

*Animal Training and Research,
International
&
SLEWTHS Project
Science, Learning, and Exploration
With the Help of Sea lions*

**END OF THE YEAR SUMMARY
2011**

*Animal Training
&
Research International*



Research

Molting Dynamics:

Although data collection for this seven year study was completed last year, analysis continues as Tiana Hanna has been hard at work correlating water and air temperature analysis to the timing of molt. This work will be presented as her capstone thesis at CSUMB in May 2012.

Growth and Morphometrics:

Neither Nemo nor Jonah changed length this year for the first time ever, which may suggest that they have completed their growth altogether. Each is shy of full adult male length by an inch or two, which may be natural variation, the result of neutering or early life stranding repercussions. Cali did add over an inch in length this year, however. Data collection will continue until all animals are at a stagnant growth point.

Testing Electronic Barriers as a Deterrence Method with California sea lions:

This year SLEWTHS and Smith-Root, Inc continued their several year collaboration testing the effectiveness of electronic fields to deter marine mammals. Design and development of a surface-mounted electric pad was conducted with help from interested harbor masters, following several invited meetings on the subject. Testing for this new device will commence in January of 2012 at the visitors dock in Moss Landing Harbor which has a year round nuisance population of sea lions. It is hoped that with the data from these trials a product can be developed to safely and easily keep sea lions from inhabiting marina and boat surfaces where they are unwanted.

We also continued to explore the use of electronic barriers for deterring marine animals from dangerous power plant inflows. We were contacted by a San Diego based nuclear power plant who is interested in exploring the use of electronic barriers to help keep not only pinnipeds but also sea turtles and fish out of their cooling inflows. Several meetings have been held on this subject and 2012 will be an exploratory and development year for this promising project.

Metabolic Effects of Prey Encounter Rates and Transit Costs:

This year we agreed to participate in a new investigation in collaboration with Dr. Leslie Cornick from Alaska Pacific University. This project seeks the necessary data to predict more precisely how sea lion foraging strategies are likely impacted by different temporal, spatial and quantitative scenarios of prey accessibility. By quantifying how sea lions alter their behavior, and how those behavioral changes are manifested in changes in their metabolism, we can begin to establish the limits to foraging plasticity as animals respond to a changing prey field in the face of increased commercial harvest of prey species, climate change and other anthropogenic stressors. We will be testing the hypothesis that changes in metabolic rate associated with an increased cost of foraging correspond to predictable and observable changes in foraging behavior and efficiency. Based on results from Cornick and Horning (2003), Cornick et al. (2006), and results from preliminary metabolic experiments (Cornick, unpublished data) we expect sea lions to exhibit reduced dive duration and foraging time in individual dives with increased swimming cost. We also expect O₂ consumption and CO₂ production to increase with increased swimming cost. Across dive bouts, we expect sea lions to maintain foraging efficiency by reducing surface interval duration and increasing respiratory rates. The data collected from this project will be

used to develop an optimal diving model that incorporates the results of the proposed work with the results from the previous studies.

Sea lions will perform a series of simulated foraging dives by searching for and retrieving prey items from a series of fish feeders distributed around their enclosure. Synchronized video cameras will record behavior and prey captures at each feeder and at the surface, where animals will breathe in a plexiglass dome connected to a respirometer. Resting and diving O₂ consumption and CO₂ production will be measured and compared to dive duration, foraging time, surface interval duration, and foraging efficiency (fish/dive) on a dive-by-dive and bout-by-bout basis over a range of prey encounter rates. The area outside the dome will be covered with kennel grating to discourage animals from surfacing elsewhere in the enclosure. Trials will be conducted at both standard and increased locomotor costs to examine these relationships in the face of increased foraging costs. For cost-increased trials a duplicate series of simulated foraging dives will be performed with the animal wearing a drag harness designed to increase the energetic cost of swimming, and thus, foraging. Prey encounter rates will be manipulated by varying the number and frequency of fish released from the feeders. Randomization of fish release between feeders should elicit search behavior in the foraging animals. Dive and surface interval duration will be under the control of the animal. Pre- and post-test resting periods in the dome will be used to measure resting and recovery metabolic rates.

