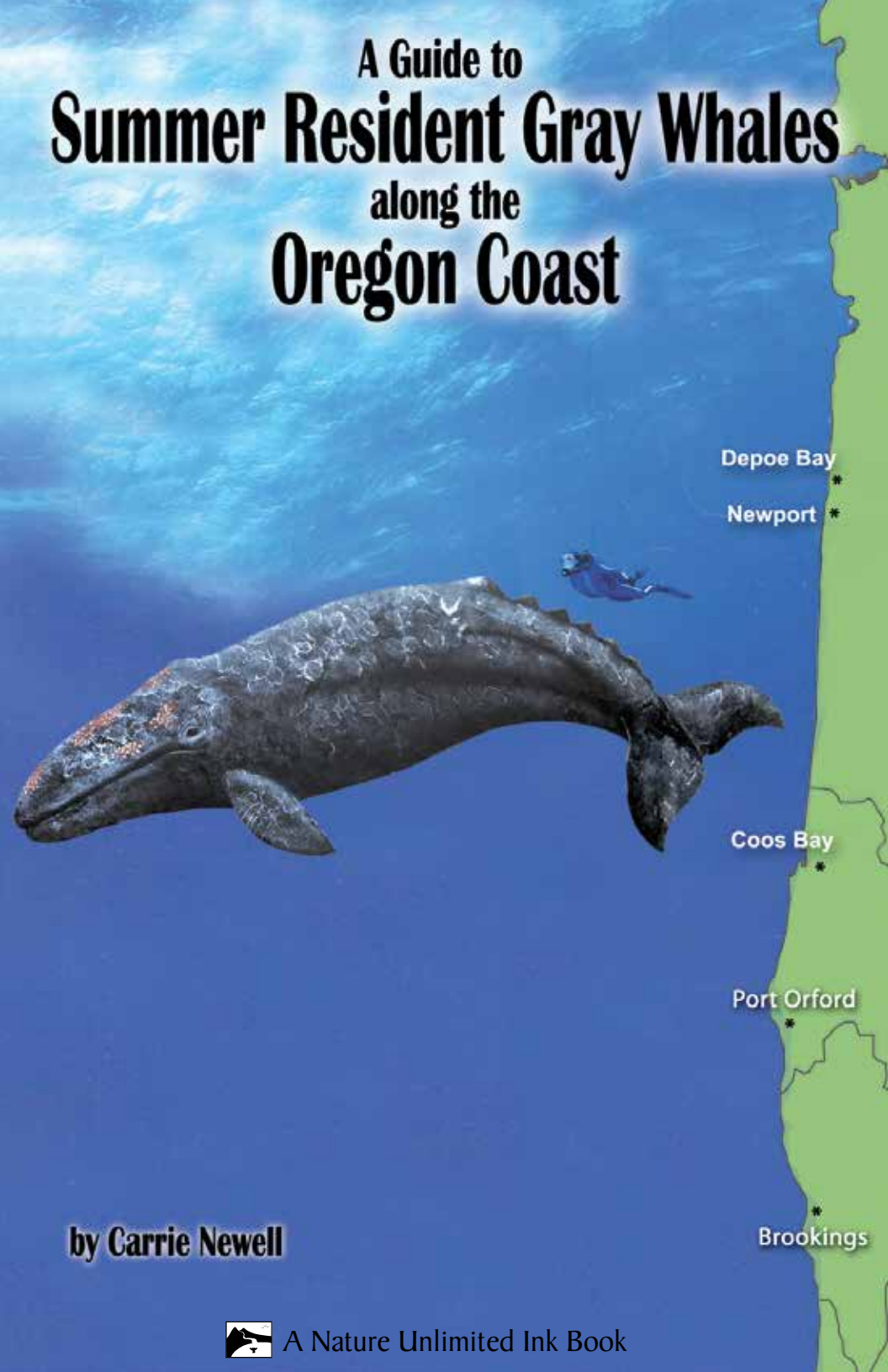
A Guide to Summer Resident Gray Whales along the Oregon Coast



by Carrie Newell

A Nature Unlimited Ink Book

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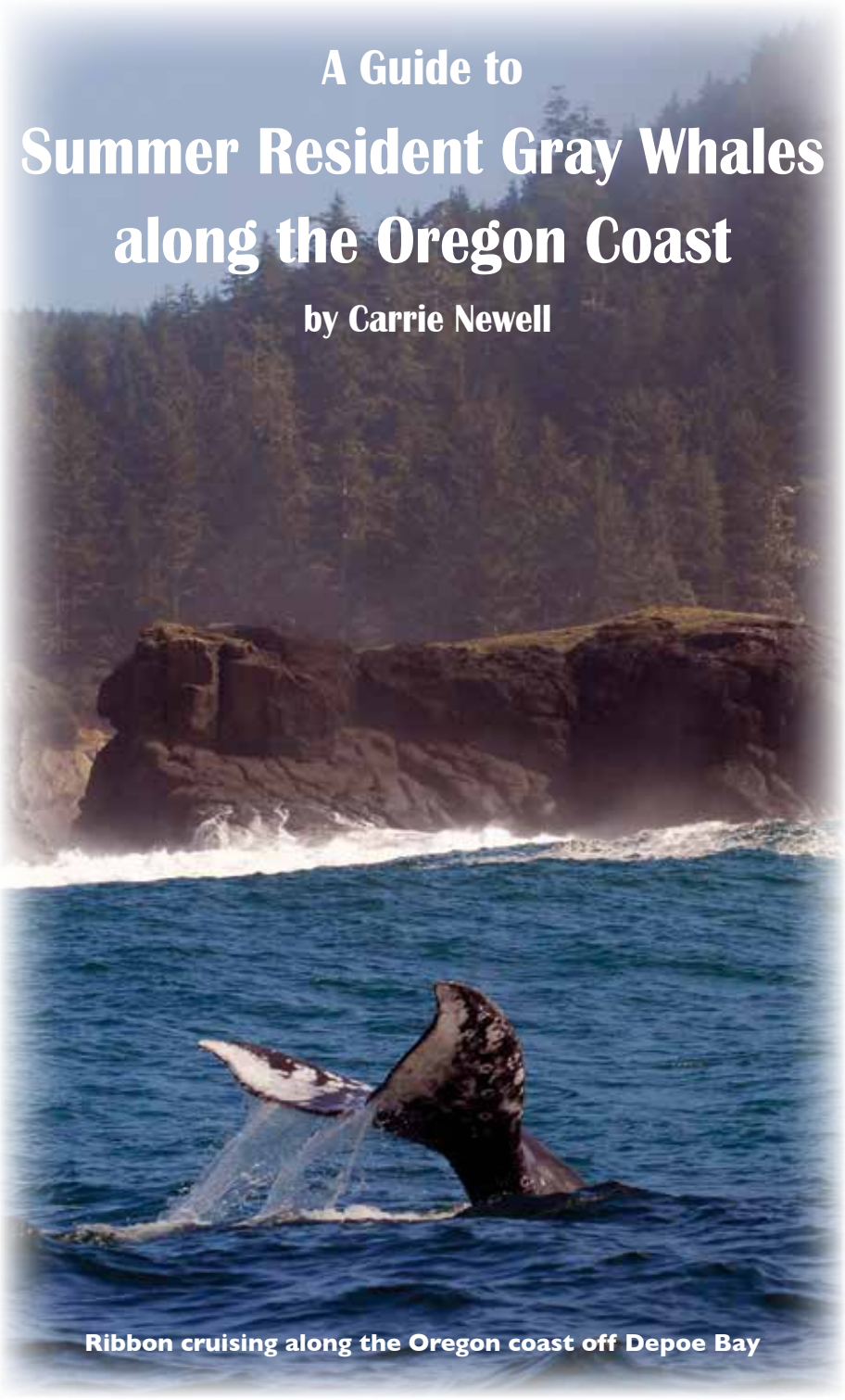

