

Friends of the Sea Otter

Education Materials- High School



P.O. Box 223260
Carmel, CA 93922

www.seaotters.org



SOUTHERN SEA OTTER FACTS

A BRIEF GUIDE TO SOUTHERN SEA OTTER BIOLOGY, BEHAVIOR, AND NATURAL HISTORY

SCIENTIFIC NAME

Enhydra lutris, or *Enhydra lutris nereis*

COMMON NAME

Southern sea otter or California sea otter

LIFE SPAN

- Averages 10 to 11 years, maximum probably 15 to 16 years.
- Females live slightly longer than males.

LENGTH

Approximately four feet.

WEIGHT

- Males average 65 pounds.
- Females average 45 pounds.

HIND FEET

- Flattened and flipper-like for efficient propulsion at the surface and under water.
- Outer fifth digit is the longest – it helps the otter swim more efficiently.

FOREPAWS

- Claws retract like a cat's – used to hold prey and to groom fur.
- "Pouches" of loose skin under their arms can be used to hold food or tools during dives or while on the surface – the pouch can hold several food items at a time.

TEETH

- Otters have strong canines for tearing food and broad, flat molars for crushing prey items.
- Southern sea otters eat shellfish almost exclusively. Alaskan otters are known to eat fish as well.

EARS

- Otters have external ears like a sea lion's (seals don't have exterior ears).
- At the surface, the ears are erect and during dives they fold down.
- Otters have very good hearing.

TAIL

- The tail is flattened and aids in propulsion.
- Otters swim through the water with a sculling-type motion, using rear flippers and tail.
- Otters can swim up to two miles per hour (on both the surface and underwater), but average 4/10ths of a mile per hour.

LUNGS

- They are 2.5 times the size found in land mammals of the same size.
- Help to regulate buoyancy and enable otters to store oxygen so they can stay warm under water longer.
- Maximum time under water is three to five minutes, and the average dive time is close to 50 seconds.

LIVER AND KIDNEYS

- The liver and kidneys are larger than most mammals of equivalent size.
- A larger liver is needed because of high metabolism (the liver needs to process food more quickly).
- Larger kidneys are needed to help process salt water intake.
- Kidneys extract the salt to be excreted in concentrated urine.



**PUBLISHED BY
FRIENDS OF THE SEA OTTER**

FUR

- Otters have extremely thick fur. There is an outer layer of long guard hairs and an inner layer of dense underfur. There are 600,000 to 1 million hairs per square inch depending on the season and the part of the body.
- Thick fur is one way the otter protects itself from cold water. It has no blubber (see also metabolism).
- Air trapped in fur fibers provides insulation and buoyancy.
- Adult fur occurs in shades of brown. Some animals tend to gray or whiten with age. Studies indicate that white-faced males may be preferred by females, so they prematurely gray in order to procure more matings.
- Newborn pup fur is light brown or yellowish. The “woolly” fur makes the pup exceptionally buoyant until this fur is shed at 8 to 10 weeks of age.



PUPS

- The pup is born in the water.
- Newborns weigh three to five pounds.
- Twins are born occasionally but a mother otter is not able to care for birth, so one is abandoned.
- Mothers care for the pups anywhere from six to nine months. Scientists are not sure why there is such a variance in nursing periods.



WHERE ARE THE OTTERS FOUND?

- The southern sea otter ranges from Año Nuevo (nine miles north of Santa Cruz, CA) to Purisma Point (just North of Point Conception) and includes a small colony at San Nicolas Island off Santa Barbara.
- There are 13 different species of river and sea otters worldwide.

SPECIES INFORMATION

The southern sea otter is separated by more than great distances from both the Alaskan (or northern) and Russian sea otter populations. Scientific studies indicate that the southern sea otter is almost certainly a distinct subspecies. This has been determined primarily by differences in morphological measurements of otter skulls from the different populations and by genetic tests.

