



Laguna San Ignacio Ecosystem Science Program

A Project of the Ocean Foundation in Baja California Sur, Mexico

HOW MANY GRAY WHALES VISIT LAGUNA SAN IGNACIO?

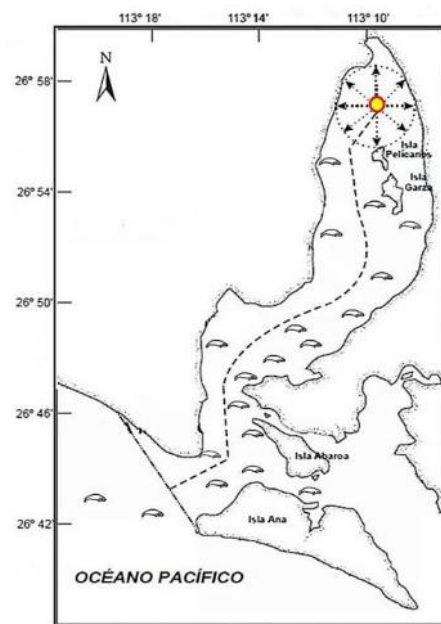
One essential aspect of gray whale conservation is the monitoring of the number of whales that utilize Laguna San Ignacio each winter, and determining how their use of the lagoon changes over the years.

We use **“Boat-based” Visual Surveys** to count the number of gray whales that occupy the lagoon during the winter months. Each winter we begin the surveys in mid-January which continue until the end of each winter season in mid-April. We complete a new survey every 4 to 5 days. The counts of whales provide a “minimum” estimate of the abundance of gray whales and the number of new calves born that winter, and their distribution within the lagoon. The boat survey methodology was first developed by Mary Lou Jones and Steven Swartz in the 1970’s and 1980’s, and is still in use today. These gray whale surveys in Laguna San Ignacio have been conducted during three separate time periods: 1977-1982; 1996-2000; and 2006 to the present, and they are one of the longest series of abundance surveys for gray whales in Baja California.

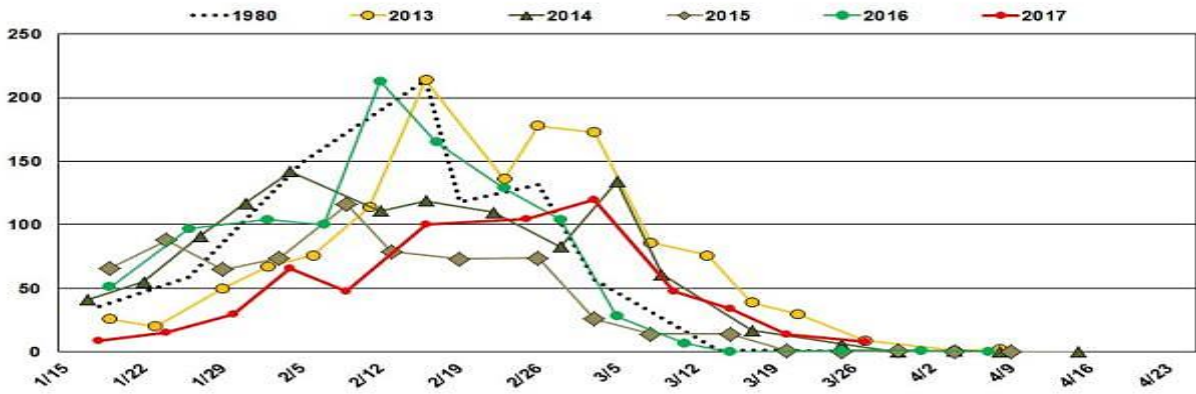
Each boat survey follows a pre-determine 31 km long course or “track-line” through the deepest water in the middle of the lagoon where the gray whales are concentrated. Every survey begins with observers counting the number of gray whales in the northern-most portion of the lagoon, or the “northern basin” furthest from the lagoon entrance. Then, using a GPS unit to keep on the “track-line” and to maintain a standard speed of 11 km/hr., the boat travels the entire length of the lagoon with the observers counting the whales as they are encountered. Traveling at this speed ensures that any whale in area of the survey boat will surface to breathe at least two or three times and they will not be missed by the observers.

The counts of whales are divided into two groups: 1) females with calves of the year and 2) single whales that include males and females without calves. For each sighting, observers also note the whale’s swimming direction, general behavior, and weather and visibility conditions. By following this standardized methodology for the surveys we can compare counts of gray whales the whale’s distribution from year to year, and evaluate the variation in the number of gray whales that have utilized Laguna San Ignacio during the last 40 years, and variations in the whales’ arrival, length of stay, and departures over time.

In the examples below, we see that in the 1980’s and in 2014 and 2016 single adult whales (breeding females and males) began to arrive in Laguna San Ignacio in mid-January, attained their greatest abundance in mid-February, and they had left the lagoon to begin their northward migrations to summer feeding areas by mid-March. In other years, like 2013 and 2017, single adult whales have arrived at Laguna San Ignacio about two weeks later, and left the lagoon a week to ten days later than was observed in the 1980’s. These differences in the arrival and departure dates at the lagoon may correspond with shifts in the distribution of the gray whales’ primary feeding areas in the Arctic, and annual variation in the amount of ice cover over those feeding areas which hinder the whales’ access to food, and require that they spend more time searching for areas of dense invertebrate populations on which they feed.