Ribbon cruising along the Oregon coast off Depoe Bay

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First Edition, April 2005,
Second Edition, December 2005
Third Edition, September 2009
Fourth Edition, December 2010
Fifth Edition, June 2013

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Dedications

This book is being dedicated to my awesome dad and mom and also to my grandson whose life was too short plus four incredible people from Depoe Bay who passed that either worked on the ocean out of Depoe Bay or had sons that worked on a charter in Depoe Bay. Dad and mom have always supported me in any of my endeavors and most recently, my Whale, Sealife and Shark Museum. They flew out Memorial Day of 2012 to finish up last minute details before its grad opening that week-end. Dad and I stayed up to 3:30 in the morning finishing everything up. Dad also helped me with a number of whale cut outs and repaired my thresher shark. For the special people in Heaven, I want to take a moment to remember them. My grandson, Matthew, who lived for only two months since he was born 3 months premature, my good friend Jim Tate who was the first person to do Zodiac rides to see the whales in Depoe Bay and who taught me lots about the grays. Jim was extremely respectful of these gentle giants. I also want to remember Gordon Wolfe, Max Haight and Mary Calkins. Both Gordon and Max died on the same day and their sons, Buddy, the deckhand on the Mr. Max and Brad the captain of the Mr. Max, the boat named after Max. Heaven got a double whammy that day! Mary's son Craig runs the Sunrise. I will miss all of these special people very deeply! My heart goes out to their families!

Larry & Grace

Matthew

Jim Tate

A Big Thank You For Book Design and Layout Charles Hall 541-579-3720

About the Author: A Childhood Dream

Growing up in the Midwest, along the shores of Lake Huron, I always dreamed of becoming a marine biologist. I would swim in the lake and pretend I was on an adventure with Jacques Cousteau. I read every book and watched every show that was related to the ocean. My first venture to the ocean was not until I was 14 years old and my next trip to the ocean was not until I was 24. Through faith and perseverance, my dream to become a biologist persisted although many barriers had to be overcome. After getting married, I followed my husband from Michigan to South Dakota, to Utah, and then Arizona. In each state I would pick up a degree although nothing in marine biology and no ocean in sight. After getting a Bachelor's degree in Fisheries and Wildlife from SDSU and another B.S. in Biology from SUU, I began teaching Biology and Chemistry at a high school in Utah. After a year we moved, pregnant with my oldest daughter, to Arizona. There I taught biology at Yavapai Community College and began a Master's program at Northern Arizona University in Invertebrate Zoology. While teaching, going to school, and waitressing, I got pregnant with my youngest daughter. Upon completion of my M.S. degree, I applied for and was accepted to a professorship position at Lane Community College, Eugene, Oregon. My girls, dog, and I moved to Oregon. At this point I began teaching marine biology. To become knowledgeable, I took every course that was offered in this field and took my girls to the coast at every opportunity. Since marine biology has always been my passion, I excelled in the areas concerning the marine environment. I passed this expertise and love for the field on to my daughters and both can easily converse in any marine biology jargon. By the time Amber was 15 and Ariel only 10, they were both certified divers and we began SCUBA excursions. I was happy, my dream was becoming a reality but the drive to do research was growing stronger. While supporting my daughters with my teaching job, I began a graduate program at Oregon State University, first in Science Education and then in Biological Oceanography. Presently I have finished the degree and now I am still researching the summer grays and teaching during the school year.

My passion lies in both teaching and marine biology and over the years I found this passion to be infectious since many of my students now work in the marine biology field. After working with gray whales since 1999, and making new discoveries about these whales, I decided to begin an ecotourism business called Whale Research EcoExcursions. I have a strong desire to share my gray whale knowledge with people all over the world and what better way to share it then by taking people into the gray whales' realm and teaching in situ.

After many years, I have achieved my dream-I am a Marine Biologist! My advice to anyone, especially young adults, is to determine what your passion is and go for it!

My Whale Family

I can barely make it through the school year as I anxiously await the upcoming summer and the arrival of my gray whale friends. Our summer resident gray whales start appearing around Memorial Day and stay to about mid October. I always wonder which individual gray whales will show up that year and hope they will once again recognize my boat, my dog and with any luck, me. Many of us experience a separation from family and friends as people become progressively more scattered around the U.S. and world. My human family is a prime example of this phenomenon living in MI., N.D., WA., CA., AZ., and CO. I so look forward to the times I can spend with both my human family and my whale family. When first getting together with family, you spend the day catching up on "the news." I do this same thing with my whale family, seeing if they have a calf, if they are in good or poor body condition, if they have been attacked by killer whales or if they have the same personality quirks. It's so fun! My favorite gray whale is Scarback and having seen her every summer since 1992, I have seen how she is "turning gray." Looking at her photos on p.50 you can see how her flukes have gone from dark gray to almost white!