At one time, there was a continuous population of otters ranging from the disputed Russian Kuril Islands near Japan, along the Aleutian chain, down the Alaskan coastline through Washington to Oregon, down California, and into Baja California. Otters at the south end of the population were probably quite different than those in Alaska due to environmental differences.

Species differentiation probably was slowly occurring because of these factors and genetic variations.

Therefore, speciation did not occur in just the past 150 years that the Alaskan, Russian and southern populations have been separate but over a much longer period of time.

DIFFERENCES BETWEEN SOUTHERN AND THE ALASKAN AND RUSSIAN OTTERS

- Alaskan otters are generally larger. Males weigh an average of 100 pounds, females 60 pounds.
- Alaskan otters tend to haul out more often.
- Alaskan otters tend to eat more fin fish.
- Natural predators on Alaskan and Russian otters include sharks, killer whales, bald eagles, bears and coyotes.
- Natural predators on southern sea otters are great white sharks and the occasional killer whale.

HOW TO TELL A JUVENILE FROM AN ADULT

- Juveniles are smaller.
- Juveniles have darker fur.
- Juveniles are not as proficient at diving – their motions are not as graceful and their dives are generally of shorter duration.



HOW TO DETERMINE GENDER

- It can be very difficult to determine gender on a dry otter. An otter accompanied by a smaller animal will often be a mother with a pup. A bloodied or scarred nose often indicates a female, but keep in mind that males may sometimes have bloody noses as a result of rough play with other male otters.
- Nipples and vulva are sometimes evident on wet otter females, and penile and testicular bulges may be seen on wet males.

SENSES

- The sea otter's sense of smell is very strong.
- Eyesight is good, both above and below the water.
- Whiskers are used to sense vibrations in the water.
- Otters have an excellent sense of touch.

VOCALIZATIONS

- There are various vocalizations but many are not audible to people standing on shore. The high-pitched "wees" of otters, sometimes heard from shore, may be from separated mothers and pups or made in protest between adults.



METABOLISM

- Sea otters compensate for their lack of blubber by maintaining a high level of internal heat production.
- In order to "keep the furnace going," they need to eat the equivalent of 20-25 percent of their body weight each day.
- Otters can feed on 40 different types of marine invertebrates. However, individual otters may specialize on just one to three types of prey, and their preference tends to be determined by what their mother's food preference was.
 - If you get a chance to see a skeleton you'll notice that in some otters, the bones have a slight purple tinge. The color comes from feichinchrome, the purple pigment in sea urchins – a favorite otter food. (There is an otter skeleton at the Pacific Grove Natural History Museum in Pacific Grove, California.)
- An otter will dive up to 180 feet foraging for food. An otter in Alaska was found dead inside a king crab pot at 316 feet and was presumed to have been trapped during part of its own foraging dive.
- Otters in Monterey Bay generally forage in water depths of 60 feet or less.
- Otters prefer areas with rocky bottoms but will forage in other areas as well.

TOOL USE

- Some birds, some primates (including humans), and sea otters are the only animals known to use tools.
- Otters use rocks, other shellfish, or manmade objects to pry prey from rocks. They also use tools as "hammers" or "anvils."
- Pups learn tool use and practice with anything they can find. Sometimes, when a tool is not available, the pup will still practice by pounding its arms up and down against its stomach.

GROOMING

- Otters spend a large portion of each day grooming. When you see an otter somersaulting, rolling in the water, and rubbing its body, it is probably forcing air bubbles into the underfur to act as insulation.



RAFTS

- In the Monterey Bay area, rafts tend to have 2-12 animals. Rafts in Alaska can number up to 1,000 animals.
- Otters stay in rafts to rest. They feed, mate, and give birth away from rafts.
- Rafts are usually segregated by sexes, although there are sometimes “territorial males” who will claim an area that may include a female raft.
- Sometimes there are nursery rafts where mothers and older pups congregate.
- Monterey is generally a female and pup rafting area.
- Subadult and other non-breeding males are found farther offshore and on the periphery of the group’s range.

