Laguna San Ignacio
ecosystem science program
a project of The Ocean Foundation in Baja, Mexico

REPORT OF RESEARCH AND ACTIVITIES FOR 2015

Summary of the 2015 Winter Research Season:

The 2015 winter at Laguna San Ignacio (LSI) and Bahia Magdalena was unusual in several ways. First, the water temperature ranged from 19°C to 21°C compared to 13°C to 18°C in the previous winters and mean 18°C in BM to 2012-2013 and 21°C for 2015 (higher by 3°C this year). This warm water was accompanied by frequent dense fog over the lagoon and thunder storms lasting up to three days that brought significant rainfall to the area. The normal prevailing North and West winds were less frequent and less severe than in previous years. Large schools of sardines and other bait fish were abundant in the lagoon, and these attracted large flocks of marine birds including pelicans, cormorants, several species of gulls, surf scoters, and terns. Species associated with warmer water, such as Brown Boobies and Jeagers, which are not frequently seen were also present in 2015.

Birds feeding on sardines in Laguna San Ignacio in 2015

Overall the numbers of gray whales residing in LSI were similar to those seen during the past four winters, except for an unexpected large number of female-calf pairs that resided in the lagoon from mid-January to mid-February. Counts of these whales exceeded the high counts observed during the 1980's. In contrast, the lowest numbers of gray whales since

2012 were counted in Bahia Magdalena (BM), suggesting a decline in the use of that area by gray whales in 2015. Humpback whales (*Megaptera novaeangliae*) and Bryde's whales (*Balaenoptera edeni*) while not seen in previous years, these species were observed near of the entrance of BM in 2015.

Humpback whale photographed in Bahia Magdalena in 2015.

Our researchers continue to pursue a collaboration with colleagues from the Department of Ecology of the Exportadora de Sal company, and the staff of the Vizcaíno Biosphere Reserve to obtain Photo-ID and biopsy data on gray whales in Laguna Ojo de Liebre (LOL) for comparison with other areas in Baja California and throughout the gray whales' range. This collaboration increases the overall contribution of information on gray whales to the North Pacific basin-wide research effort on gray whales sponsored by the Scientific Committee of the International Whaling Commission's (IWC-SC).

Courting gray whales in Laguna San Ignacio.

Major Accomplishments in 2015:

• Surveys for gray whale abundance and distribution were conducted in LSI between January 16and April 12, and in BM between January 15 and February 23.

• Photographic-Identification(Photo-ID) surveys were conducted in LSI and BM from January through April.

• A revised estimate of female calf production and calving interval is also developed from the re-sightings (photo-captures) of breeding female whales.

- Photo-ID catalogs of gray whales from 2006 to 2015were updated and posted on the LSIESP website.
- Review of ten years of gray whale photographic identification findings.
- Collaboration continued with the International Whaling Commission's Scientific Committee (IWC-SC)to identify endangered Western gray whales that migrate to the breeding lagoons of Baja California.
- Fishing gear, floats and fishing lines were successfully removed from three gray whale calves in LSI.
- A report summarizing underwater digital recordings of sounds, their sources and patterns in LSI from 2006 to 2013 was completed and published in the Journal of the American Acoustical Society.
- TheLSIESP field laboratory was dedicated as *"Laboratorio de Investigación de Laguna San Ignacio Francisco 'Pachico' Mayoral, 24 febrero 2015"* in honor of lagoon resident Francisco "Pachico" Mayoral.
- Students from the Autonomous University of Baja California Sur (UABCS) made a 3-day field trip as part of their vertebrate zoology course.
- Dr. Georgina Brabata and her students from UABCS will lead a new avian research program at LSI.
- Sealion occupation of islands in LSI throughout the year was documented.

LSIESP Leadership and Research Staff:

Laguna San Ignacio 2015 Research Team

The 2015 LSIESP was directed by Drs. Jorge Urban R., Steven Swartz, and Alejandro Gómez Gallardo. We welcomed Dr. Georgina Brabata from UABCS, who will lead the new avian research program. Dr. Aaron Thode from Scripps Institute continues to lead the acoustic investigations. Dr. Rafael Risomena Rodiguezof UABCS continues to lead the marine botany research. Sr. Ranulfo Mayoral continues his investigations of the developing sealion colonies in the lagoon.