Photo by: Ray Lusson

Using a plankton net

Explore the Kingdom of the Gray Whale and Journey into its Habitat with Whale Researcher, Carrie and her deckhand dog, Kida

Be involved in cutting edge gray whale research by joining us on our research vessel, a 6-person Zodiac, the Sea Star. One or two hour tours are available. Tour the beautiful Oregon coast, identify resident gray whales, log their behaviors, collect whale food or fecal material, and observe whale prey in their habitat with an underwater camera.

EcoExcursions: Educational Whale Watching

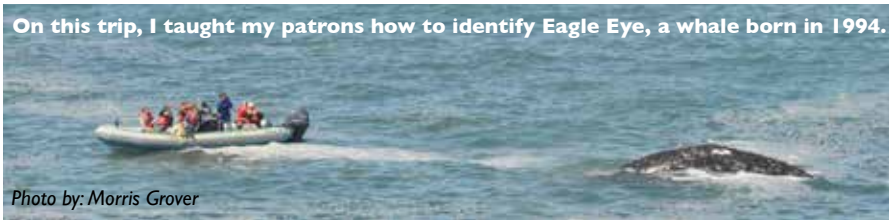

On this trip, I taught my patrons how to identify Eagle Eye, a whale born in 1994.

Photo by: Morris Grover

Have you ever had the dream of becoming a Marine Biologist? Have you ever marveled at nature programs and wondered what it would be like to be one of those researchers? Well, here is your chance! Join gray whale researcher and marine biologist Carrie Newell as she takes you into the realm of the gray whale.

Daily ocean trips will give patrons the opportunity to photograph and identify individual gray whales plus help name new whales AND learn the names of other wildlife (birds, seals, sea lions, etc.) that live along the coast. YOU will learn on my trips. Be an active learner not a passive passenger!

On this trip I taught my patrons how to identify DD and showed them the killer whale tooth rakes on her body.


Photo by: Morris Grover

First mate Kida at the helm.

Experience the excitement of a Zodiac. This extremely stable boat prevents most people from getting seasick plus it is fast so we can view numerous gray whale localities.

SIGN UP

Go To:
www.oregonwhales.com
Or Call:
541-912-6734

Trips will run through summer, from mid-June to the end of September, prime time to see our resident gray whales

A Day in the Life of a Researcher

by Morgan Sky & Carrie

The sun is just cresting over the coast range mountains as you hear the water gently lapping along the shore. Western gulls cry out "Good Morning" as they create a spectacular ballet against the pale orange morning sky. You are here to experience a journey! As you glide along Depoe Bay harbor, sitting low in a Zodiac, the pea green water is calm. A dappled gray harbor seal bobs gently near the boat, her curiosity as great as yours. Dipping beneath the Depoe Bay bridge, gulls scatter from the Zodiac's path in the early morning light. You find yourself gasping in awe as you clear the smallest navigable harbor in the world and enter the great expanse of the mighty Pacific with its gently rolling white-capped waves spreading out as far as the eye can see. Coasting up to the red buoy, floating gently with the rhythm of nature's music, you spot a lone California sea lion resting next to the clanging bell.

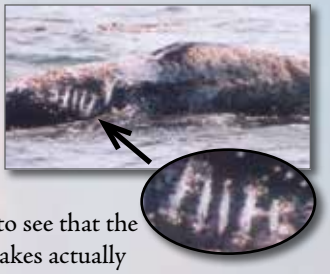
You laugh with delight as he raises his head and barks a greeting. You wonder if this male loser will ever successfully compete for that harem of 30 females. As you round the buoy, the 500 pound animal slips beneath the waves with unbelievable grace. Zipping south to Whale Cove you experience an incredible roller coaster ride.

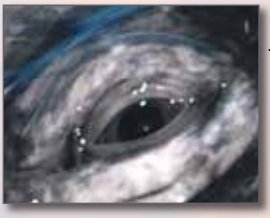
With the mist on your face and the smell of the ocean in your nostrils, you are about to encounter and learn about one of the largest creatures on this earth.

You have come to study the resident gray whales during their summer feast. It's all about food! Here the 40-ton behemoths have come to gorge on the one-half inch mysid shrimp which enjoy residence in the bullwhip kelp beds. What these small creatures lack in size they make up in numbers with billions making up a swarm. Numbers are essential since one gray whale engulfs a ton of these critters per day.

As you approach a kelp bed, the Zodiac coasts to a rolling stop. You carefully lower an underwater camera into the forest of gently swaying kelp fronds. At 30 feet the screen becomes alive with a massive swarm of mysids moving to and fro in their watery environment. Watching these small stalked-eyed critters, makes one wonder what goes on in such a tiny mind. Suddenly, near Whale Cove, you spot a heart-shaped blow and then the telltale sign of feeding as the left tail fluke

rises above the water in the kelp beds. Why the whales feed on their right side-no one knows. As you approach closer, you hear the rush of 200 mph breath as it rises into the sky. A massive head, covered with a heavy coat of barnacles, rises slowly out of the water. You hold your breath as the gray whale catches your eye and stares at you for a moment that feels as though you were gazing through generations of time. A gigantic back appears followed by the uniquely scarred dorsal hump and finally a brief sighting of the tail fluke. You are excited as you flip through your ID book. Yes, this is a whale you recognize, it's Scarback, a whale that marine biologist Carrie has been charting for several years. Wishing it a successful food harvest, you mark on your GPS where she was seen, noting with delight that she had returned for her nineteenth straight year. Suddenly, a mother and a calf appear so close to the edge of the Zodiac that you could reach out and touch them. Amazingly, this giant knows you are there, comes within a hairs breadth of the Zodiac and doesn't so much as bump it. Recognizing the mother with the slash on her dorsal hump, you grab your book and wow it's Matrix Slasher! Checking all available data, you realize that no one has recorded her as having a calf! Upon closer inspection, you notice killer whale tooth scarring along the right side of the calf's head and with a sigh of relief you realize that it had survived a transient killer whale attack. You are shocked to see that the calf's tooth rakes actually spell out the word N-I-F-E and so the calf is dubbed Nifer. Part of your job here is to name newly seen whales. Each day as you record and share your data with others, you find more fascinating bits of information about the gray whales and the other inhabitants in their watery realm.