MATINGS

- Otters have promiscuous mating habits.
- Males mate with as many females as possible.

- Females usually mate with only one male per estrus.
- The otters pair bond anywhere from 1 to 10 days while the female is in estrus.
- Mating occurs throughout the year with peaks in the summer and fall.
- Copulation is preceded and followed by nuzzling, tumbling, and other synchronous activities. During copulation, the male approaches from behind, clamps his mouth on the female’s nose and grasps her body with his forepaws. Then he rolls over so she is belly up for mating. The female’s nose often ends up bloody and then scarred for several months as a result of mating activities.
- Copulation lasts between 15-30 minutes.
- Gestation lasts four to six months. Mating is more prevalent in summer and fall and most pups are born January through March.

MOTHERS AND PUPS

- A female can have one pup every 10 months to a year. The timing depends on how long her previous pup stays with her.
- Pupping season in Monterey has a strong peak from January through March and a lesser peak from August to October.

REFERENCE

Reidman, Marianne. Sea Otter. Monterey Bay Aquarium and Interprint (Petaluma, CA) 1997. 80pp.



Friends of the Sea Otter

P.O. Box 223260
Carmel, CA 93922

Email: info@seaotters.org
Web Site: www.seaotters.org

WHAT IS A SEA OTTER?

A sea otter is a marine mammal that lives in the coastal waters in the central and North Pacific Ocean. It is the smallest marine mammal in North America and is about four feet long. Female otters weigh an average of 45 pounds and male otters weigh an average of 65 pounds. Sea otters live an average of 10 to 11 years.

What do sea otters eat?

Sea otters eat clams, crabs, snails, sea stars, abalone, and 40 other marine animals. Sea otters dive up to 330 feet to find food. Their average dive lasts about fifty seconds. The longest dive recorded lasted four minutes.

When sea otters come to the surface, they lie on their backs and use their stomachs as a table. Sometimes they use a tool, such as a rock, to help them open the hard shells of their prey. They bang the hard shell on the rock until it breaks open.

Sea otters have to eat 20-25% of their body weight every day to stay alive. That means a 40-pound otter must eat 10 pounds of food every day!

How do sea otters swim?

Sea otters usually swim on their backs at the water's surface. They use their rear flippers to move and their tails to steer. They don't swim very fast (about 1 mile per hour). If otters are frightened, they will flip over on their stomachs and swim away. Sometimes they will dive under water to get away.

How do sea otters stay warm?

The water that southern sea otters live in is a chilly 30 to 50 degrees Fahrenheit – much too cold for humans. Otters don't have blubber to keep them warm like other marine mammals. Instead, they rely on their

thick fur coats and their fast metabolism.

Sea otter fur is the thickest fur of any animal. It has 600,000 to one million hairs per square inch. Humans only have 100,000 hairs on their whole head! It is important for otters to keep individual hairs clean. If the fur isn't clean, it gets matted and this can lead to death by hypothermia.

Why aren't there more sea otters?

Two hundred years ago, 300,000 otters may have ranged along the 6,000 miles of Pacific coastline from northern Japan, through the Aleutian Islands of Alaska and down the coast of California to Baja California in Mexico.

Because the pelts of sea otters are thick, warm and beautiful, fur hunters killed hundreds of thousands of them – until not a single otter was visible along the entire California coastline.

The southern sea otter was thought to be extinct. Then, in 1938, a raft of about 30 to 50 otters was discovered off the coast of Big Sur, California. The population has grown and spread along 200 miles of California coastline, but its population is still small – only about 2,200. Southern sea otters are now protected by the Endangered Species Act and the Marine Mammal Protection Act so they can no longer be hunted.

Where do southern sea otters live?

Southern sea otters are found in the Pacific Ocean off the coast of central California. They range from Año Nuevo (9 miles north of Santa Cruz) to Purisima Point (just north of Point Conception). Additionally, there is a small colony off San Nicolas Island near Santa Barbara.