Bahia Magdalena 2015 Gray Whale Research Team.

The gray whale research team at LSI was led by Sergio Martínez Aguilar and included Lizbeth Sánchez Eliseo, Carlos Alberto López Montalvo, Natalia Serna Urrea, Karen Cruz, and Kia Hayes. The gray whale surveys at BM was led by Hiram Rosales Nanduca, and included Diana López Arzate, Raquel Arroyo Loranca, and Vinnie Caicero García.

Gray Whale Abundance Monitoring:

Sixteen abundance surveys were completed in LSI to monitor the whales' seasonal abundance and use of the lagoon habitat. Surveys began on January 19 and continued until April9 (Table 1).

Boat survey observers and data recorder.

Gray whales are highly visible during surveys under calm conditions.

In general the overall number of gray whales and their seasonal occupation of the lagoon wasconsistent with that seen from 2011to 2014. Total adult whales reached their highest count213 whales (79 single whales and 134 female-calf pairs) on February 13 (Fig.1).

Table 1. Boat survey counts of gray whales in Laguna San Ignacio from 19 January to 9 April 2015.

Survey Number	Date	Female-Calf Pairs	Single Whales	Total Adults
1	19-Jan-15	41	66	107
2	24-Jan-15	35	88	158
3	29-Jan-15	101	65	166
4	03-Feb-15	124	73	197
5	08-Feb-15	74	116	190
6	13-Feb-15	134	79	213
7	19-Feb-15	107	73	180
8	26-Feb-15	88	74	162
9	03-Mar-15	85	26	111
10	08-Mar-15	81	14	95
11	15-Mar-15	73	2	75
12	20-Mar-15	78	1	79
13	25-Mar-15	95	0	95
14	30-Mar-15	49	1	50
15	04-Apr-15	35	0	35
16	09-APr-15	48	0	48

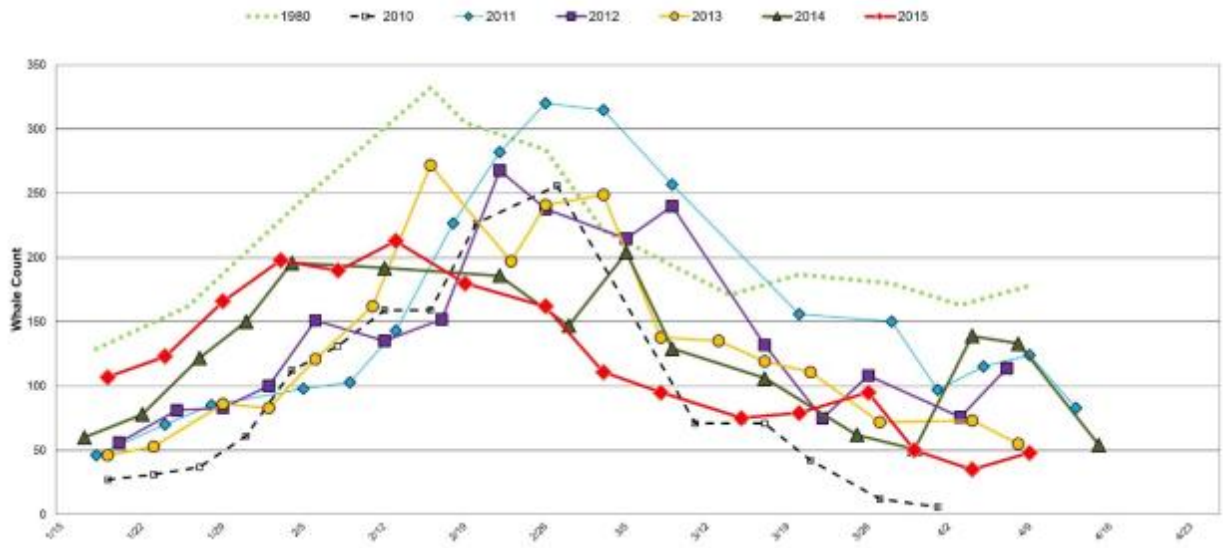


Figure 1. The number of adult gray whales (males, females and females with calves) counted in Laguna San Ignacio in 1980 (dotted green line), 2010 (black broken line), 2011 (blue line), 2012 (purple line), 2013 (yellow line), 2014 (dark green line), and 2015 (red line).

