

*Animal Training and Research,  
International*

&

*SLEWTHS Project*

*Science, Learning, and Exploration  
With the Help of Sea lions*

**END OF THE YEAR SUMMARY**

**2017**



## Research

### Metabolic Effects of Prey Encounter Rates and Transit Costs:

In 2012, the Science Learning and Exploration With The Helps of Sea lions (SLEWTHS) project at California State Universities partnered with Alaska Pacific University graduate student, Tori Norrell, to quantify how the foraging behavior of 1.1 California sea lions (*Zalophus californianus*) relates to their metabolic rates and their behavior, and how different levels of foraging effort may affect the animal's metabolism. The work was published in 2017.

Neises V, Zeligs J, Harris B and Cornick L. 2017. Examining the metabolic cost of otariid foraging under varying conditions. *Journal of Experimental Marine Biology and Ecology*. Volume 486, January 2017, Pages 352-357

### Sea Lion Maneuverability Study

In early 2016, 1.3 of our sea lions participated in a pilot study to digitize and quantify sea lion maneuverability and physical characteristics working with Dr. Frank Fish of Westchester University. This work was submitted to the Office of Naval Research as a pilot study, requesting funding as part of a three-year investigation. The grant was awarded in 2017 and research will begin in 2018, and run through 2020.

This study will create a digital database of sea lion locomotion focusing on steady, fore flipper driven forward motion, which sea lions use to generate the majority of thrust while swimming. However, it will also include data on accelerating from rest, turning (sea lions are highly agile and maneuverable), station holding (hovering).

When completed, this data, which will be the most extensive and highest quality in existence, will be used to develop models for hydrodynamic testing.

### Bridge Maintenance Research

Animal Training and Research International uses a pros and cons Best Outcome Model, as outlined in *Animal Training 101*, to evaluate the nuances of any training decision rather than an all or none dictate of techniques and approaches. To demonstrate this approach, we offer further insights using data we collected to highlight some of the relevant nuances in the "Blazing Clickers" debate over continuous bridge maintenance versus intermittent maintenance. We collected data on 1.4 California sea lions and 2.0 domestic pigeons to evaluate bridge usage in a professional facility. From February 24 until March 29, 2017, we ran a total of 119 training sessions which consisted of 1,632 bridges. We calculated that we maintain an 85% bridge reinforcement maintenance association while maintaining a nearly 100% response rate to the bridging stimulus.

Throughout the analyzed data we found that our adult sea lions, on average, are being reinforced for 80% percent of bridge stimuli and the juvenile sea lions for 87%. The two domestic pigeons in our collection also average a similar reinforcement ratio as the baby sea lions at an average of 90% percent. Primary reinforcement rates as low as 70% were common during behavior sessions that were highly routine and established.

## Calibrating Accelerometers for Field Research in Prey Capture Rates

In 2015, SLEWTHS partnered with Moss Landing Marine Labs Marine Mammal Faculty researcher, Dr. Gitte McDonald and her graduate student, Mason Cole in his Masters project. The SLEWTHS project is proud to have donated and supported this MLML Masters student thesis project. This project aims to help validate the use of modern, triaxial, fast-sampling accelerometers to reliably identify prey engulfment and possibly prey size by California sea lions.

Trials were conducted throughout 2016 and were completed in the first six months of 2017 (n= 129) with 1.1 of our California sea lions (*Zalophus californianus*) wearing accelerometers either on their head or back while presented with a prey item underwater. Prey item size was recorded prior to feeding and each fish was presented within view of an underwater-mounted GoPro camera synced precisely to the accelerometers. The sea lions were recorded eating the prey item by both accelerometers and GoPro cameras.

The acceleration and jerk (rate of change in acceleration patterns) were compared to synced video to establish optimal detection criteria. Custom-written MATLAB code used these criteria to temporally identify feeding in remaining trials. We found that California sea lion feeding motions produce stereotyped patterns in acceleration data. Feeding detection analyses incorporating these stereotyped temporal patterns with acceleration and Jerk magnitude were highly accurate across a broad range of fast sampling rates. False positive rates were greatly decreased compared to similar studies with simpler detection criteria. We feel the results indicate that future field studies may confidently employ this low-cost method to detect feeding events in the wild.

This work was presented in its preliminary analysis as a poster presentation to the Society for Marine Mammalogy meeting at the end of 2017.

