

A photograph of a whale's tail breaching the water surface at sunset. The tail is dark and curved, with water splashing around its base. The water is calm with gentle ripples. The sky is a warm, golden-brown color, and a distant shoreline is visible on the horizon.

Laguna San Ignacio Ecosystem Science Program (LSIESP)

Preliminary 2009 Field Report

www.lsiecosystem.org

LAGUNA SAN IGNACIO ECOSYSTEM SCIENCE PROGRAM (LSIESP)

Preliminary Field Report – 2009

The Laguna San Ignacio Ecosystem Science Program (LSIESP) began the 2009 winter season with the arrival of the gray whale research Team at the lagoon on 17 January. The 2009 gray whale Team is led by Steven Swartz (CRA), Jorge Urbán (UABCS), and Alejandro Gómez Guallardo U. (UABCS) and includes five researchers and graduate students from universities in Mexico: Sergio Martínez (UABCS), Hiram Nanduca (UNAM), Anaid Lopez Urbán (UNAM), Ana Liria Del Monte Madrigal (UABCS), Maurico Nájara Caballero (CICIMAR), and Héctor Pérez Puig (CICESE). The Team will remain at the lagoon until the end of the 2009 gray whale winter season in early April.



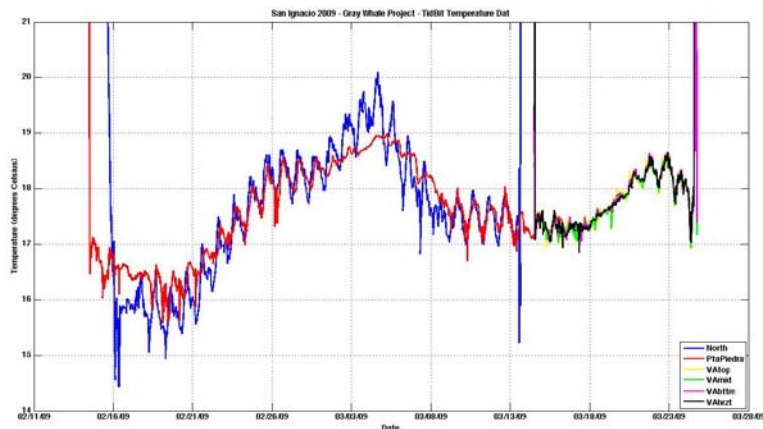
2009 Project Updates:

Gray whale monitoring and assessment:

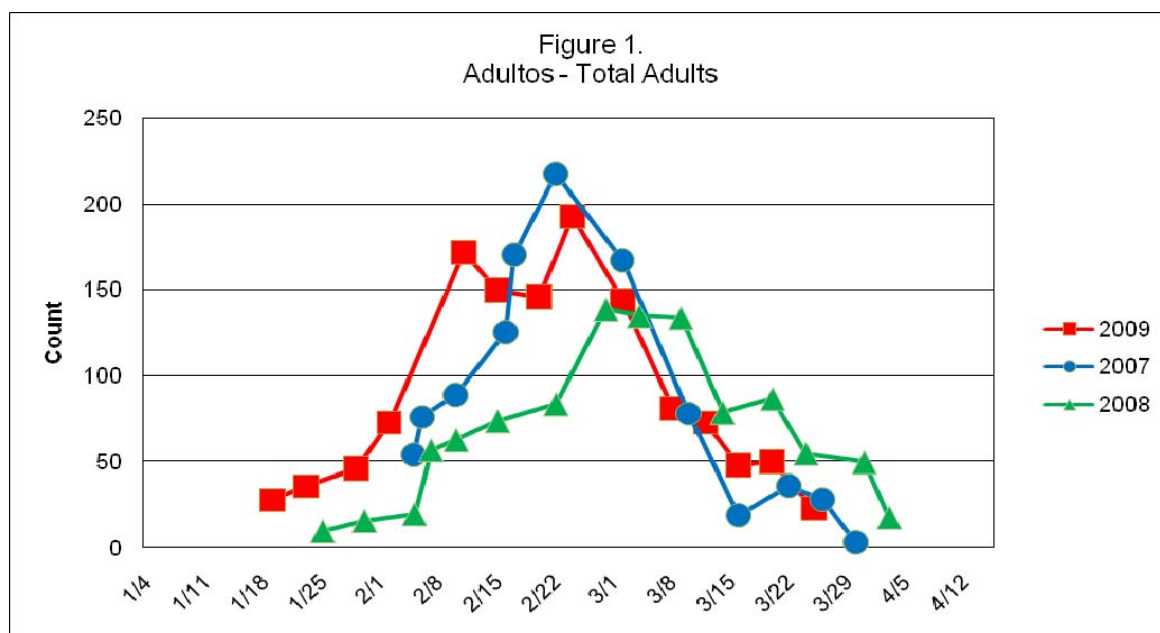
The two primary activities are conducting weekly census (counts) of the number of gray whales in the lagoon to monitor habitat use, and the on-going collection of photographic identification information (Photo-ID) of individual whales, especially females with calves that are indicative of the reproductive health of the population.