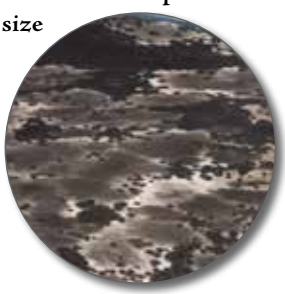


By being able to identify individual gray whales, marine biologists are better able to determine their longevity, behavior patterns, residency times, migration, feeding, birthing and the unique personality quirks of each individual whale. Through education, humans can learn to share the ocean realm with one of the gentlest of all giants, the gray whale.

A Closer Look: Physical Characteristics

The most conspicuous identifying characteristics of gray whales are their size, distinctive mottled gray coloring, dorsal hump (no dorsal fin) and the knuckles immediately behind the dorsal hump. **Size:** Gray whales range in size from 35 to 45 feet long, and weigh 30 to 40 tons - about the length of a school bus and the weight of ten elephants. Females are about 5 feet longer than the males. Gray whales are intermediate in size compared to other well-known whales. In comparison, blue whales are 80 to 100 feet long and orcas (killer whales) are 20-25 feet long.

Coloration. Gray whales are named because of their mottled gray coloration. The natural pigmentation can range from almost black to almost white, and can include white spots that range from the size of a marble to a basketball. This mottled appearance is enhanced by barnacles, barnacle scars, and whale lice.



Rostrum (Head Region). The rostrum extends from the tip of the snout to the blowholes, a length of about six feet. The rostrum of adult gray whales is covered with barnacles and whale lice. Gray whales that feed on the bottom, rub off barnacles on a specific side. Most gray whales are right "rostrumed", feeding on the right side, but a few are lefties.

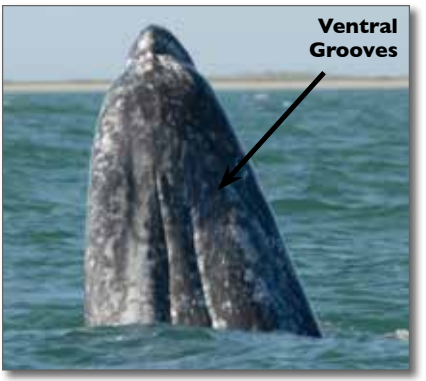
Young gray whales have a dimpled rostrum with one sensory hair in each dimple. As the whale ages, the dimples and hairs become less prominent due to increased blubber thickness.

A Closer Look: Spouts, Blowholes & Baleen

Blow - The gray whales' blow is 6–10 feet high and is heart-shaped if seen from behind on a calm day. About 100-150 gallons of air is expelled from the blow at speeds that range from 150 and 200 miles per hour. The blow pattern is variable, averaging three-five minutes underwater and from three to five blows at the surface.

Blowholes - Like all baleen whales, gray whales have two blowholes unlike toothed whales which have only one blow hole.

Baleen Plates - About 300 blonde baleen plates approximately one foot long hang from the top jaw. Bristles on the inside edges of these plates trap food organisms.

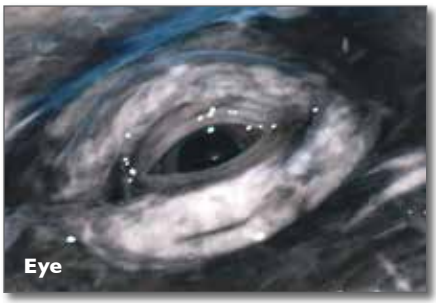


Flippers - Behind the throat grooves and below the blow holes are pointed, paddle-shaped flippers that have digits like human "fingers."

Ventral Throat Grooves: Two to five throat grooves on the bottom of the throat expand when the whales are feeding. Notice the 2 white grooves as this whale spyhops.

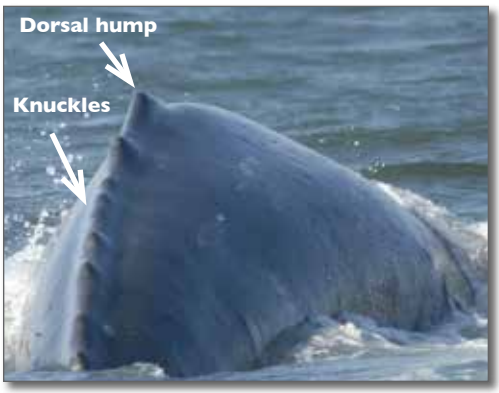
A Closer Look: Eyes, Flukes and Knuckles

Eyes - The eyes of the gray whale are brown in color and the size of an orange. Eyes are located at the end of the mouth line, seven or eight feet from the rostrum tip. They have very good eyesight.



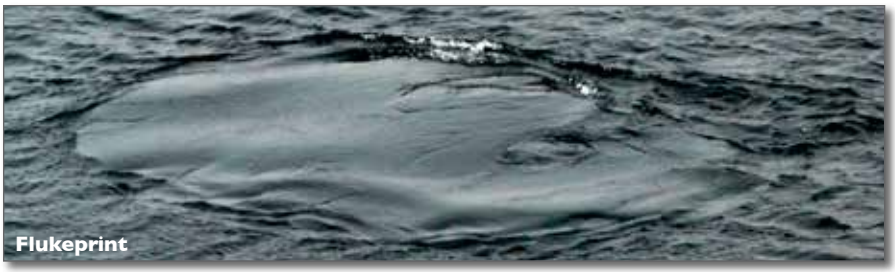
Dorsal Hump - Gray whales have no dorsal fin, instead they have a dorsal hump on the back. Like human fingerprints, the patterns on the dorsal hump are unique and this is what most researchers use to identify individuals.

Knuckles - Behind the dorsal hump are 6–12 bumps called knuckles. In some whales they are very distinct and in others they are not. The shape and size of the knuckle and the distances between each knuckle can also help identify individuals.



Tail Fluke - An adult's tail fluke is 9 feet wide. Each fluke has a characteristic pattern and therefore the flukes can also be used to identify individuals. The dorsal (top) and the ventral (bottom) surfaces of the tail fluke have different patterns.

Flukeprint - A large circle of smooth water formed by tail fluke turbulence as the whale goes under the water on a deep dive.



A Closer Look: Behaviors


Gray whale breach

Breach - In a breach, three-quarters of a whale's body comes out of the water and the whale then lands on its side. Possible causes for breaching include communication with other whales, attracting mates, threat displays, play behavior, dislodging barnacles and whale lice, or just for the fun of it.

Spyhop - In a spyhop, the head comes out of the water vertically, with the eye usually exposed above water. Many times the whale is checking its surrounding or observing you with intimate eye contact.