Usually, sea otters stay close to shore, but sometimes they are found as far out as four miles from shore. Otters rest in kelp forests in groups called rafts. Often they will drape the kelp over their bodies to keep from drifting away.

Now there are other threats to otters. Oil spills can be fatal to the sea otter and could cause this species to become extinct. Oil coats the fur, destroying the blanket of air that keeps the otter warm. This causes chilling, hypothermia and death.

Other kinds of pollution in our oceans threaten sea otters. Fishing nets are another cause of sea otter deaths. Sea otters become caught in the nets and drown. Laws have been passed to limit the use of fishing nets along the coastline to protect sea otters.



Friends of the Sea Otter

P.O. Box 223260
Carmel, CA 93922

Email: info@seaotters.org
Web Site: www.seaotters.org

Text copyright © 2003
by Friends of the Sea Otter

Illustrations copyright © 1993

Word Search

What is a Sea Otter?



See if you can find and circle the words listed. They are hidden in the puzzle vertically, horizontally, and diagonally — some are even spelled backwards.

M F L I P P E R S X K E K P W
 O A F L P C D L I V E U Z P H
 H C R A B S I H Y T L F O O D
 Y A I I C A L P A W P A L L O
 P L O T N S C O M S F O K L O
 O I T S T E C C T B O I M U N
 T F F F A R M L J T R L O T T
 H O A X U E E A W Q E S W I M
 E R T F V P A M M A S P T O A
 R N U I O T T S A M T I A N R
 M I D **B I G S U R** S A L I M I
 I A M O T T E R T O O L L I N
 A F I S H I N G N E T S S U E
 O P A C I F I C O C E A N R R
 S T A R F I S H W W A T E R T
 P U R P F I O C E A L I V E Z

- √ Big Sur
- California
- Clams
- Crabs
- Dive
- Fishing Nets
- Flippers
- Food
- Fur Coat
- Hypothermia
- Kelp Forest
- Live
- Marine Mammal
- Oil Spills
- Otter
- Pacific Ocean
- Paw
- Pelts
- Pollution
- Rafts
- Snails
- Starfish
- Swim
- Tails
- Tool
- Water



**PUBLISHED BY
 FRIENDS OF THE SEA OTTER**



Word Search

Why Are Sea Otters a Threatened Species?

- | | |
|-------------|------------|
| ✓ ALASKA | MAMMAL |
| AIR | MMPA |
| BAJA | OCEAN |
| CLASSIFIED | POPULATION |
| COAST | RANGE |
| DILEMMA | RISK |
| DISTRESS | RUSSIA |
| ENDANGERED | SPECIES |
| ENVIRONMENT | SURVIVE |
| ESA | THREATENED |
| HARM | VULNERABLE |
| JAPAN | WATER |
| LAW | |

C F L O N O I T A L U P O P T
 O V U L N E R A B L E U Z E H
 A X B A J A U T H N A S E N E
 S U R V I V E E C R G O A V N
 T W I L D L N L L A T F I I E
 B M S E N B D L A B I F S R D
 B A K S A L A I S M E R S O E
 A X L A E E N L S Q M H U N N
 M C T F C S G O I A M A R M E
 M R U I O G E S F S P R M E T
 E R E L A W R U I E A X I N A
 L O A T O C E A E L G N M T E
 I J A H A R D F D L A N P S R
 D L O C S W Y R O F O A A R H
 S E I C E P S N A P A J E R T
 D I S T R E S S E N T P O P T

See if you can find and circle the words listed. They are hidden in the puzzle vertically, horizontally, and diagonally — some are even spelled backwards.



Current Threats to Sea Otters

Since 1995, the California sea otter population has exhibited a decline, but with a promising upward trend from this year's count. However, this small population is still very vulnerable and is not growing at the rate expected, due to many environmental threats and infectious diseases. Sea otter researchers have discovered that an increase in mortality of prime age animals (3–10 yr) has been the primary cause of the sea otter population decline. The following is a list of threats that have been linked to high sea otter mortality.