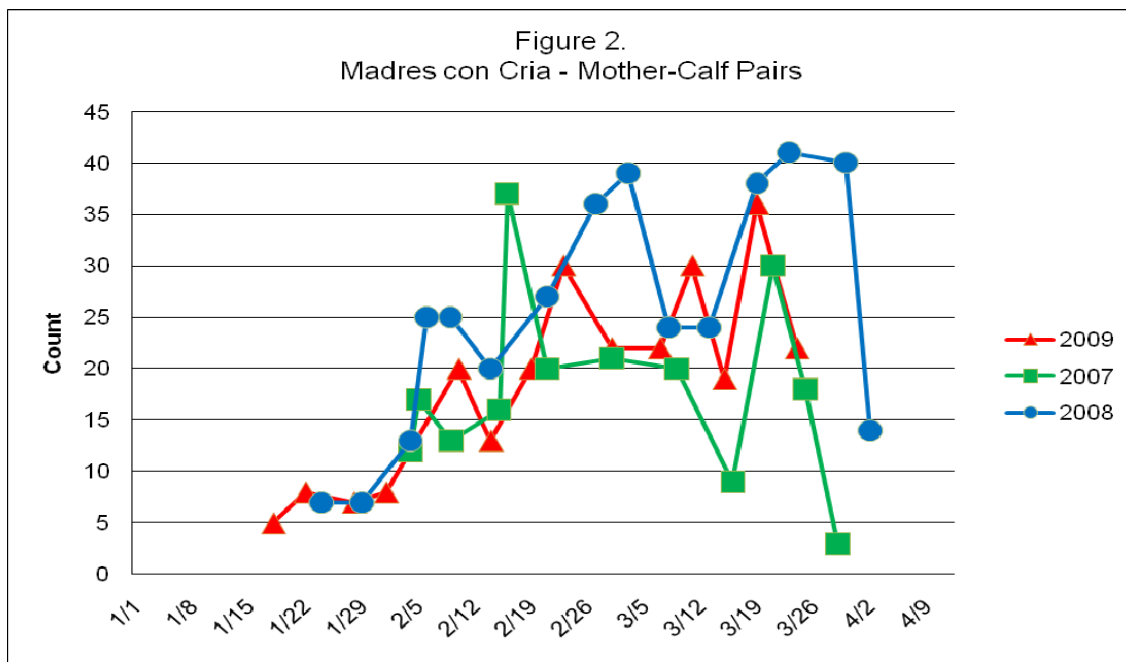
Monitoring of the number of gray whales that utilize Laguna San Ignacio and within other wintering gathering areas in Baja California indicate that water temperature can have an effect on the duration and lengths of their migration, and the aggregation areas the whales choose to use each winter. In the winter of 2009 the water temperature in the lagoon was 16-19 degrees °C during February and March, which was 2-3 degrees °C warmer than in the previous winter, and this could account for the greater number of whales seen in the lagoon this year. The

trends in water temperature within Laguna San Ignacio in 2009 were measured using autonomous recording devices placed on the bottom of the lagoon by the marine Acoustics program (see below). The water temperature reached a minimum of 15-16 degrees °C in mid February, and increased to a high between 19-20 degrees °C the first week in March.



