populations is most commonly done with the maternally inherited DNA, called Mitochondrial DNA (*mtDNA*).

Today, any additions or changes to zoological names, from the rank of superfamily down to the subspecies level, is governed by the International Commission of Zoological Nomenclature (ICZN). This official scientific body is responsible for providing and regulating that every animal has a unique and universally accepted scientific name.

Where do we go from here? Why is Taxonomy Important?

Understanding cetacean taxonomy is a vital part of their management and conservation. With the increase of pollution, ocean noise, and a renewal of whaling, recognizing distinct species and populations of whales and dolphins may help identify which ones are at risk. Despite much of the progress made in

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SAVE THE DATE—February 16th

Phinney Neighborhood Center, Room 6, 6532 Phinney Ave. N., Seattle, 7-9 pm, (just north of the Woodland Park Zoo)

Uko Gorter—Why Are Killer Whales Black and White?

This presentation will take a close look at color patterns in cetaceans. Uko Gorter, ACS/PS president, will discuss the patterns' function and usefulness to us in identifying individuals, and in recognizing their taxonomic relationship as species. We hope that you not only come away with some interesting new terminology, but also with a renewed appreciation of these beautiful animals.

Uko Gorter is a natural history illustrator specializing in marine mammals. He has illustrated a number of field guides on marine mammals, whale watch brochures, interpretive signs, and magazines such as Ranger Rick. Uko has an insatiable curiosity about the subjects he draws. "Researching what you are illustrating is immensely rewarding and just plain fun," says Uko. Please visit Uko's web site, www.ukogorter.com, for more information about him and his work.

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