In 2011 we acquired the necessary permitting, built the apparatus and trained two animals to cooperate in the investigation. As of December 2011, training for these experiments has been nearly completed with Jonah and Sake and we expect to commence data collection in March of 2012.

Water Quality and Sea lion Eye Disease

By the end of 2011, all but one of our sea lions had completed all remaining eye disease treatments. Having been weaned off these mostly topical treatments appears thus far to have resulted in no ill effects. We are thrilled after three years, to be finally returning to normal without the constant pressure of administering an expensive variety of medications. The final animal, Nemo has recently begun to make further progress after a year long setback, and we are currently experimenting with a dramatic reduction in his treatments as well. The data we have so far collected on this disease and its treatment is being prepared for presentation at a conference in 2012.

Coastal Health Analysis:

SLEWTHS was happy to cooperate with a Stanford graduate student, Lauren Sassoubre (formerly an MLML masters student) working on coastal microbial pollution issues. For one of her projects, she needed samples of sea lion or seal feces to test against the molecular markers used to identify human fecal pollution in coastal ecosystems.

Publications, Presentations, Proposals and Permits (P⁴)

Publications

- The staff as a whole wrote and published 2 volumes of our *Inspiring Minds* Newsletter (2/11 and 10/11) and Dr. Zeligs produced a 2010 end of year report.

- Dr. Zeligs and Stefani Skrovan wrote 5 summary articles for the MLML online newsletter: (4/11, 6/11, 7/11, 10/11, and 12/11)
- Numerous overhauls and edits were made to the SOP manuals for the Encounters and regular laboratory operations.

Presentations and conference participation

Dr. Jenifer Zeligs and Stefani Skrovan attended the Western Fairs Association conference in Reno, Nevada to present the Sea Lion Encounters Public Outreach Program Jan 16-17, 2011.

Stefani Skrovan, Sophie Darling and Rachel Daggett attended the IMATA regional conference in Vallejo, CA May 3-5, 2011.

We were happy to contribute to Dr. Carmen Colitz's presentation to the International Association for Aquatic Animal Medicine meeting in Las Vegas, May 2011. The presentation was entitled "Retrospective of Clinical Findings and Results of Lensectomies in Pinnipeds: 46 Cases"

SLEWTHS contributed to a formal presentation by Chelsea Grubb of the Kansas Zoo for the International Marine Animal Trainers Association conference in Miami, FL in September 2011, entitled "LET SEA LIONS BE SEE LIONS! ANALYSIS OF BEHAVIOR IN CALIFORNIA SEA LIONS BEFORE AND AFTER CATARACT REMOVAL SURGERY"

Dr. Zeligs and Smith-Root colleague Carl Burger attended two harbor masters meetings; one in Astoria, Washington Feb 22/23 and one in Moss Landing on 7/27/11. Both were invited presentations to discuss electronic barrier sea lion deterrence possibilities.

Dr. Zeligs also made an invited formal presentation on sea lion deterrence to the Pacific Coast Convention of Harbormasters on 4/20/11 in San Francisco.

Participated in the MLML in-house open house

Proposals and Permits

- Renewed our APHIS public display license
- Renewed IACUC protocols #863, 887
- Wrote and received a new IACUC protocol #971: Evaluation of non-lethal electric array system to deter marine mammals from surfaces of marina infrastructure.
- Wrote and received a new IACUC protocol #973: Behavioral and metabolic responses to simulated reduction in prey availability: implications for physiological plasticity in pinnipeds.
- Stefani Skrovan completed an on-line certification course in Institutional Care and Use of Captive Animals as part of a new SJSU permitting requirement for proper animal care and research.

Education and Public Outreach

Sea Lion Stewards Environmental Education Program and Beach Clean-up Activities

SLEWTHS conducted 16 Sea Lion Stewards half-day programs for over 370 participants who collected over 125 lbs of garbage from our local beach in the process.