Weekly census counts of the number of whales in the lagoon began on January 19th 2009 and continued until the first week in April 2009. The greatest number of adult whales counted was 193 adults including 30 mother-calf pairs counted on 24 February 2009 (Fig. 1). As the season progressed, larger numbers of mother-calf pairs were seen in the lagoon in March (Fig 2). Most gray whale calves are born by mid-February, so this increase late in the season suggests that females with older calves born elsewhere were entering Laguna San Ignacio. This late season increasing trend has been seen in the lagoon since 1978-1982 census counts.





This suggests that females with older calves were using the lagoon later in the winter before beginning their migration north. Review of the photographic identification data for females with calves visiting the lagoon in recent years will determine if these female-calf pairs have been in Laguna San Ignacio all season, or if they arrived at the lagoon from other areas later in the season.

Photo-Identification Research:

This year Team member Sergio Martínez (UABCS) re-designed the data-base for all the digital images of gray whales since the year 2006 when digital photography replaced the older film and paper based technology. The new database is patterned after the humpback whale database used to archive, organize, sort and search digital images of humpback whales from Mexico as part of the “SPLASH” Pacific humpback population estimation project. This new database management system will allow Laguna San Ignacio gray whale researchers to update and manage digital images of whales and their associated meta-data, and to produce summary reports and image catalogues as new photographs are obtained. These catalogues will be posted on the LSIESP web-site to facilitate review by gray whale researchers working in other portions of the ENP gray whales’ range, and allow them to compare their photographs and to identify possible matches with whales photographed in Laguna San Ignacio.



As with previous years, the 2009 digital photos are sorted into two groups – mothers with calves and single whales, and then compared within the season to estimate minimum duration of stay of these whales in the lagoon, and also compared with photos from previous seasons to



identify re-sightings of known individual whales, especially females that have been seen with and without calves in previous years. The calving intervals for these females are then estimated from the number of years they are seen with and without calves in the lagoon, and within year estimates compared for trends across years.

The gray whale Team is also tracking the number of “skinny” whales that visit the lagoon. “Skinny” whales are those that exhibit some evidence of nutritional stress presumably as the result of insufficient feeding during the summer and/or disease. The photos of whales are assigned numerical scores based on three physical characteristics of nutritional stress. This scoring system was developed by Dave Weller and his colleagues to evaluate the health of Western North Pacific gray whales. These condition criteria are: (1) degree of post-cranial depression, (2) prominence of dorsal edge of the scapula, and (3) degree of concavity of the lateral flanks. In 2007 and 2008 approximately 11-13% of the gray whales photographed in Laguna San Ignacio exhibited some or all of these indicators of nutritional stress. The 2009 photographs will be similarly analyzed and compared.



Acoustics Project:

The LSIESP Acoustic Research group was led again in 2009 by Aaron Thode, and included Melania Guerra, Delphine Mathias, and Anaïd Lopez Urbán. In early February they deployed two



bottom mounted acoustic recording arrays at two stations; one next to Punta Piedra in the lower lagoon within the whale-watching zone, and the second in a deep channel in the middle lagoon north of the Kuyimita Eco-Tour campground. The stations recorded the calls of the gray whales and other ambient environmental sounds underwater, including the sounds produced by tidal currents, winds on the water, fish and snapping shrimp sounds, and noise from whale-watching and fishing boats that operate in the lagoon. These data will permit identification of

distinctive whale call types, the distribution and number of call types in the two portions of the lagoon. Researchers will be able to learn about the specific call types used by single whales and mother/calf pairs, as well as correlate call numbers with visual counts of the number of whales in the lagoon.

In March the Acoustic Team assisted by gray whale researcher Mauricio “Millhouse” Nájera Caballero placed acoustic tags on individual whales using self-contained acoustic recording tags attached by suction-cups. These tags record the underwater sounds heard by the whales (natural and man-made), the whale’s breathing, its depth, and their movements and behavior underwater. Recording tags were attached to single whales, including one that was a member of a “courting group”, and to mother and calf pairs. This is the second year of acoustic tagging in Laguna San Ignacio, and represents the first time acoustic tags have been placed on individual gray whales, and the sounds recorded are known to come from those animals. Examples of the sounds recorded from these whales are available for listening on the LSIESP web site (www.lsiecosystem.org). Ultimately this research will inform us on what sounds gray whales experience in the lagoon, and their vocal and behavioral responses to those sounds.