Double spyhop

Sharking Behavior - When gray whales feed in shallow water (less than 30 feet) on prey items like mysids, they typically go on their right side and suck up their food which is located just above the bottom. On the surface, this feeding activity is evidenced by a partial tail fluke sticking up, usually the left fluke. When uninformed people see this "fin" they think it's a shark fin and sometimes become alarmed.

Skim Feeding - Gray whales skim feed by opening their mouth as they travel along the water surface. They are trapping planktonic organisms like crab larvae in their blonde baleen plates. Notice the front and side views.

Fluking - When a whale wants to take a deep dive, it raises its tail flukes to propel itself powerfully downward. Just before the whale dives, its dorsal hump arches up and then the tail flukes rise above the water's surface. If you see this behavior, "You have been Fluked!"

Killer Whale Tooth Rakes - Many times tooth rakes from killer whales are visible on the flukes. Killer whales grab the fluke to slow a gray whale down in order to kill it or its calf. Notice the tooth rakes on the fluke to the right. About 1/5th of the whales in this book have been attacked.

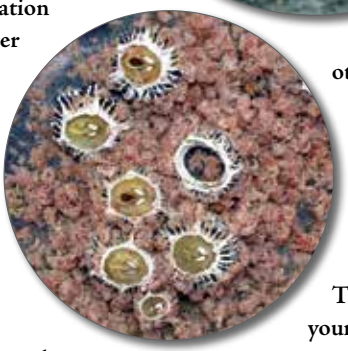
Kelping - Term used when a whale has kelp draped over its body which may be done on purpose for rubbing or dislodging barnacles and whale lice or just by accident as they rise through the kelp beds.

(Top) notice the kelp draped over the knuckles of a gray whale.

(Left) Bullwhip kelp stipes in the fluke notch of a gray whale. This "apparently" feels good since certain whale species intentionally put the kelp stripes in their fluke notch.

A Closer Look: Hitch-Hikers: Barnacles & Whale Lice

Barnacles are a fact of life for gray whales. Hundreds of pounds of barnacles can be found on gray whales—the most found on any whale species. The acorn barnacle, *Cryptolepas rhachianecti*, is host-specific; it attaches only to gray whales. Larvae of barnacles attach to gray whales in the nursery lagoons when baby whales are born. Barnacles stay attached to one whale as long as they live, filter feeding as they hitch a ride through nutrient-rich waters. Barnacles feed by sticking out their legs to comb the water for plankton. Barnacles depigment the skin when they attach; and when barnacles die and fall off, they leave a round white circle or ring about the size of a silver dollar. Barnacle scars create a unique pattern on each whale which can aid in the identification of individuals. The other hitchhiker is the whale louse. These are not true parasites because they feed on skin and damaged tissue and in fact keep many of the wounds infection free. These hitchhikers can be found not only in wound areas but also around the blowholes, skin folds and interspersed with the barnacle clusters. The are not actually lice, they are a type of amphipod, related to what gray whales feed on in Alaska. Three different species of whale lice can be found on gray whales with two of these species unique only to the gray, *Cyamus scammoni* and *Cyamus kessleri*. A third species, *Cyamus halize*, is also found on other slow moving whales. The largest whale louse, *Cyamus scammoni*, is the most abundant louse on the gray whale and there can be over 200,000 of them on one whale. The other two species can make up another 100,000. All together over 300,000 whale lice can be on one whale. Whale lice can attach as larvae from the plankton or can be transferred from one whale to another with any bodily contact. Transfers occur especially when young calves rub against their mom or nurse.



A Closer Look: Hitch-Hikers: Barnacles & Whale Lice

Barnacles showing the feeding legs retracted on the left and extended out for filter feeding on plankton on the right.

(Right} Notice the barnacle and the barnacle scar. When a barnacle attaches to the skin, it permanently depigments the skin leaving a unique barnacle scar. Many of these scars are used to identify individual whales.

(Left) This is a young calf that has the beginnings of a barnacle patch and whale lice at its mouth line. These barnacles will live on the calf the rest of their life. On the right is a close-up of whale lice living on the skin of a gray whale.

(Left) Here is a clump of barnacles attached to whale skin. Young barnacle larvae leave the plankton and attach to a young calf's skin while in the breeding lagoons of Mexico. The barnacle spends its whole life attached to one individual whale.

A Closer Look: Migration Route

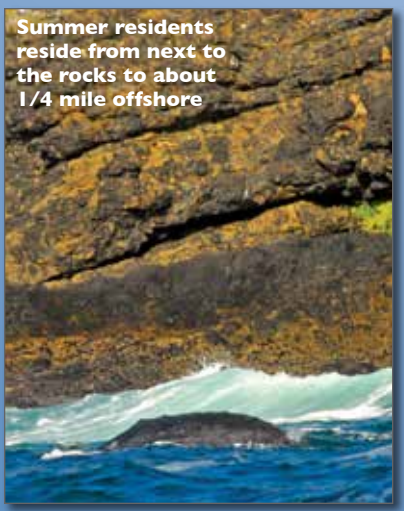
Gray whales can be seen off the Oregon coast almost every month of the year. Summer residents reside along the Oregon coast from May-October. Migrating whales can be seen on their southbound migration from December-January en route to three lagoons in Baja California—San Ignacio, Magdalena Bay and Scammons Lagoon—where they mate and give birth to their calves. In San Ignacio lagoon, we hear of the friendlies. These gray whales purposefully and willingly come up to boats to interact with humans. If you do not interact with them, they leave and find another boat that will interact. Many times mothers will push their newborn calf up to a boat for a human encounter. It is unclear as to the true purpose of these actions on the part of the whale. Oregon whale watchers also encounter very friendly whales during the summer months, although it is illegal to touch them in U.S. waters.

The northbound migration of gray whales is from February through June as they head to their Arctic feeding grounds in the Bering and Chukchi seas. Later in the spring (April -June) many mother/calf pairs are seen heading north. Females with their calves need to travel slower.

Carrie petting a calf. Calves are born from 12-16 feet long and weigh a ton

Carrie petting a female "friendly" gray whale in San Ignacio Lagoon

Migrating whales are typically 1-5 miles offshore



Summer residents reside from next to the rocks to about 1/4 mile offshore

Alaskan Feeding Grounds

The migrating gray whales can be found in the Arctic from May - November

Alaska

Canada

Summer residents breaking away from the main migration and residing between northern California and Vancouver Island for the summer.