An unexpected high number of female-calf pairs were observed in the lagoon in mid-January to mid-February, and their numbers exceeded their abundance during the same months in the previous nine winters. Counts of female-calf pairs increased during January and early February, reaching a high count of 213 pairs in mid-February. Their numbers hovered around 70 to 80 pairs through March, and declined to 40 to 50 pairs by early April. (Fig. 2).

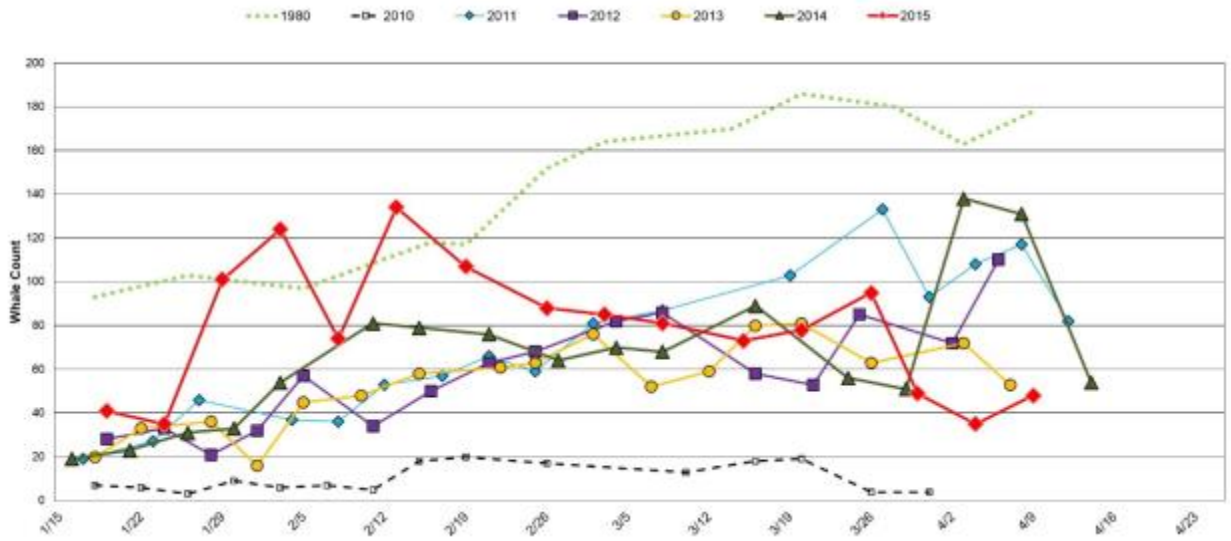


Figure 2.The number of female-calf pairs (females with calves of the year) counted in Laguna San Ignacio in 1980 (dotted green line), 2010 (black broken line), 2011 (blue line), 2012 (purple line), 2013 (yellow line), 2014 (dark green line), and 2015 (red line).

Many of the calves observed in January appeared to be at least a month older than newborn calves, and perhaps they were born during the southward migration, or were coming to LSI from other areas. During this time female-calf pairs

occupied the entire lagoon particularly the northern basin north of the Islands. During one Photo-ID survey, sixteen female-calf pairs were encountered in the northernmost lagoon basin above the islands.

The abundance of single adult gray whales through mid-February was similar to that seen in previous winters, reaching a high count of 116 whales on February 8. After mid-February their counts declined to the lowest numbers of single whales observed during the previous five winters, finally declining through March with few to no singles whales observed after mid-March (Fig.3).

