Laguna San Ignacio Ecosystem Science Program (LSIESP)
2008 PROJECT FIELD RESEARCH REPORT
MAY 1, 2008

This reports summarizes the accomplishments of the Laguna San Ignacio Ecosystem Science program (LSIESP) during the winter 2008 field season at Laguna San Ignacio. Additional analyses and post-field season reporting continues through June 2008. Reports of the 2008 LSIESP research and monitoring projects are submitted to the Vizcaino Biosphere Reserve, the Scientific Committee of the International Whaling Commission, to scientific journals, presented at conferences and symposia, and made available to the program's sponsoring organizations and interested public via the LSIESP's internet web-site (*www.sanignacioecosystem.org*).

The ***Mission*** of the LSIESP is to provide scientific information on the ecological status of the lagoon and its living marine resources that is relevant to resource management questions and concerns about development, eco-tourism and the sustainability of the lagoon ecosystem as a viable habitat for marine wildlife. The ***Goals*** of LSIESP are to provide relevant scientific support for the conservation of the Laguna San Ignacio Wetlands Complex by: (1) conducting research and monitoring the biological status of the lagoon and its wildlife; (2) providing training opportunities for university students interested in careers in marine conservation science; (3) providing science based information to the community and local entrepreneurs so they may evaluate options for future development (e.g., expansion of eco-tourism, increased human habitation) and to evaluate the outcome of previously implemented management actions (e.g., the efficacy of existing regulations for whale-watching and commercial fishing in the lagoon); and (4) involving and empowering local residents and eco-tourism operators by providing public workshops and symposia to discuss and comment on relevant science issues affecting the lagoon ecosystem.

The LSIESP's progress toward achieving these ***Goals*** is demonstrated by the following 2008 accomplishments:

1. **Gray Whale Monitoring & Assessment:** The gray whale team was led by Co-PIs, Dr. Jorge Urban R. from the Autonomous University of Baja California Sur (UABCS) in La Paz, Steven Swartz of Cetacean Research Associates, Maryland USA, and included four UABCS graduate students (Alejandro Gómez-Gallardo U., Sergio González C., Benjamín Troyo V., and Mauricio Nájera C.) and two undergraduate volunteers (Anaid López U. of UABCS and Angie Sremba of Oregon State Univeristy). The team arrived at Laguna San Ignacio the third week in January, and completed 14 surveys of the number of gray whales in the lagoon by the end of the 2008 winter season in early April. This completes a 30-year series of census surveys that began in 1978, the longest such series for any of the gray whale breeding lagoons in Baja California. Surveys during the first four weeks of 2008 documented the lowest numbers of gray whales, particularly mothers with calves, ever recorded in Laguna San Ignacio during the whales' winter breeding season. Gray whale photographic identification studies documented the presence of individual whales, particularly females with calves, within the lagoon's interior. Approximately 250 individual whales were identified from photographs. Analysis will continue through June 2008 to identify individual whales and calves of the year. Final analyses will determine annual return rates for individual whales, minimum duration of stay in the lagoon, calving frequency, intervals, and rates for known females, and allow detection and evaluation of any "skinny" or resource compromised individuals.

2. Acoustic research and ambient noise documentation: For the second year the acoustics project was led by Aaron Thode and his graduate student Melania Guerra of Scripps Institution of Oceanography. Bottom mounted acoustic recorders were placed in two locations along the southern shore of the lagoon to monitor and record the ambient noise in areas just outside and within the whale-watching zone in the lagoon. Acoustic records of the frequency and levels of natural and anthropogenic noise will be analyzed during the 2008 spring and findings reported during the 2008 summer. In addition, six acoustic recording tags were successfully attached temporally to whales using rubber suction cups. These recorders documented ambient noise, and the whale's movements and behavior underwater and at the surface. This approach provides data on the whale's individual response to specific levels and frequencies of underwater noise, and documents the whale's swimming and diving behavior in real-time for correlation with the underwater noise.

3. Black sea turtle (*Chelonia mydas*) habitat use in Laguna San Ignacio: Jesse Sneko from Univeristy of Florida, Gainesville, Volker Koch from UABCS, William Megill from the University of Bath, Bath, UK, and Ranulfo Mayoral from Laguna San Ignacio began the current Laguna San Ignacio black sea turtle field studies in November 2007 and population monitoring will continue through summer 2008. Immature black sea turtles were captured using entanglement nets, measured, weighed, and tagged before release. Sea

turtle movements were tracked using VHF radio telemetry event loggers and GPS location electronics attached to floating tags tethered to the turtles with "break-away" links. Tagged turtles were released and tracked within the lagoon, re-captured every 12-24 hours and the data down-loaded from the loggers, batteries replaced and the turtles re-released to gather additional data. Tracking was terminated when the tether broke, or if it were still attached after 96 hours. Turtle movements were plotted on charts of the lagoon and will be analyzed in relation to rate of movement, surface and diving behavior, habitat correlates, and foraging behavior over 24-hr periods. This information will contribute to the evaluation of the importance to sea turtles of eel grass and other habitat types within the lagoon. As more data are acquired, multi-layered GIS models of the lagoon, including tidal cycles, seasonal features, and forage resources will be developed to illuminate the little known life history and habitat requirements of these sea turtles.