From 17,000-20,000 gray whales migrate between Mexico and Alaska each year.

Northbound whales travel 1-3 miles off-shore

Depoe Bay, OR
Newport, OR

U.S.A.

Baja California, Mexico

Southbound whales travel 3-5 miles off-shore

Scammon's Lagoon
San Ignacio Lagoon
Magdalena Bay

Mexico

Notice the dimpled rostrum of this young calf as it approaches the boat in San Ignacio Lagoon

Gray whales can be found in Baja California from December through March

Friendly Gray Whales in Mexico

The gray whale is one of the most curious of all the cetaceans (collective name for whales, dolphins and porpoises). It is the only species that I am aware of that literally pushes its baby up to boats in the lagoons of Mexico so humans can interact with them. Having been a naturalist in San Ignacio Lagoon, I am convinced that the moms use humans as a baby sitter. My good friend Linda and I observed this behavior various times. The mom would bring the calf up to the boat and then many times would leave and rest about 30 feet away from the pangas while the calf continued to interact with humans. The calf would spyhop (stick its head straight up) and look at the people or approach the boats close enough to be "petted." We observed one calf that repeatedly went from boat to boat interacting with people until it was so tired that it could barely keep its eyes open yet it still came and interacted. The friendly gray whale moms seem to be passing this "friendliness" onto their calves.

Linda, my daughter Ariel and I having a close encounter in Mexico

Me kissing a whale

(Above) Mom and calf approaching boat.

(Right) Adult spyhopping to check out the people.

Friendly Gray Whales in Oregon

I have also seen this "friendly" behavior with Oregon's whales. Although they are only in Oregon to feed, I believe they still are innately curious and love to surprise humans with various antics. Having worked with Oregon's gray whales for almost 20 years and seeing 1000's of them over the years, I know they have a sense of humor. Many, many times they pop up a few feet from my boat and I scream with excitement… and I am sure they get a chuckle out of it. My dog, Kida, is also on the boat with me and I also believe they like teasing her. Kida is very attuned to the sea life, especially the whales and various times I have had a whale travel along the length of my boat while Kida runs on the tube following it. Various other researchers have told me that people with dogs have better whale encounters possibly because of some connection between the two. I have also observed that if I am excited and clap or call to them then the whales feed off this excitement and approach closer. Numerous times whales have T-boned it right to my boat when I am very excited.

Below: Close whale encounters with my patrons and Kida

Courting Whales

Courting and mating can be seen in the lagoons of Mexico and also along the migration route. BUT if you are in Depoe Bay, Oregon in September, you probably will also see courtship. The majority of the time that gray whales are in Oregon is spent on feeding but after their fill of food, they become energetic and frisky and then there is another activity they like doing. Throughout September, they court! I have seen various whales either traveling side by side and fluking synchronously or a male following closely behind a female.

Occasionally we see a mating triad and once in a great while, we see the 6 foot long "pink floyd" of the males. Although females probably can't get pregnant at this time of year, I think they like practicing. Females have a gestation period of 12-13 months so it would not be beneficial to have a calf in fall while migrating. Some of the whales I have tentatively called females is because they are in the lead of the courtship and they are larger (remember female grays are about 5 feet longer than males).

Courting progression in Depoe Bay with the male initially following the female, Joker, then...fluking up together for a deep dive to practice...

Courtship in San Ignacio where whales rub and roll over each other

Courtship while on the migration route as these two whales rolled against each other and fluked in synchrony.

Series of three shots showing two whales off Depoe Bay courting with the lead whale probably a female.

Doorknob following Stretch during courtship activities in September off Depoe Bay.

History of Summer Resident Gray Whales

For hundreds of years the California gray whale has been migrating from its breeding lagoons in Mexico to its feeding areas in the Arctic Sea. Yet in the 1960's and 1970's researchers observed that a few gray whales were spending their summers along the coasts of California, Oregon, Washington, and British Columbia. These were the early beginnings of what we now call the summer seasonal residents or the Pacific Coast Feeding Aggregation (PCFA).

Me with crossbow to help collect DNA samples

Photo: Johnathan Scordino

A photo-identification study of the summer seasonal residents off Vancouver Island began in 1972 by Dr. Jim Darling. Jim has done comprehensive studies on the summer residents. Another photo ID study began in 1984 by John Calambokidis through Cascadia Research. John founded Cascadia Research **(www.cascadiaresearch.org)**, a non profit scientific and educational organization based in Olympia, Washington. John does incredible work and it is Cascadia Research that maintains the most comprehensive photo ID catalogue of gray whales specifically the summer seasonal residents. He collaborates extensively with other whale researchers in order to fully document sightings of these summer grays. These ongoing studies have provided an estimated population size of 200 seasonal residents that spend summers from Northern California up to Southeast Alaska.

Since the mid 1980's, Dr. David Duffus has been involved in exceptional studies researching the food and other ecological aspects of the seasonal residents. Dave is the founding director of the Society of Ecological and Coastal Research (SEACR) and the University of Victoria Whale Lab. Recently, Jim Darling and geneticist Tim Frasier have shown that the seasonal residents may have a separate genetic identity. The summer resident females bring their calves to their feeding grounds off the Northwest coast and not up to Alaska. I have seen two of Scarback's calves return in succeeding years to the same feeding areas where I saw her teaching these calves to feed. To determine genetics of the whales off Depoe Bay, I was asked to help out with a genetics study (me using crossbow to collect DNA sample) done by biologist, Jonathan Scordino. If the seasonal residents are genetically different from the whales in Alaska, then there will be additional laws to protect them.

To make this book a usable ID guide for researchers, educators, whale watching boats and the general public up and down the West coast, we want consistency in numbers and names. Cascadia Research compared my photos to their ID catalogue and I put their CRC numbers with our whale names. It is my hope that this book will help us further document the ranges and specific residency times of these incredible summer gray whales. I also hope that each person seeing the same whale will be calling it the same name. Each of our names are based on unique patterns, primarily on the dorsal hump.

