

## Research and Monitoring

# Identifying Individual Humpback Whales

Two techniques, photo-identification and genetics, are used to identify and catalog individual humpback whales and link them to specific breeding and feeding areas.

## Photo-Identification

Humpback whales have patterns of black and white pigmentation and scars on the underside of their tails that are unique to each whale, just as fingerprints are to humans. Researchers document the marks on the right and left lobes of the tail, or flukes, and rate the percentage of dark vs. light skin pigmentation from 100 percent white to 100 percent black.

For scientific purposes, each humpback whale sighted in the North Atlantic is assigned a catalog number. The unique scarring and shading patterns also provide the inspiration for common names. For Gulf of Maine humpbacks, researchers and naturalists work together each year to name new adult whales and young animals sighted in a second year. New calves are not named because their coloring and scarring often change dramatically during that first year.

Information collected for humpbacks in the sanctuary constitutes the longest and most detailed data set for baleen whales in the world. Photographs in the Gulf of Maine Humpback Whale Catalog, maintained by the Provincetown Center for Coastal Studies, and the North Atlantic Humpback Whale Catalog, maintained by the College of the Atlantic in Maine, allow scientists and naturalists to identify and monitor individual animals and gather valuable information about population sizes, migration, health, sexual maturity and behavior patterns.

Photographing individual whales and their calves each year helps to identify family relationships. Four generations of humpback whales have been documented in certain maternal lines, or "matrilines."

The most famous Stellwagen Bank sanctuary whale is "Salt," the first humpback whale to be given a name along with another female named Pepper. Unlike other whales whose names are inspired



Photo: SBNMS



Photo: SBNMS

Pigmentation and scarring patterns on the tail flukes provide ways of identifying individual humpback whales. The top image shows Echo (note marks on left fluke) and the bottom whale was named Nile for the mark resembling a river delta (also on her left fluke).

by their tail patterns, Salt's name is based on the thick white scars on her dorsal fin that look like encrusted salt. She is known as the matriarch of the sanctuary and the "Grand Dame of Stellwagen Bank" because she has been seen here in all but one summer since 1976. She was also the first humpback whale to be identified by researchers on Silver Bank off the Dominican Republic. Those photos helped scientists confirm the migratory route that links northern feeding grounds with southern breeding grounds. Salt is a grandmother, and over the past 30 years she has escorted 12 known calves, the last born in 2010, from the Caribbean Sea back to Stellwagen Bank.

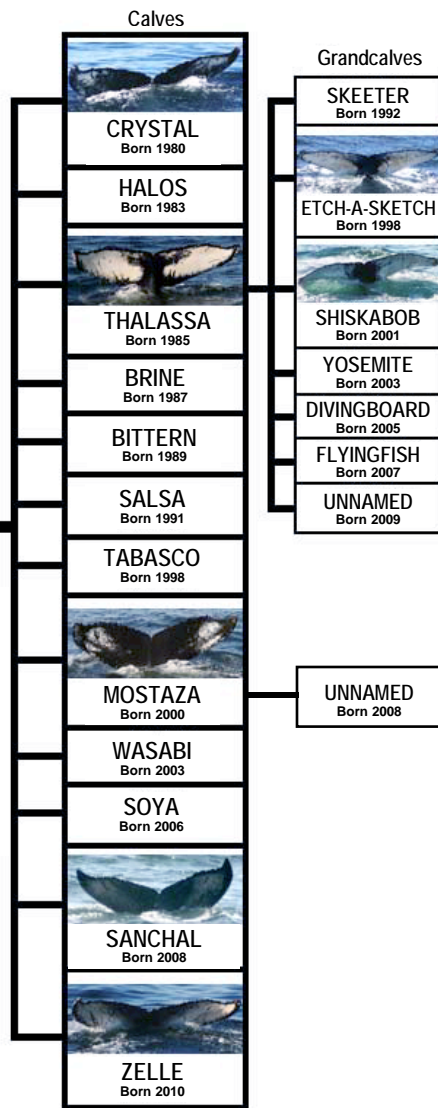
## Genetics

Another way to identify individual whales and confirm family relationships is through DNA analysis. Genetic data are generally obtained from skin samples. Pieces of naturally sloughed skin can sometimes be collected from the water after a whale has been active at the surface. More commonly, researchers shoot a small dart from a special crossbow at the whale's back. The biopsy dart takes a small plug of skin and blubber before bouncing off into the water. Back in the laboratory, DNA extracted from the sample can provide answers to questions about the sex of the individual whale, population structure, evolutionary history, paternity of offspring and social relationships.

## Salt's Family Tree



Salt is the most famous humpback in the Gulf of Maine. She was the very first to be named in 1976 by Captain Al Avellar. His family has the privilege of naming each of her calves, usually something that is related to salt. In 2010 she gave birth to her 12<sup>th</sup> recorded calf, Zelle. Her daughter Thalassa has had seven calves of her own, making Salt a grandmother. Between 1976 and 2011, Salt was seen in all but one year in Stellwagen Bank National Marine Sanctuary.



## FOLLOW THAT WHALE

Being able to identify individual whales can be critically important during research projects. When attaching a data-recording device, scientists like to know as much about the tagged animal as possible. By knowing who the animal is, scientists may be able to find out about its age, sex and past associations with other whales. The whale can be recognized, even when in a group, and followed until the tag detaches. In some cases, whales have been tagged multiple times, giving scientists the opportunity to study the animal in different years, times of the day, and locations.

### 2009 TAGGED HUMPBACKS

- Draco
- Entropy
- Fern
- Fern's calf
- Glo-Stick
- Jabiru
- Lavalier
- Lavalier's calf
- Milkyway
- Samovar
- Solas
- Tripod
- Upsilon
- Valley



Draco



Glo-Stick

### 2008 TAGGED HUMPBACKS

- Cajun
- Cardhu
- Colt
- Etch-A-Sketch
- Falcon
- Hancock
- Isthmus
- Lavalier
- Milkweed
- Moray
- Nile
- Pepper
- Perseid
- Tectonic
- Venom



Lavalier



Isthmus

## THE TRUTH FROM TAILS

Flukeprints are the "fingerprints" of whale identification. By recognizing and studying Salt and her family, we can begin to understand the lives of humpback whales.

### What is the age of the animal?

Salt was first seen in 1976 (and she was an adult at that time, so she was at least 3 then). In 2011, she would be at least 38.

### When is a humpback whale sexually mature?

We know that Thalassa was born in 1985 and she had her first calf (at least the first that we know of) in 1992. Gestation is about one year. Other mothers in our population have had calves at even younger ages. Our conclusion is that humpback whales probably reach sexual maturity within the span of ages four to six.

### What is the calving interval for humpbacks (how many years between births)?

In looking at Salt and Thalassa, we see a general calving interval of two or three years.

Whale photos taken under NOAA Fisheries Permits #605-1904 and #775-1875 or under NOAA Northeast Regional Whale Watching Guidelines.