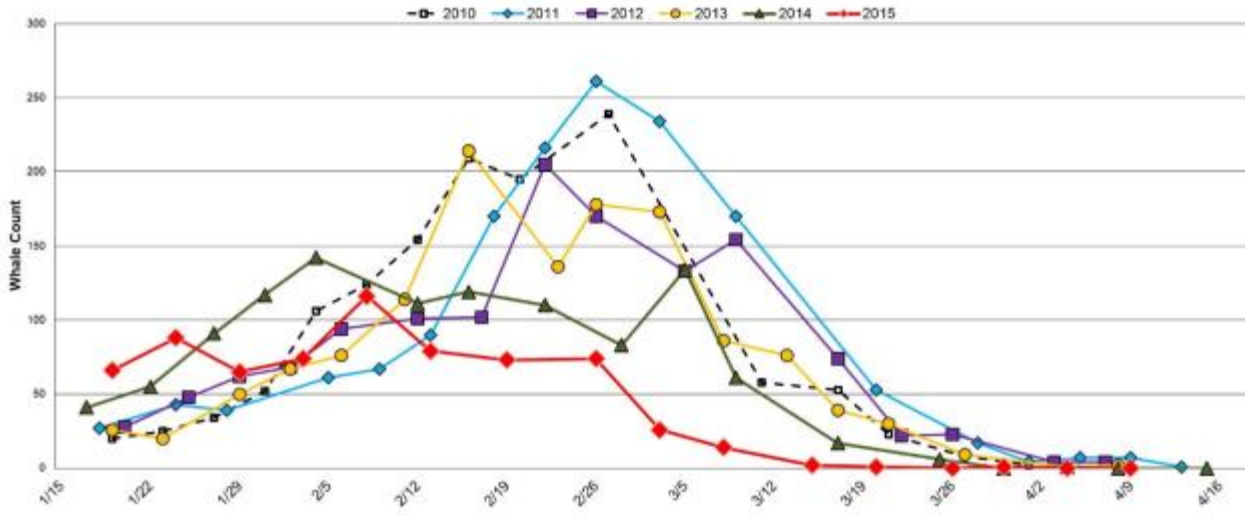


Figure 3. The number of single adult whales (males and females without calves of the year) counted in Laguna San Ignacio in 1980 (dotted green line), 2010 (black broken line), 2011 (blue line), 2012 (purple line), 2013 (yellow line), 2014 (dark green line), and 2015 (red line).

For a second winter water temperatures ranged between 19-21^{0}C, compared to 13-18^{0}C in previous winters, which may have influenced the numbers and residence time for the whales, particularly the female-calf pairs.

In contrast, counts of gray whales in BM were the lowest recorded since the 2012 winter. From15 to 29 January and from 17 to 24 February 2015 three surveys for gray whale abundance were conducted in the BM lagoon complex (January 16 and 27, and February 19) (Table 2).

Table 2. Boat survey counts of gray whales in the Bahia Magdalena lagoon complex for 2012, 2013, and 2015.

	2012			**2013**			**2015**		
	Single	**Mc**	**Total**	**Single**	**Mc**	**Total**	**Single**	**Mc**	**Total**
Census 1	36	1	**37**	36	0	**36**	6	0	**6**
Census 2	36	0	**36**	74	0	**74**	13	2	**15**
Census 3	48	2	**50**	17	0	**17**	3	0	**3**
Census 4	23	5	**28**	25	3	**28**	-	-	-
Census 5	-	-	-	21	0	**21**	-	-	-

The highest count of gray whales was obtained on January 27 and was of 15 individuals (two mother-calf pairs and 13 single whales), while the lowest count was 3 single whales in February 19. Mother-calf pairs were seen in only one of the three surveys. Due to the low presence of gray whales in BM, a third visit was not conducted in March. Previously the

lowest survey count occurred in 2013 and was of 17 whales, which was higher than the 2015 count of 15 whales. These low counts of gray whales suggest that gray whales did not use the BM area extensively in 2015.

Stranded Whales and Other Marine Mammals in 2015

All the gray whales stranded during 2015 in Laguna San Ignacio were calves; 4 females, one male and one unknown. Also found stranded were 4 bottle nose dolphins (*Tursiops truncatus*) and 2 California sea lions (*Zalophus californianus*). (Table 3).

Table 3. Stranded marine mammals discovered in Laguna San Ignacio in 2015.