4. Analysis of historical whale-watching pressure: Whale-watching tourism within Laguna San Ignacio was documented each winter during the period 1978 to 1982 by Jones and Swartz (1984) and more recently by Kuyima Eco-Tourism since 1996. Alejandro Gómez-Gallardo U. and UABCS researchers began analysis of the most recent whale-watching records during the fall of 200, by converting the "paper" records into a digital database. Once compiled, the digital database will be analyzed to determine the number of whale-watching pangas that operated each day of each winter to determine the trends in the number of pangas that operated each hour of the day, each day of the week throughout each season. Trends in whale-watching activity will be compared with gray whale abundance and other wildlife trends during the same years and analyzed for correlations to evaluate the potential impact of this commercial activity within the lagoon.

5. "Second Community Reunion" Workshop: The Second Annual Science Workshop and "Community Reunion" was held at the Kuyima Campground on 27 February 2008. This community meeting was attended by 61 local community members and visitors to the lagoon including Eco- Tour operators, Fishing Cooperative Leaders, local government officials including the Director of the Vizcaino Biosphere Reserve, Mexican and US based NGO environmental organizations, and local residents. The LSIESP investigators presented updates on their various science programs and recent findings and entertained questions and discussion with the meeting attendees. These included gray whale" monitoring, passive acoustic monitoring, benthic fauna surveys and evaluations, sea turtle tagging & monitoring, and education-outreach programs with the local schools. Plans were discussed to have in 2009 a "Laguna San Ignacio Ecosystem Symposium and Festival" in the town of San Ignacio to increase public awareness of the marine protected area, its environmental, social and economic importance to the region.

6. Science laboratory Upgrade: The LSIESP field laboratory built in 2007 serves as a location for researchers and students to base their field studies and conduct preliminary data analysis. The 7 x 7 m "Palapa" also serves as an example of "green alternative technology" because its electrical system converts solar and wind energy into electrical power for charging computer, camera, and other equipment batteries, and to run lights at night. The wind generator was installed in 2007, and in 2008 a solar panel was added to the system to augment the electrical generating capacity of the field laboratory. Many lagoon visitors and local school students have visited the laboratory during the winter field season where LSIESP researchers frequently respond to questions about their research and the lagoon ecosystem.

7. LSIESP internet website (*www.sanignacioecosystem.org*) was launched in September 2007 to provide information on the Program, its goals and objectives, and to disseminate the Program's findings and other information about the Laguna San Ignacio ecosystem and its marine wildlife. Between September 2007 and April 2008 the website received 82,000 hits from visitors that read and downloaded information on Laguna San Ignacio's marine ecosystem and efforts to provide conservation science for this marine protected area..

8. Naturalist training & Educational Outreach: Throughout the 2008 winter research season LSIESP researchers met with the naturalists staff of the various eco-tourism companies that operate eco-tour excursions within Laguna San Ignacio to discuss and exchange information on the lagoon and its wildlife, especially the gray whales. LSIESP staff developed power-point presentations and provided these as reference materials to naturalists working at the lagoon on CDs. Presentations on the Laguna San Ignacio marine ecosystem and wildlife were provided by LSIESP researchers to eco-tourists visiting the lagoon and to the local school groups s in the nearby Ejido Luis Escheverria Alvarez.

9. Sergio González C. was the first UABCS graduate student to receive his Master Degree in 2008 while participating in the LSIESP, and he is now applying to graduate programs to pursue a Ph.D. in marine science. The undergrad volunteers that participated in the gray whale monitoring research in 2008 now intend to pursue advanced graduate degrees: Anaid López U. is applying to the Master's program at UABCS to pursue marine acoustics and marine animal behavior, and Angie Sremba will pursue a Ph.D. in cetacean

genetics and oceanography at Oregon State University. Both have expressed an interest in returning to LSIESP in 2009.

10. LSIESP Co-PIs J. Urban and S.L. Swartz initiated discussions for future LSIESP projects that include: measuring and monitoring the primary production and specific physical and chemical water variables in the lagoon; photographic identification of the bottlenose dolphin (*Tursiops truncatus*) population in the lagoon; photographically monitoring and evaluating impact of the new sealion (*Zalophus californianus*) rookeries and haul-out areas on Islas Garzas and Pelicano in the northern portion of the lagoon. Urban and Swartz also initiated discussions with the Director of the Vizcaino Biosphere Reserve concerning future collaboration on specific science projects, and with Pronatura-Noroeste to collaborate on a conservation program for water fowl and migratory birds at Laguna San Ignacio.

11. Ecosystem Symposium in San Ignacio for 2009: The LSIESP researchers received commitments from the six active Eco-Tourism companies to co-sponsor a "Laguna San Ignacio Science Symposium" in the town of San Ignacio during the spring of 2009. The Science Symposium will include a day of science based presentations targeting the local San Ignacio and Ejido Luis Echeverria Alvarez school children, their parents, and interested public. The following day will include field trips to the lagoon to view the gray whales, mangrove estuaries and marine birds, and other wildlife that reside at the lagoon.