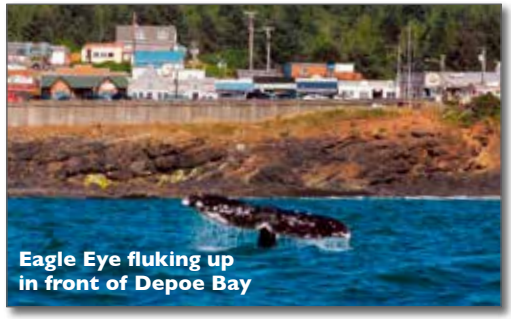
CRC #204
Look for CRC #s next to the whale names

My ongoing research will focus on mysid life cycles, especially their swarm densities to determine the amount of available food, document daily whale numbers, residency times, calves born each year, locate favorite feeding areas, sex the whales, and figure out how many of our summer residents continually return or have been attacked by orcas.

Gray Whales off the Oregon Coast: Summer Residents

The total population of California gray whales in 2010 was estimated between 17,000 and 20,000. In the spring (March-June) most of these gray whales make the 5,000-6,000 mile journey from their breeding lagoons in Baja California to Arctic feeding grounds. On this northbound migration, small numbers of gray whales fall out of the migration group and stop at various locations along the Northwest coast. These whales make up a population of summer residents off Depoe Bay that range from northern California to Vancouver Island. At present photo-identified about 75 resident grays (out of the total population of 200) off Newport and Depoe Bay. I call these summer resident whales the "smart whales" because they make a much shorter trip. The journey to the Arctic is a 10,000-12,000 mile round trip and to Oregon, it is only a 5,000 mile round trip. They're saving energy and time! Plus the trip only takes one month to Oregon, not the two month trip to Alaska. Also the water temperatures are warmer off Oregon so they don't lose as much heat to outside water temperatures.

For whales to be known as summer residents, they must stay around a certain area for at least two days, exhibit feeding behavior, and return in succeeding years. This distinguishes them from migrating whales which may briefly stop on their migration to grab a quick bite of food but then proceed on their way.



Eagle Eye fluking up in front of Depoe Bay

Along the central Oregon coast, summer resident gray whales begin showing up around Memorial Day and leave about mid-October. On any one day throughout the summer, specific numbers range from one to 20. Some arrive in early summer, leave, and then return in late summer or early fall, before joining the southbound migration.

Individual gray whales remain around Newport or Depoe Bay for a period of days to weeks or months. Some residents don't show up for a year or more, while others like Scarback have been a yearly regular for at least 20 years. The last of the summer residents leave in October or November and return to the breeding lagoons of Baja California to rejoin the remainder of the population.

Eagle Eye going towards the shore in Depoe Bay

Depoe Bay bridge

Whale Localities Around Depoe Bay

Eagle Eye in front of the Whale Center.

Doorknob in Whale Cove, in front of Whale Cove Inn

Whale blowing off Government Point just north =of Depoe Bay.

Close Whale Encounters at Depoe Bay

Eagle Eye once again exhibiting friendly behavior.

Rusty giving us a close look at his barnacles and whale lice.

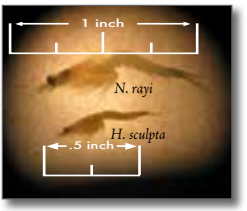
Minus 8 checking us out.

A New Discovery: Gray Whales Eating Mysids

I had a revelation in 1999. I wondered why the gray whales were hanging out in kelp beds off Depoe Bay. Literature states that gray whales primarily eat amphipods and it was assumed that is what Oregon's grays were eating. I did my Master's thesis on amphipods and knew that amphipods live primarily in mud. The whales were not over a muddy bottom, they were in kelp and since kelp is attached to rock, then something different was going on with our Oregon whales. I needed to check out this discrepancy underwater so I donned SCUBA gear and went into the kelp beds. To my astonishment there were enormous swarms of mysid shrimp. I hypothesized that the grays were eating these mysids but I needed to prove it! I collected fecal samples, not an easy task I might add, since you have to be in the right place at the right time. Oh, how excited I was when it finally happened! My heart throbbed as I took this precious cargo and analyzed it. Sure enough mysid parts were clearly visible in the fecal material! I proved my hypothesis! Since the literature is very limited on the life history of these specific mysids and little was known about Oregon's resident gray whales, this opened a door to a graduate study at Oregon State University in Biological Oceanography. My thesis is titled *Ecological Interrelationships Between Summer Resident Gray Whales and Their Prey, Mysid Shrimp along the Central Oregon Coast*. I have found two separate species: ***Holmesimysis sculpta*** (size 12-13 mm) and ***Neomysis rayi*** (size 22-23 mm). Besides being a food source for gray whales, they are also an important part of the diet of near-shore rockfish and salmon. Mysids are also important in toxicity studies, since they are sensitive to pollutants. They act like the "canary in the coal mine" if pollutants are released in the ocean.

I'm holding a plankton net filled with mysids.

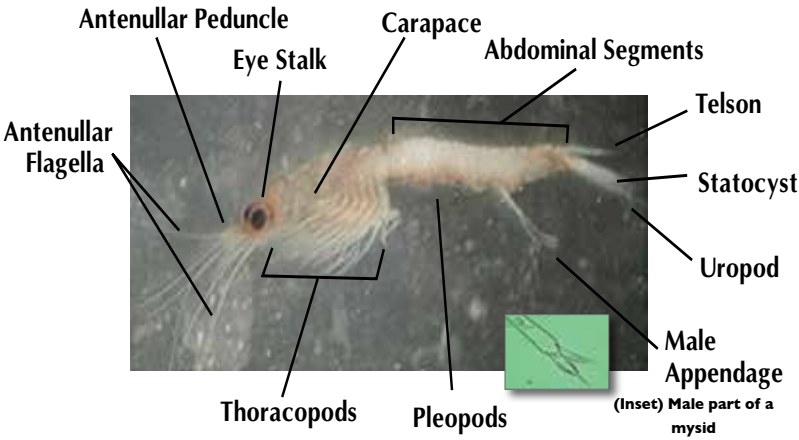
Superficially mysids look a lot like small shrimp and often they are called opossum shrimp. However, they are not true shrimp because true shrimp have five pairs of walking legs and mysids have eight legs. They have a head with two pairs of antennae, a pair of stalked compound eyes, a thorax with an unfused carapace (that's the hard covering you peel off shrimp) and a long thin abdomen consisting of six segments. The first two thoracic pairs of legs are used to filter plankton and particulate matter from the water for food. The last six pairs of thoracic appendages are used for swimming. The thorax of mature females bears a ventral brood pouch in which eggs and developing young are brooded and protected for days to months.



Notice reddish fecal material with mysid telsons and statocysts in it.