Stranding No.	Date	Species	Sex/Age Class
1	17-Jan-15	*Eschrichtius robustus*	Female / Calf
2	25-Jan-15	*Zalophus californianus*	Female / Calf
3	29-Jan-15	*Tursiops truncatus*	Undetermined
4	29-Jan-15	*Eschrichtius robustus*	Undetermined
5	5-Feb-15	*Tursiops truncatus*	Undetermined
6	9-Feb-15	*Zalophus californianus*	Female
7	9-Feb-15	*Eschrichtius robustus*	Male / Calf
8	10-Feb-15	*Eschrichtius robustus*	Female / Calf
9	10-Feb-15	*Tursiops truncatus*	Undetermined
10	20-Feb-15	*Tursiops truncatus*	Male
11	27-Feb-15	*Eschrichtius robustus*	Female / Calf
12	4-Mar-15	*Eschrichtius robustus*	Female / Calf
13	9-Abr-15	*Zalophus californianus*	Female

Photo-Identification, Photo Archiving and Management:

Sergio Martinez leads the Photographic Identification (Photo-ID) program at Laguna San Ignacio.

LSIESP researchers spent 348 hours over 67 days photographing gray whales in LSI. A total of 13,733 digital images were obtained from 1,145 gray whale sightings that provided 572 individual whales. These included 277 single whales what averaged 10.1-days in the lagoon (range 1 to 68 days), and 295 females with calves that averaged 32.8-days in the lagoon (range 1 to 82 days).Digital photographs from BM were obtained from 88 sightings: 35 sightings of single whales yielding 57 individual whales; and 53 sightings of female-calf pairs yielding 41 different females with calves of the year. At least 13 mother-calf pairs and 6 single whales were sighted two or more times in BM. Final numbers of identified whales and matches with previous winter seasons will be determined during post-field season analysis.

Calving interval is a key indicator of the reproductive health of the population. Sergio Martinez compared photographs of known breeding females obtained from 2005-2013 and calculated a revised estimate of the female calving-interval of 2.44 years (n=75), which is similar to the estimated calving interval of 2.40 years (n=17) calculated by Diaz from photographs obtained between 1996 and 2002. Comparing these estimates to the interval of 2.25 years (n=60) calculated by Jones for the 1977-1982 time period suggests that the calving interval for female gray whales has not changed significantly in the past two decades, but they are not reproducing as frequently as they were in the late 1970's and early 1980's.

Photographs from 2015 will be archived, placed into digital catalogs, compared with the catalogs from 2006-2014, and compared with photo ID catalogues of Laguna LOL, and LSI to determine the number and movements of gray whales that are utilizing these lagoon areas. All gray whale catalogs are posted on the LSIESP website to allow other researchers to review and search for matches with photographs of gray whales from other portions of the species range (e.g., Arctic, Western Pacific, etc.).

LSIESP Photo-Identification manager Sergio Martinez completed a review of ten years of photographic identification findings based on photographs from LSI and other regions in Baja California which is available on the LSIESP website at www.lsiecosystem.org.

A naturally marked gray whale photographed in Laguna San Ignacio.

Whale Dis-Entanglements:

The January 2014 the Natural Resources Defense Council (NRDC) supported an IWC-SC endorsed cetacean disentanglement training workshop at LSI that provided the tools and training to safely remove fishing lines, gear, and floats from gray whales that are encountered each winter in the lagoon and elsewhere in Baja California. In 2015 three gray whale calves were discovered with lines and floats wrapped around their bodies and in their mouths. LSIESP researchers assisted by pangueros (operators of eco-tour whale watching boats) successfully removed the lines and floats from all three calves. When pangueros first identified gray whale calves tangled in fishing gear and floats, they radioed their sightings and positions to the LSIESP researchers who responded. Fishing gear was removed from the first calf on January 29, the second on February 12, and a third on March 14. All three calves were subsequently observed swimming normally with their mothers in the days following the disentanglements. Basic training in the methods of disentanglement and practice is now provided to each team of LSIESP researchers by researchers that have received complete training from IWC -SC Disentanglement Instructors.