1) INFECTIOUS DISEASES:

Fecal pathogens from terrestrial sources (domestic cats and opossums) are threatening sea otters. Both cause encephalitis in sea otters, and many otters that have died from other primary causes were also carriers of these diseases.

2) CONTAMINANTS:

PCBs and tributyltin may accumulate in sea otter prey species that filter water through their tissues. An accumulation of such contaminants in their tissues may make sea otters more susceptible to other potential threats, such as infectious disease.

3) OIL SPILLS:

When otters come into contact with an oil spill, the oil coats and mats their fur, making grooming extremely difficult. A heavy dose of oil can subsequently cause hypothermia. If oil is in their fur while they groom they will swallow it. Since oil is toxic or poisonous, it can cause liver and kidney failure and severe damage to their lungs and eyes, all of which can result in death.

4) FISHERIES INTERACTIONS:

Gill and trammel nets have been known to be very deadly to sea otters that get tangled in the thin monofilament lines and drown. Live fish traps and purse seines may also pose a threat of incidental drownings for sea otters.

5) PREDATORS:

Predators, like great white sharks have been known to kill sea otters and in Alaska entire populations of sea otters have suffered from attacks of killer whales. We do have killer whales that visit Monterey Bay often during gray whale migrations, but there has been no documentation of them attacking a sea otter.

6) "NATURAL" PHENOMENON:

Other more perplexing "natural" phenomenon in the Monterey Bay have been outbreaks of domoic acid and/or red tides that biomagnify in the food web and can reach very toxic levels that can kill sea otter, as well as humans.









7) BOAT STRIKES & ECOTOURISM:

Boat strikes have occurred during busy fishing times, like the opening day of salmon fishing in Monterey Bay. Ecotourism has become more of concern with the increase of people inhabiting our coast. Studies are presently being conducted to look at the potential impacts (both short and long-term) on sea otters.



WHAT CAN YOU DO TO HELP SEA OTTERS AND MARINE LIFE?

Here a few ways that you and your family can make a difference:

-  Do not pollute storm drains.
-  Do not flush kitty litter down toilets.
-  Be careful what you put down your drains at home.
-  Help keep our beaches clean - every little bit of trash collected helps!
-  Buy environmentally friendly products - use paper bags, not plastic.
-  Use public transportation, carpool, walk or ride your bike.
-  Do the 4 "R's" = **R**efill, **R**educe, **R**euse & **R**ecycle.
-  *Can you think of some others?*

If so, write to us at:

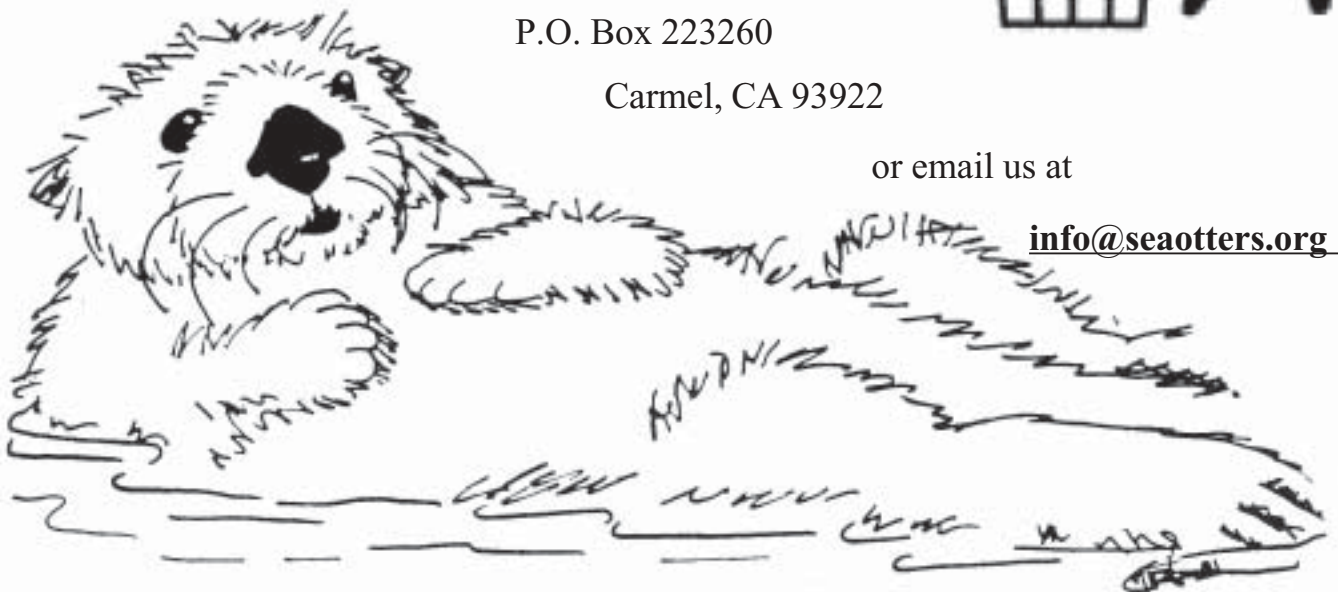
Friends of the Sea Otter

P.O. Box 223260

Carmel, CA 93922

or email us at

info@seaotters.org



LINKS TO INTERESTING WEB SITES:

American Cetacean Society: Monterey Bay Chapter
www.starrsites.com/acsmf/

BAY NET: Monterey Bay National Marine Sanctuary
www.mbay.net/~baynet/

Birch Aquarium
www.aquarium.ucsd.edu/

Defenders of Wildlife
www.defenders.org/

Discovery of Sound in the Sea
omp.gso.uri.edu/dosits/dosits.htm

Elkhorn Slough
www.elkhornslough.org/

Elkhorn Slough Safari Nature Tours
www.elkhornslough.com/

International Otter Survival Fund
www.otter.org/

Mammalian Physiology: Dr. Terrie M. Williams Lab
www.biology.ucsc.edu/people/williams/

The Marine Mammal Center
www.tmmc.org/

Monterey Bay Aquarium
www.mbayaq.org/

Monterey Bay Aquarium Research Institute
www.mbari.org/

Monterey Bay National Marine Sanctuary
bonita.mbnms.nos.noaa.gov/

Monterey Bay Whale Watch
www.montereybaywhalewatch.com/

Moss Landing Marine Laboratories
color.mlml.calstate.edu/

National Geographic: Monterey Bay
www.nationalgeographic.com/monterey/

National Marine Fisheries Service
www.nmfs.noaa.gov/

National Marine Mammal Laboratory
nmml.afsc.noaa.gov/

The Ocean Conservancy
www.oceanconservancy.org/

Ocean Futures Society
www.oceanfutures.com/

The Otter Project
www.otterproject.org/

Otternet
www.otternet.com/index.htm

Pacific Cetacean Group
www.pacificcetaceangroup.org/

Save our Shores
www.saveourshores.org/

Save the Whales
www.savethewhales.org/

The Scripps Research Institute
www.scripps.edu/

Sea Otter Research and Conservation
www.mbayaq.org/cr/sorac.asp

Seymour Center at Long Marine Lab
seymourcenter.ucsc.edu/

SIMoN — Monterey Bay National Marine Sanctuary
www.mbnms-simon.org/

Tethys Research Institute
www.tethys.org/

The Society for Marine Mammalogy
www.marinemammalogy.org/

Ventura Fish and Wildlife Office
ventura.fws.gov/

Whales-online
www.whales-online.org/

Woods Hole Oceanographic Institution (WHOI)
www.whoi.edu/