## **Publications, Presentations, Proposals and Permits (P<sup>4</sup>)**

### Publications

- Numerous overhauls and edits were made to the SOP manuals for the Encounters and regular laboratory operations.
- The staff as a whole wrote and published 1 volume of our *Inspiring Minds* Newsletter (9/17) and Dr. Zeligs produced a 2016 end of year report.

Neises V, Zeligs J, Harris B and Cornick L.2017. Examining the metabolic cost of otariid foraging under varying conditions. *Journal of Experimental Marine Biology and Ecology*. Volume 486, January 2017, Pages 352-357

### Presentations and conference participation

- Jenifer Zeligs, Stefani Skrovan, Alex Tyrrell, Jessica Simpson, and Aubrienne Culbertson attended the 2017 IMATA (International Animal Training Association) conference.
- The project participated in a local Moss Landing Craft fair by offering paintings made by our sea lions.

Zeligs, J.A., S. Skrovan, and J. Simpson (2017). Minimizing Restraint in Medical Procedures. Poster Presentation at the 45<sup>th</sup> annual IMATA conference, Riviera Maya, Mexico.

Cole, M, J.A. Zeligs, S. Skrovan, P.T. Madsen and B. McDonald (2017). Head mounted accelerometry accurately detects prey capture in California sea lions (*Zalophus californianus*). Poster Presentation at the 22<sup>nd</sup> biennial SMM conference, Halifax, Nova Scotia.

### Proposals and Permits

- Renewed our APHIS public display license.
- Renewed IACUC protocol #887, 1015, 1027
- Received IACUC permit #1009

## **Education and Public Outreach**

### Sea Lion Stewards Environmental Education Program and Beach clean-up activities

SLEWTHS conducted 20 Sea Lion Stewards half-day programs for over 500 participants who collected over 120 lbs of garbage from our local beach in the process.

### Sea Lion Encounters Public Outreach Program

Based on daily performance tallies, approximately 44,000 people attended performances of *Sea Lion Encounters* in 2017.

*Sea Lion Encounters* was featured at:

- Pima County, Arizona: April 17<sup>th</sup>-27<sup>th</sup>, 2017
- The Santa Clara County Fair: August 3<sup>rd</sup>-7<sup>th</sup>, 2017
- Spokane County Interstate fair: September 8<sup>th</sup>-17<sup>th</sup>, 2017

### Tours for MLML, CSU, and other academic institutions

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

- 4/11/17: Tour for Tova Lichman and boyfriend
- 5/29/17: Tour for Kris Machado from MLML and family

- 8/22/17: MLML New Student orientation, 19 people
- 9/27/17: Tour for Dave Lichman and 6 students
- 10/26/17: Tour for John from MBARI and potential graduate student
- 10/27/17: Moorpark College Exotic Animal Training and Management class came for annual demonstration and seminar, 40 people
- 11/21/17: Tour for Greg Cailliet from MLML and 3 people
- 12/7/17: Tour for Jocelyn and Katie from MLML

### Classes

-A total of 21 undergraduate students from the all over the US attended 2 intensive immersion classes in marine mammalogy through CSUMB extended education department, representing 4 different universities in addition to CSUMB.

-Dr. Zeligs created a live and on-demand online Animal Training 101 class for the first time. 88 students participated in either Part 1, Part 2/3 or both from all over the world, representing 4 continents. The course ran on a live platform (Electalive) offering students the option of live question and answer with Dr. Zeligs, or on-demand streaming. It contained videos of training with dozens of different species of animals, and in total contained 15 topic lectures with over 30 hours of content.

### Workshops

In May 2017, Reaseheath College in the United Kingdom hosted a workshop with Dr. Zeligs titled “Be the Trainer Your Animal Would Choose.” 30 people participated from around the UK and Europe.

### Internships

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

### Student projects

- Mason Cole, a MLML Masters student worked on his thesis research with us
- Dr. Zeligs worked with Nick Andrighetto on his capstone project for CSUMB

### Media

- One of our students, Kelsey Dodson, created from scratch all new web sites for both SLEWTHS and ATR in a massive modernizing and branding effort. They are amazing!
- Numerous interviews for local media were provided by SLEWTHS staff at each of our public outreach events.

- SLEWTHS staff created numerous Facebook posts to promote ATR and SLEWTHS activities and programs.