Lines and floats successfully removed from a gray whale calf by LSIESP researchers.

Acoustic Research and Monitoring:

Dr. Aaron Thode and Ph.D. candidate Kerri Seger of Scripps Institute completed their report summarizing the findings of underwater digital recordings made in LSI from 2006 to 2013. Their report presents new information on diel cycles of underwater sounds, annual trends and variations in frequencies and levels of underwater noise in the lagoon, and frequency characteristics of underwater ambient noise from whale-watching boats, marine fish and invertebrates, and gray whale vocalizations. Their report is currently "In Press" in the Journal of the American Acoustical Society and will be published in 2015. An interactive web-page featuring recordings of underwater sounds in LSI will be available on the LSIESP's new website.

AVIAN Research: Coyote predation of Ground Nesting Birds:

Beginning in 2016 Dr. Georgina Brabata from UABCS and her graduate students will develop and implement a new program to inventory the seasonal diversity and habitat requirements of the marine birds that gather and reside in LSI during the winter and during other months of the year. This research will include evaluation of the seasonal distribution and abundance, habitat selection and the nutritional needs of marine birds and their diets. Dr. Brabata will also continue to monitor and investigate the ongoing problem of coyote predation on the lagoon's bird colonies. This research will provide a valuable comparison with historical information on the avian fauna found at the lagoon in previous years.

Brown Pelicans (*Pelecanus occidentalis*) and Brandt's Cormorants (*Phalacrocorax penicillatus*).

Ecological Function of Seagrasses in Laguna San Ignacio:

Rafael Riosmena-Rodríguez of the Programa de Investigaciónen Botánica Marina at UABCS and his students were unable to conduct surveys of the of eel grass meadows (*Zostera marina)*and other marine plants in the lagoon following hurricane Odile which brought severe rain and winds to the area 16 September 2014. Dr. Riosmena and his students plan to resume surveys of LSI during the summer of 2015 and into 2016.

A Great Egret (*Ardea alba*) in the mangrove estuaries in Laguna San Ignacio.

Public Outreach and Education:

Alejandro Gómez Gallardo recounts the history of the research program at Laguna San Ignacio to UABCS students.

Our public outreach activities included interviews and discussion with Mexican and other international media groups that visited the lagoon. Field Chief Sergio Martinez and Co-Director Steven Swartz made several presentations on gray whales and the lagoon to local school groups and visiting eco-tour groups including "Andiamo" Eco-Tours, Nature Adventures Inc., and Natural Resource Defense Council.

Biosphere Reserve: LSIESP researchers were visited by the Director of the Reserva de la Biosfera del Vizcaíno, MSc. Everardo Mariano Meléndez, and they discussed with him the science program, conservation programs at LSI and BM, and collaboration between the Reserva and LSIESP.

University Students: LSIESP researchers hosted a group of 25 university students from the Autonomous University of Baja California Sur (UABCS) and their instructor LSIESP's Dr. Alejandro Gómez Gallardo. This 3-day field trip was part of a vertebrate zoology course "Marine Amniote" taught by Alejandro at the university.

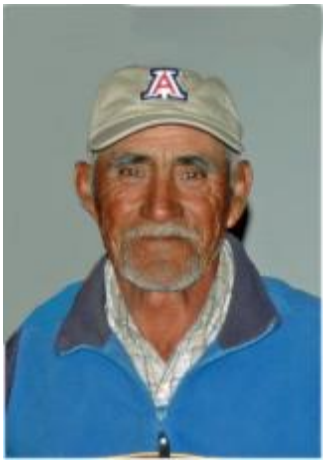
Students from the Autonomous University of Baja California Sur arrive at the LSIESP field laboratory.

2015 Community Reunion and Laboratory Dedication:

On February 24th, 2015 the LSIESP sponsored the Annual Community "Reunion" at the Kuyimita Eco-Tourism Campground Palapa on the south shore of LSI. The presentations reviewed the findings of the LSIESP during the past ten years.

Guests and visitors gather in the Kuyimita palapa for the 2015 Reunion and laboratory dedication.