The long, thin six-segmented abdomen bears a tail with two parts-the uropods and the telson. The pair of uropods contain a gravity-sensing statocyst (organ of balance) which helps mysids orient themselves in the rough near shore waters. The pointy telson is how you can identify separate species found in the whale fecal material, thereby identifying food sources.

Mysid Facts



(Inset) Male part of a mysid

Mysid females carry their young in a brood pouch from a few days to weeks, depending on the species. While in the brood pouch, the young go through three stages: egg, eyeless (torpedo), and eyed (cookie monster) stages. Female mysids are also known to adopt other young.

Egg Stage

Female showing eggs from brood pouch

Close-up of eggs in brood pouch

The underside of a female mysid brooding eggs

Eyeless Stage (Torpedo)

Female showing torpedo young from brood pouch

Torpedo Larvae without legs

Torpedo Larvae getting legs

Eyed Stage (Cookie Monster)

Female showing cookie monster young

Young peeking out of brood pouch

Googley eyes of cookie monster young

What They Eat: Opportunistic Feeders

Gray whales are opportunistic feeders, which means they will eat food from a wide range of available sources. Along the coast of Newport and Depoe Bay, Oregon, it appears they feed primarily on large mysid shrimp swarms found in water depths of around 30 feet near kelp beds. These swarms become dense enough to feed on in April or May when billions of mysids make up the swarms. A brief 1-2 day feast of porcelain crab larvae is usually seen in late May or June. In the Bering and Chukchi Seas around Alaska, they feed on bottom sediments packed with amphipods. Studies by researchers in British Columbia, Washington, and northern California have shown that prey items of local summer residents also include: amphipods, crab larvae, krill, ghost shrimp, pelagic red crabs, skeleton shrimp, small fish, polychaete worms and various other organisms, besides the mysids.


Amphipod


Mysid


Porcelain crab larvae


Porcelain crab larvae on finger

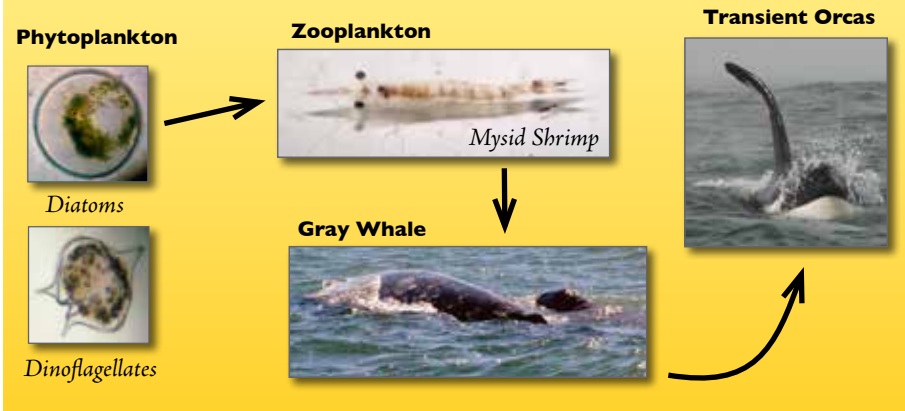

Amphipod on fingers


Mysid on finger

The Mysid/Gray Whale Connection

Gray whales are drawn to the central Oregon coast because there is usually abundant food. It is estimated that whales consume a ton of food per day. Gray whales, like most baleen whales, spend up to six months continuously feeding and then six months fasting. To feed the whales migrate to very productive areas like the Arctic Ocean or the Oregon coast. The Oregon coast has episodes of upwelling which brings the cold, nutrient rich water to the surface providing essential nutrients for phytoplankton blooms consisting primarily of diatoms. The diatoms are consumed by the mysids which in turn are consumed by the gray whales. Mysids are a favorite food source for gray whales because they are rich in lipids and lipids are converted into blubber. Blubber thickness determines whether the whales will survive the fasting period.

Food Chain



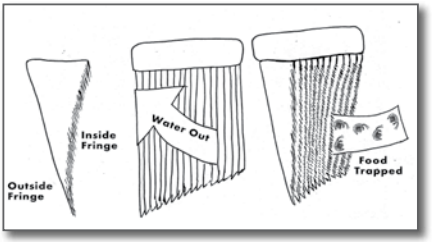
[(x) number of mysids = (y) thickness of blubber]

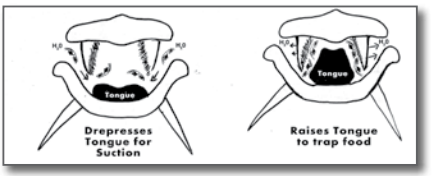
How They Eat

Gray whales are baleen whales and they are in the Mysticeti category which literally translated means moustache whale. In place of teeth on the upper jaw, the Mysticetes have a series of overlapping plates made of keratin (same substance as fingernails).

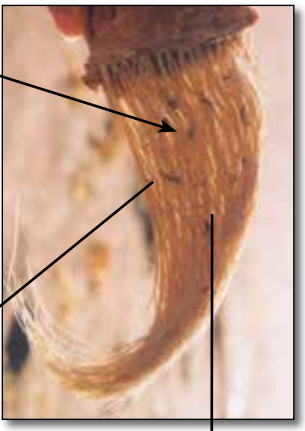
Feeding Mechanism - Hanging from the top jaw of a gray whale are about 300 blonde, one foot long baleen plates. The inside edges of these plates have bristles which trap food organisms while allowing water to pass through.

Here's how it works - The gray whale depresses its one to two ton tongue. This forms a suction that brings in water and small food items. Once the food-laden water is inside the mouth, the tongue is lifted up and the prey (mysids) become trapped on the inside edges of the baleen plates and the water leaves through the openings of the baleen plates. The tongue licks these bristles clean and then the prey move through the grapefruit-sized throat. Two to five throat grooves also expand when the whales feed to increase the surface area.



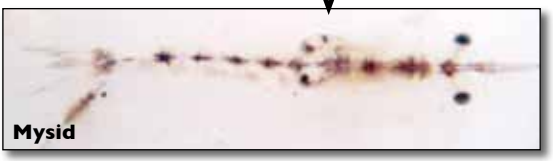


(Above) Baleen plates hang from the roof of the mouth and these one foot long baleen plates filter food like crab larvae when skimming or mysids when sharking behavior is seen. *(Photo by Richard Newton)*



(Right) Mysids or crab larvae become trapped on the inside bristles (tongue side) of the baleen plates.

Porcelain crab larva



Mysid