School Presentations & Laboratory Field Trip:

In mid-February the LSIESP gray whale Team members and our colleague Morning Glory Farr from the NGO Philanthropiece met with the primary and secondary school teachers at the Ejido Luis Echeverria School to discuss opportunities for using the LSIESP projects and laboratory as resources for teaching students about the unique marine wildlife that live in Laguna San Ignacio and, the importance of conserving the lagoon for the future. On March 10th, LSIESP gray whale researchers Liria Del Monte Madrigal and Anaid Lopez Urban gave a series of classroom presentations to the primary and secondary classes at the school.



The presentations featured the diversity of marine life, gray whales, dolphins, birds, and mangrove habitats at the lagoon, and introduced the students to basic concepts for marine conservation that are fundamental to the survival of this unique coastal marine ecosystem.



The following week the students boarded the Baja Expeditions School Bus for a site visit to the LSIESP field laboratory located at the Kuyimita campground on the southern shore of the lagoon. Due to the large size of the group, students visited the Lab facilities in smaller parties of 10 kids and then attended together a series of activity stations set up in the main Kuyimita palapa. These hands-on, science learning stations were led by LSIESP researchers, and in them, children participated in scientific activities based on the research being conducted at the lagoon. These learning stations included: climate change effects on marine life, generalities of gray whales, gray whale photo-identification matching of pictures taken in the lagoon; gray whale census methods and abundance trends; and underwater acoustics including gray whale sounds. With the assistance of Maria de los Angeles of Kuyima, additional classes of students from the town of San Ignacio are scheduled to visit the LSIESP laboratory later in March to participate in this education and outreach effort. We hope that this pilot activity will grow and

become an established event that will serve as a resource for teaching local students about the natural history of the lagoon and its wildlife, and that will educate students and the local population about the need to conserve Laguna San Ignacio and its marine life for the region and the world.



Whale-Watching Analysis:

This year Ana Liria Del Monte Madrigal (UABCS) began interviewing the leaders of the Eco-Tourism companies that operate at the lagoon to obtain historical information on the development of each eco-tour operation, and to evaluate the organization of the whale-watching industries at the lagoon. These interviews are part of her studies for a Master of Science degree at the Autonomous University of Baja California Sur (UABCS). The research will also include an analysis of the trends of whale-watching activity in Laguna San Ignacio during

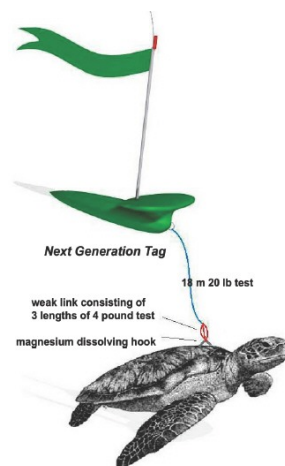


the past decade. She will compare the number of whale-watching pangas that operate on a daily basis each winter season with the number of gray whales in the lagoon and their

distribution during the past ten years. This analysis will document the numbers of boats that operate in the lagoon each winter, identify correlation between trends in whale-watching activity in the lower lagoon “whale-watching zone” and the abundance and distribution of the whales within the lagoon each winter.

Sea Turtles:

Later this summer, the LSIESP sea turtle research program will begin its third season under the direction of Volker Koch from the Autonomous University of Baja California Sur in La Paz (UABCS). Volker’s Team includes researcher Ranulfo Mayoral who grew up at Laguna San Ignacio and now, along with his brothers, are “RARE” trained naturalists and eco-tour guides at the lagoon. The Turtle Group is using radio tags to monitor the movements and distribution of sea turtles in the lagoon and to assess the habitat requirements of the turtles in present times, and forecasting their habitat and food needs in the future.



NEW PROJECT FOR 2008-2009:

Distribution, Status, and Ecological Function of Seagrasses in Laguna San Ignacio.