The 2015 Reunion included the dedication of the LSIESP field laboratory as the *"Laboratorio de Investigación de Laguna San Ignacio Francisco 'Pachico' Mayoral, 24 febrero 2015"* in honor of lagoon resident Francisco "Pachico" Mayoral who passed away on October 22, 2013. "Pachico" was an Ambassador for the gray whales and for LSI, and he is credited for being the first person to experience a "friendly" gray whale while fishing in LSI in 1973. Pachico's insights into the lagoon, its wildlife, and the need to protect the lagoon were an inspiration to all. In attendance were the Mayoral family, LSIESP researchers, representatives of the eco-tourism companies that work at the lagoon, visitors and guests.



Francisco "Pachico" Mayoral (above), and the Mayoral family (right) at the dedication of the laboratory.

Professional Meetings, Training and Publications:

LSIESP researchers presented papers at the "16 Reunión de Expertos en Mamíferos Acuáticos de América del sur, Congreso La Sociedad Latino Americana de Especialistas en Mamíferos Acuáticos (SOLAMAC)" held in Cartagena D.T, Colombia from 1 to 5 December 2014. These included:

> Urbán Ramírez, Jorge. 2014. AVISTAMIENTO DE BALLENAS EN MÉXICO: CONOCIMIENTO CIENTÍFICO Y CONSERVACIÓN.
>
> Gómez Gallardo Unzueta, E Alejandro; González López, Irma; Swartz, Steven L.; Martínez Aguilar, Sergio.; Urbán Ramírez, Jorge. 2014. CAMBIOS EN LA ABUNDANCIA DE LA BALLENA GRIS EN LAS LAGUNAS OJO DE LIEBRE Y SAN IGNACIO, B.C.S, MÉXICO, 2007-2014.
>
> Sergio Martínez, A., Steve Swartz, Alejandro Gómez Gallardo y Jorge Urbán. R. J. 2014. FIDELIDAD Y RESIDENCIA INVERVAL DE LA BALLENA GRIS (*Eschrichtius robustus*) EN LA LAGUNA SAN IGNACIO, B.C.S., MÉXICO.

Co-Director Jorge Urban R. attended a special IWC-SC workshop on Western Gray whales held April 8-11, 2014 at the U.S. Southwest Fisheries Science Center in La Jolla, CA. Co-Director Steven Swartz presented a lecture at the Cabrillo National Monument in San Diego in January 2015, and he will present a paper on gray whales and conservation program at LSI at the June 2015 meeting of The Animal Behavior Society in Anchorage, Alaska. Additional presentations covering the 2015 research findings will be made at the 21st Biennial Conference on the Biology of Marine Mammals to be held in San Francisco, California from 13-18 December 2015, and for the 35th meeting of the Mexican Marine Mammal Society (SOMEMMA) meeting in May 2016 in La Paz, Baja California Sur, Mexico.

LSIESP researchers prepared reports on their gray whale research for the 2015 meeting of the International Whaling Commission's Scientific Committee meeting in May-June of 2015 in San Diego, California. These include:

> J. Urbán, R., S. Swartz, A. Gómez-Gallardo U., S. Martinez A., and H. Rosales N. 2015. Report of the 2015 gray whale research in Laguna San Ignacio and Bahia Magdalena, Mexico. Rep. International Whaling Commission Scientific Committee SC/66a/BRG-15 pp.

Student Researchers and Graduates:

LSIESP researchers get a close view of a "curious" gray whale mother and her calf.

From August 5 to December 5, 2014 LSIESP researcher Carlos Alberto López traveled to the Institute of Environmental Human Health at the Texas Tech University Health Science Center in Lubbock, Texas where he received training in steroid

extraction and analysis methodologies from Dr. Celine Godard-Codding. The determination of steroid hormones in the gray whale supports Carlos' Ph.D. research on the "Migratory Origin, Reproductive and Energetic Status of Gray Whales During the Winter Season." In the coming year, Carlos will continue studies for his Ph.D. at UABCS.