Sea Lion Encounters Public Outreach Program

Based on daily performance tallies, approximately 52,465 people attended performances of *Sea Lion Encounters* in 2011.

We continued to fine tune our newest Sea Lion Encounters performance, featuring our “Talented” baby sea lions: Cali and Ariel, and added water work with Cali into the demonstration.

Sea Lion Encounters was featured at:

- The Stockton Asparagus Festival in Stockton, CA: April 15-17
- Sacramento County Fair in Sacramento, CA: May 27-31
- Western Idaho State Fair in Boise, ID: August 20-29
- Santa Cruz County Fair in Watsonville, CA: September 13-18

Tours for MLML, CSU, and other academic institutions

18 private tours and/or demonstrations were provided on-site by SLEWTHS.

- 1/19/11 Kenneth Coale with campus police
- 2/10/11 Homeschool tour for Friends of MLML
- 3/22/11 Pilar Marien and SJSUF accounting staff
- 4/30/11 MLML Open House- two sea lion demonstrations plus public viewing
- 5/1/11 MLML Open House- two sea lion demonstrations plus public viewing
- 5/3/11 Tour and demo for Aldo DeRose and family
- 5/9/11 Kenneth Coale and Barbara Conry, Associate Dean of the College of Applied Science and Arts at SJSU
- 6/7/11 UBC research assistant, Brandon Russell and friend
- 6/15/11 Kenneth Coale and 1st National representatives
- 6/30/11 Kenneth Coale and friends
- 8/23/11 MLML new student orientation and demo
- 10/11/11 Tour for Steve Davenport, Director of Long Marine Lab
- 10/27/11 Moorpark College, Exotic Animal Training and Management class came for annual demonstration and seminar
- 11/17/11 Tour for Jim Harvey, MLML acting director
- 12/20/11 Tour for James
- 12/20/11 Tour for Shalaka from San Jose State University Foundation contracts and grants

Classes

-A total of 26 undergraduate students from all over the US and 3 foreign countries attended 2 intensive immersion classes in marine mammalogy through CSUMB extended education department.

-Dr. Zeligs, with the help of David Lichman, filmed some horse training work that was edited along with other training footage into a DVD that is now available to accompany the SLEWTHS coursework.

Internships

- 22 day-long internships for class students were conducted
- 12 multi-day adult internships were also provided
- 4 Jr. Internships were provided for aspiring future marine mammalogists
- 5 Certificates of Completion in Marine Mammalogy were earned by people who successfully completed both classes and a week-long internship.

Student projects

- Service Learning projects were completed by CSUMB students Tiana Hanna, Michelle Jones, Ashley Acridge, and Shelby Peters.

Media

- Numerous interviews for local media were provided by SLEWTHS staff at each of our public outreach events.
- “Zombie Sea lions” a documentary about domoic acid poisoning in sea lions aired on the National Geographic Channel featuring footage of SLEWTHS sea lions Cali and Jonah.

Consulting and Contract Work

-Dr. Zeligs continued in 2011 to act as the marine mammal biologist consultant for Smith-Root, Inc. and all associated marine mammal work with electronic barriers done by Smith-Root, Inc.

-In July Cali performed in her first studio work in LA for the Nickelodeon Channel kids program “Bucket and Skinner’s Epic Adventure” costarring Mindy Erwin, due to air early in 2012.

Facilities

Projects

-Repaired and replaced numerous office floor tiles to resurface.

-Repainted compound sign “How do you measure up to a sea lion?”

-Created a PC blood sampling door on one of our cages

- We finished strengthening the floor of the encounters trailer with 5 more steel plates to add structural stability under the stage carts, and replaced all 6 leaf springs and hanging brackets on the trailer suspension.