Dr. Rafael Riosmena-Rodríguez of the Programa de Investigación en Botánica Marina at UABCS and his students began field studies in summer 2008 to document the distribution and ecological status of the vast seagrass meadows of eelgrass (*Zostera marina* and *Gracilaria vermiculophylla*) that occur in various portions of the lagoon. The extensive seagrasses and seaweeds meadows provide feeding habitat for brant geese (*Branta bernicla*), green sea turtles (*Chelonia mydas*), and other marine species. Dr. Riosmena’s team will develop an historical assessment of seagrass distribution to identify critical areas for their conservation and

maintenance. This research will also evaluate the role of these plant habitats to support the biodiversity and recruitment of economically important fish species.



Riosmena's team began visiting the lagoon in summer and fall of 2008 to document the seasonal density, and distribution of specific seagrass meadows. This baseline information is then used to "ground-truth" satellite images of the lagoon, and from these images the total distribution and extent of the seagrass meadows can be estimated and monitored seasonally and in future years. Samples of the benthic sediments were taken (cores) from representative sites to measure the faunal biodiversity and to evaluate the richness of meiofauna. Riosmena's team will visit the lagoon in April 2009 and again over the summer to complete their initial evaluation and sampling during all seasons of the year. In the laboratory satellite images will be compared with the lagoon data to determine seaweed and seagrass distribution and to document their historical trends. Invertebrate biodiversity will be evaluated in relation to temporal and spatial trends of the substrate. The stomach contents of dead sea turtles will be compared with the seagrass diversity in the lagoon to better understand the feeding ecology turtles in the Pacific Baja California Sur Lagoons using isotope analysis.

Doctorate students involved in this project include: Jorge Manuel Calderon (Historical trends of seagrasses in Coastal Lagoons in Northwestern Mexico) CIMACO UABCS; Master's students are: Mario Vergara (Gracilaria beds) and Juan Manuel Rodriguez (green turtle feeding ecology) CICIMAR IPN.

Community Reunion 2009:

The LSIESP researchers held the Third Annual Community “Reunion” at the Kuyimita campground on 28 February 2009. The Reunion brought together representatives from the Eco-Tourism Companies, fishermen, panga drivers, naturalists, and local residents to review the current LSIESP research activities in the lagoon, updates on climate change impacts on gray whales and other marine species, and plans for future research and community activities. Steven Swartz



updated the participants on the current abundance of the Eastern North Pacific gray whale population as estimated by the U.S. National Marine Fisheries Service, and counts of gray whales in the Laguna San Ignacio over the past three years. Jorge Urban reviewed the topics and papers from the Workshop on gray whales and their responses to climate change which was held in conjunction with the American Cetacean Society’s Biennial Conference last November in Monterey, California. Abstracts from this workshop are available at the following link: GrayWhaleClimateWorkshop.

Liria Del Monte Madrigal discussed her Master’s Thesis project to documents and analyze the growth of the whale-watching tourism at Laguna San Ignacio, and to compare trends in number of whale-watching boats operating in the lagoon with trends in gray whale abundance and distribution. Anaid Lopez Urban gave a



Power Point presentation from Melania Guerra and Aaron Thode on the acoustics program including the suction-cup acoustic tag research and preliminary findings. Following these presentations the participants discussed several local issues and concerns. One outcome is that beginning in 2010, LSIESP researchers will offer an information workshop for the naturalists working for the Eco-Tour Operators at the beginning of the winter whale-watching season to share current

information and observations on the status of the gray whale population, observed responses to climate change, status of LSIESP research projects underway, and to discuss issues related to informing the visitors to the lagoon about the lagoon wildlife and conservation efforts.

Public Relations and Outreach:

The LSIESP was featured on Mexico's number one rated morning TV program broadcast from Mexico City. LSIESP researchers and students were interviewed by several news media teams from the United States (San Diego channel 8 news), then United Kingdom (BBC World News), and the Japan News Agency. LSIESP researchers also provided lectures and slide shows on the natural history of the lagoon and gray whales to several Eco-Tourism groups that visited the lagoon this winter.



For more information on the LSIESP visit our web-site at www.lsiecosystem.org