Sergio Martinez completed his Master's Thesis at UABCS during summer of 2011 and is now enrolled in the Ph.D. program. UNAM Ph.D. graduate Hiram Rosales Nanduca leads the LSIESP photo-id based population assessment of gray whales in BM, and works with Ecological Projects International (EPI) as a marine biology instructor. In the coming year Carlos will continue studies for his Ph.D. at UABCS.

Ludovic Tenorio began his Ph.D. studies in acoustics at Scripps Institution of Oceanography in the fall of 2014. Following the completion of her undergraduate studies, Lizbeth Sánchez Eliseo is beginning her graduate studies at UABCS. Natalia Serna Urrea and Vinnie Caicero García are continuing their university studies at UABCS, and Karen Cruz at the Universidad Juárez Autónoma de Tabasco Tabasco, México.

Sergio Martinez directs the re-construction of a gray whale calf skull.

The following LSIESP student researchers with completed academic degrees and/or theses in progress:

Undergraduate:
Jessica Robles -Intervalos de nacimientos de la ballena gris (*Eschrichtius robustus*) en la laguna San Ignacio BCS, México, durante las temporadas de 2005 a 2011.
Erandi Calderón -Análisis corporal de las ballenas grises (*Eschrichtius robustus*), que visitaron la laguna San Ignacio, durante las temporadas 2008 a 2011.
Mauricio Najera-Cambio en la distribución de las madres con cría de ballena gris (*Eschrichtius robustus*), en la laguna San Ignacio, durante tres períodos de estudio (1978-82, 1996-00 Y 2007- 11).
Liria del Monte - Diagnostico de la actividad Turistica de observación de la ballena gris (*Eschrichtius robustus*) en la laguna San Ignacio (in progress).
Lizbeth Sanchez- Distribución y abundancia de la ballena gris (*Eschrichtius robustus*) en la laguna San Ignacio, BCS, con relación a parámetros ambientales.

Masters:
AnaidUrbán- Sonidos de la ballena gris (*Eschrichtius robustus*), en su área de crianza y reproducción en la laguna San Ignacio, BCS,México.
Sergio Gonzalez -Filopatria de la ballena gris (*Eschrichtius robustus*) en la laguna San Ignacio BCS, México 1996-2005.

Doctorate:
Melania Guerra -Passive acoustic detection and localization of vocalizing east Pacific gray whales by means of Autonomous sensors in multiple array configurations.
Sergio Martínez -Identidad poblacional de la ballena gris (*Eschrichtius robustus*) en la Península de Baja California, México. (in progress).
Carlos A. López -Origen migratorio, estado energético y reproductivo de la ballena gris durante el invierno (in progress).

Acknowledgements:

The *"Laboratorio de Investigación de Laguna San Ignacio Francisco 'Pachico' Mayoral, 24 febrero 2015."*

Many individuals and organizations provide the support needed to conduct the field research program at Laguna San Ignacio, and the necessary follow-up analysis and reporting and the end of each year of research. We are grateful for and appreciate their support and shared vision for the science program at Laguna San Ignacio. The 2015 LSIESP field research program was directed by Drs. Jorge Urbán R., Steven Swartz, and Alejandro Gómez Gallardo. Sergio Martínez Aguilar and Hiram Rosales Nanduca lead the research teams at Laguna San Ignacio and Bahia Magdalena, respectively. Field researchers included Lizbeth Sánchez Eliseo, Carlos Alberto López Montalvo, Natalia Serna Urrea, Karen Cruz, Kia Hayes, Diana López Arzate, Raquel Arroyo Loranca, and Vinnie Caicero García. Dr. Rafael Risomena Rodiguezof UABCS continues the marine botany research, Sr. Ranulfo Mayoral continued monitoring the sealion colonies in the lagoon, and Dr. Georgina Brabata from UABCS lead the avian research program. Supporters of the 2015 LSIESP included The Ocean Foundation, Searcher Natural History Tours, Kuyima Eco-Tourism, Baja Discovery, Pachico Whale-Watching, Exportadora de Sal Department of Ecology, and private contributors. This research was carried out under scientific research permits issued by the Subsecretaría de Gestión Para La Protectión Ambiental, Dirección General de Vida Silvestre, Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT), de Mexico. Nuestro corazón sentir gracias a todos.