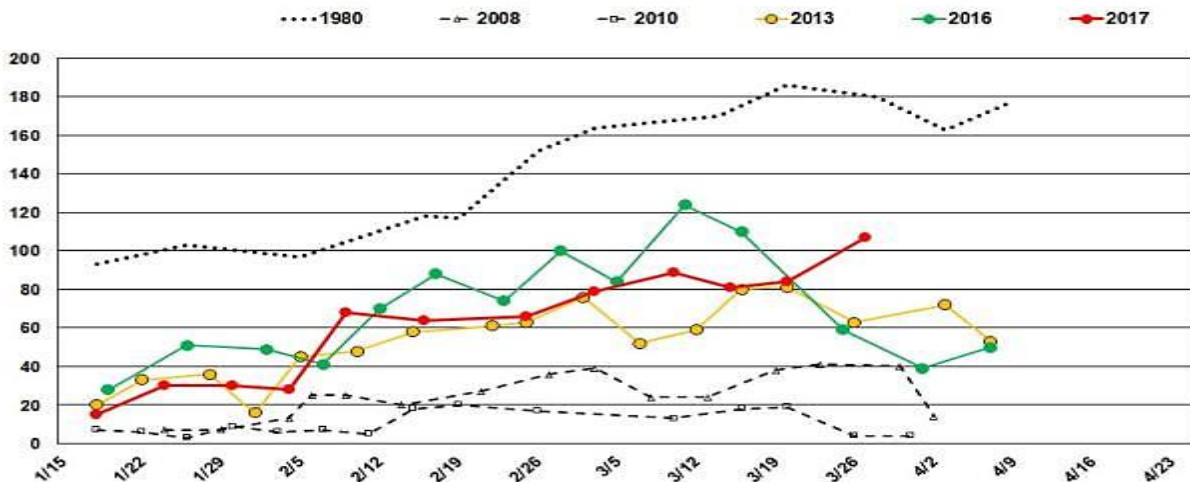


COUNTS OF SINGLE ADULT GRAY WHALES IN LAGUNA SAN IGNACIO



In contrast, during the 1980's weekly survey counts of females with calves increased each winter through the birth period for calves (January to mid-February), and into March almost a month after the last calves were born. This pattern of females with calves that are one-to-two months old entering Laguna San Ignacio following the birth period has continued into recent years. Photographs of female whales with new calves from Bahia Magdalena to the south, and Laguna Ojo de Liebre to the north of Laguna San Ignacio confirm that some females are bringing their calves to Laguna San Ignacio from these other areas. In the years following the 1998-2000 range-wide mortality event (2008-2010), calf counts were very low presumably the result of a significant reduction in the number of breeding female whales. Beginning in 2013 calf counts began to increase as young female whales were reaching breeding age and producing new calves. Just why the abundance of females with calves in Laguna San Ignacio was higher during the 1978-1982 period is not understood.

COUNTS OF FEMALE-CALF PAIRS IN LAGUNA SAN IGNACIO



These survey counts of whales over the years also show the annual variation in the whales' abundance and timing of their arrivals and departures in different years. For example, in years with sea surface temperatures warmer than average (El Niño conditions) abundance is greater in the lagoon and the whales' duration of residence is shorter compared to years with water temperatures cooler than average (La Niña conditions). These patterns in the gray whales' behavior at Laguna San Ignacio help us to understand how the whales respond to changing environmental conditions.

Photographic Identification (AKA "Photo-ID") provides another way to estimate how many individual gray whales visit Laguna San Ignacio during each winter. We conduct "Photo-ID" surveys each winter to obtain digital photographs of the gray whales throughout the lagoon. As we encounter individual whales, groups or female-calf pairs, we photograph the left and right sides of each whale, and note any distinguishing marks, scars, etc. At the end of each day we review these

photographs and determine how many different individuals we photographed, and at the end of the season we can estimate how many different gray whales were visiting the lagoon that winter. Also, because we often re-photograph (“re-capture”) many whales, the time between the first photograph and the last time we photographed a whale gives us a “minimum” number of days that whale was in or around Laguna San Ignacio. Over the years we learned that single breeding whale often stay in the lagoon no more than a week to ten-days, while female calf pairs may stay as long as three months! All of the photographs for each winter are listed in catalogs and posted on our website (<https://www.sanignaciograywhales.org/research/photo-id-catalogs/>) for additional analysis, and to share with gray whale researchers working in other areas of the species range in the North Pacific. For example, these collaborative comparisons resulted in the detection of “Western North Pacific” gray whale migrating from Russia eastward across the North Pacific to join the spring and fall migrations along the East coast of North America to Baja California, Mexico and then returning to the Western North Pacific in the spring. Of course, such data raises the question, “Who are the Western gray whales... just Eastern North Pacific expanding their territory, or a distinct sub-population?”

Please visit our website at www.sanignaciograywhales.org, and consider making a donation to support our graduate student researchers and the “ecosystem” program at Laguna San Ignacio.