-Reinforced the stage carts for the Encounters set up

- Replaced the fish kitchen garbage disposal
- Purchased and installed new bulbs on our U.V. salt water purification system.
- Did a large repair to the dually replacing the injectors.
- Did numerous cleanout and repairs to our Norte sea water outflow system
- Repaired the N1 back stairs and associated wheels

Acquisitions

- Bought a new water pump for Encounters
- Received multiple donations of medications for the sea lion eye disease.
- Bought a new computer for the staff to replace one that crashed and was unrecoverable
- Bought a new printer for the office
- Had a small table-top ice machine donated
- Had a hot plate for water quality monitoring donated
- Designed and had donated two A frame signs to point to our Encounters presentations

Animals

Behaviors started but not completed this year are called *started*, behaviors started and completed this year are called *learned*, work in progress behaviors neither started nor completed this year are called *working on*, and behaviors started in a previous year and finished this year are called *finished*.

Sake

- | | |
|--------------------|--|
| - Started "Otter" | - Learned drag harness |
| - Started flexible | - Learned prey encounters metabolic research |
| - Started wiggle | |

Nemo

- | | |
|------------------------------|-------------------------|
| - Working on embarrassed | - Finished PC rollover |
| - Started drag harness | - Finished vogue |
| - Finished PC front flippers | - Learned pc open mouth |
| - Finished toothbrush | |

Jonah

- | | |
|--|------------------------------------|
| - Learned gimme 5 | - Working on water work |
| - Learned sad | - Started circle |
| - Learned drag harness | - Started flexible |
| - Working on not | - Started Prey encounters research |
| - Working on Sea Lion Encounters Performance | - Started metabolic dome |

Ariel

- | | |
|--------------------------------|--------------------------------------|
| - Finished sing | - Working on tactile desensitization |
| - Finished follow-me | - Started superstar |
| - Working on compound training | - Started mark |
| - Working on blood stick | - Started balance/tumble |

- Started PC toothbrush
- Learned high 5

Cali

Cali did her first studio shoot for Hollywood working on a sound stage in LA

- Finished harness
- Finished toothbrushing
- Finished diving
- Finished tap
- Finished Encounters water work sequence
- Learned PC front flippers
- Working on stomach tubing
- Working on flip
- Started intern swim-with
- Started slap

Fluffy

Sadly, Fluffy died this year due to cancer in the beginning of May. She was with us for 7 years.

- Working on retrieval
- Working on "Coo"
- Working on wing lift

Shamu

- Finished bridge conditioning
- Finished perch
- Finished hand feeding
- Learned hand
- Learned cage
- Learned scale
- Learned mobile perch
- Learned table
- Learned come
- Learned crate
- Started wing
- Started peck the x
- Started tactile
- Started finger
- Started retrieve
- Started target pole

Lassie

Lassie is a (presumed) female German owl pigeon who came to us May 11, 2011.

- Learned to hand feed
- Learned table
- Learned perch
- Learned cage
- Learned scale
- Learned mobile perch
- Started crate
- Started come
- Started finger
- Started retrieve
- Started Peck the X
- Started tactile

Staff

5 new people were hired into *Animal Care*

(Isaiah Foulks, Brock Bartimus, Alix Foster, Alex Kjellgren, Dustin Petrie)

5 people left the project after an average longevity of 2.5 years

(Allison Limbaugh (5.25), Shaylyn Rasmussen(1.5), Arielle Romero(2.2), Kate Collins(2.7), Laura Lockwood (1.0))

3 people became *Senior Animal Care*

(Michelle Jones, Angela Preston, Isaiah Foulks)

4 people became *Assistant Trainers*
(Tiana Hanna, Megan Cuzick, Isaiah Foulks, Michelle Jones)

3 people became *Trainers*
(Sara Pipes, Raquel Bahrami, Ashley Acridge)

2 people became *Senior Trainers*
(Rachel Daggett, Ari Smith)

2 people received their *Multi-year Senior Trainer* anniversary Badges
(Nancy Wenkel (4), Sophie Darling (1))

Short term contracts:

ANL, NW, and RD worked short-term single events on contract with SLEWTHS this year