## **Consulting and Contract Work**

- Dr. Zeligs consulted for the Cameron Park Zoo in Waco, Texas
- Dr. Zeligs recorded a podcast for the Animal Training Academy that was downloaded by thousands of people on last report

## **Facilities**

### Projects

- Our staff prepped and repainted the office
- We repaired storm damage to the eastern fence of N1 enclosure adding new wood beams and anchoring them to the cement.
- Created all new web sites for ATR and SLEWTHS
- Created 30 hours of online coursework for AT101
- Lowered the N4 hartford loop to reduce flooding the back compound

### Acquisitions

- Commissioned and received a memorial plaque in honor of Sake. It was made in bronze by local artist Brian Moneypenny (the husband of former SLEWTHS staff, Tritia Moneypenny (Hunziker) and hung on the office wall to be seen by all who visit the facility.

## **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*.

### Nemo

- Finished Drink
- Finished swim with in education demo
- Learned anesthesia cone
- Learned to be dry docked for prolonged periods
- Became desensitized to masking of the transport cage

- Working on Yes

In late November 2017 Nemo underwent a highly successful bilateral cataract surgery. We created an elaborate surgical suite at the facility to enhance his safety and care locally. He was trained for months to accept all aspects of the process voluntarily, including the anesthesia masking, treatments and dry docking. An expert team of marine mammal vets were present from all over the country and Nemo received extraordinary care. He recovered beautifully and his eyesight improved far beyond the last decade or so.

#### Ariel

- Finished yes
- Finished stomach tubing
- Working on seal
- Working on ultrasound training
- Working on tactile desensitization
- Working on blood stick

#### Cali

- Finished Walk
- Finished 2<sup>nd</sup> person swim
- Finished Tongue
- Finished Drink
- Working on Superstar
- Started Wipe for Wildlife

#### Gaia

- Finished float
- Finished lie down
- Finished tactile desensitization
- Finished tail present
- Learned Toothbrushing
- Learned FC eye presents
- Learned eye drops
- Learned salute
- Learned open mouth
- Started back up
- Started shoulder target
- Started 2<sup>nd</sup> person vet exam
- Started rollover
- Working on Compound training

#### Freya

- Finished backup
- Finished front flipper targets

- Finished float
- Finished heeling
- Finished tactile desensitization
- Finished FC eye presents
- Finished PC eye presents
- Learned hand target
- Learned salute
- Learned tail present
- Started retrieval/take
- Started shoulder target
- Started 2<sup>nd</sup> person vet exam
- Started Lie down
- Started seat
- Working on Compound training
- Finished water spirals
- Working on back up

### Shamu

- Working on Circle
- Working on tactile
- Working Backup
- Working on Turkey
- Working on land hold
- Working on hurdles
- Finished Drink

After living 8 wonderful years, Shamu passed away in December 2017.

### Spot

- Learned Drink
- Learned Box
- Working on peck the x
- Working on remote target
- Working on retrieve
- Working on circle
- Working on land hold
- Working on tactile
- Working on 2<sup>nd</sup> person work

### **Staff**

5 new people were hired into *Animal Care*

(Kaitlyn Kirkland, Megan Fee, Kaitlyn Weinmeister, Kasie Ryan, Krista Yerena )

7 people left the project after an average longevity of 3.9 years



- (Alex Kjellgren (5.5 years), Alondra Teran (1.0 yrs), Aubrienne Culbertson( 4.5yrs) , Sean Williams (5.0yrs) Brandy Ziriak (1.1 yrs), Alex Tyrrell (5.0 yrs), Jessica Simpson (5.0 yrs)
- 3 people became *Senior Animal Care*  
(Kelsey Dodson, Taylor Ott, Kaitlyn Kirkland)
- 4 people became *Assistant Trainers*  
(Bree Wheeler, Deneille Pritchard, Kelsey Dodson, Taylor Ott)
- 2 people became *Trainers*  
(Jana Martin, Kerissa Eslick)
- 1 person became a *Senior Trainer*  
(Austin Raymond)
- 2 people received their *Multi-year Senior Trainer* anniversary Badges  
(Sean Williams(1), Melodie Lawicki(1) )

**Paid contracts:**

A seasonal contract was given to Alexandra Tyrell, and a single event contract was given to Melodie Lawicki. Michelle Jones continued in her role as Head Trainer.