

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

**END OF THE YEAR SUMMARY  
2009**

*Animal Training  
&  
Research International*



## Research

### Molting Dynamics:

Data collection continued through 2009 to further study the molting patterns of the California sea lion. Nancy Wenkel continued monthly sampling of the five animals that have taken part in the study: Beaver, Sake, Nemo, Jonah, and Cali. Upon completion of his molting cycle, Beaver completed his participation in the study as his geriatric condition had made his sampling cooperation more difficult. We will continue to collect shed hairs and photograph the molting process in a collection of two males and 2 females in the upcoming year.

### Growth and morphometrics:

With the addition three years ago of two new juvenile sea lions (Cali and Ariel) to our collection, we continue to add weekly data collection on weight and monthly length measurements for our on-going, long term morphometrics data collection. Coupled with data collected in past years on our juvenile male sea lions, these efforts comprise a long term study on growth dynamics in California sea lions, contrasting male and female development. The animals all grew considerably this year and the males are now very close to full adult male length. Ariel is similarly closing in on normal adult female length, while we see are littlest animal Cali making great strides but still having a way to go before become an adult female size. We are uncertain given her pre-mature birth status and demoic acid survivor history if she will ever reach full size, so this adds an interesting element to our study.

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

In 2008 SLEWTHS began a multi-year collaboration with Smith-Root, Inc to test a new strategy for deterring pinnipeds from undesirable areas and predation on endangered spawning salmon. We conducted the first-ever testing with California sea lions of the effects of a mild underwater electronic barrier. Based on results of our tests in 2008, California sea lions, we believe are extremely sensitive to a mild, underwater field of pulsed DC electricity which could be used safely to deter them from areas even in the presence of a food motivation. These and other successful preliminary investigations have led to the continued evaluation of this technique in a variety of field environments. Testing in Canada with a gill-net fishery and harbor seal predation have proved increasingly encouraging about the potential of this new technological approach to pinniped deterrence. At a highly successful conference in January of this year, preliminary data presented by SLEWTHS was the guiding point for testing the effects of electronic barriers on other species. Smith-Root, Inc in collaboration with SLEWTHS then submitted and was awarded this year a continuing grant to pursue the evaluation of an electronic barrier to be placed in the Columbia river near Bonneville Dam. While further data on the effects of the barrier on various crucial fish species are being completed, SLEWTHS has begun writing the necessary federal and institutional permits to place and test this barrier on wild California sea lions, Harbor seals, and Stellar sea lions in the Columbia river on the Washington/Oregon boarder. Dr. Zeligs has been selected as the Principal Investigator for marine mammal research, overseeing the evaluation and safety of all the field trials of this new technology. Further possible

studies involving Manatees in Florida, Harbor seals in Scotland, and harbor areas all along the west coast of the U.S. are being explored as possible off-shoots of our initial investigations. Obtaining the necessary permits and further background research is slow due to the sensitive nature of several endangered species (both fish and marine mammal) involved in these investigations. Nevertheless, we continue to move forward with these efforts and look forward to launching some form of field investigation in the next year or two. SLEWTHS is proud to be involved with helping to solve such an important conservation issue for both pinnipeds and endangered fishes.

### Water Quality and Sea lion Eye Disease

Starting at the end of 2008 and continuing throughout 2009, SLEWTHS was beset with a series of traumatic animal health events which are outlined in further detail at the end of this document under the “Animals” section. The situation necessitated extensive evaluations of the water supply, environment and animal health parameters as we attempted to determine the cause of these epidemics, prevent and develop treatments for them.

We were able to determine indirectly that some of the health issues of our collection were related to the water supply after extensive research into coincident causal factors. As a result we began sterilizing the incoming ocean water using a very powerful UV filtration system. The exact cause of the illness remains something of a mystery which we continue to pursue with the help of the Marine Mammal Center and other facilities with free ocean water access animals. Further, we have now determined through a collaboration with investigators at UCSC that there is a significant amount of domoic acid (a toxic algae) which can be found in our water (broken into pieces now by the UV) when our animals appear to have inappetent malaise. We are still pursuing further investigation in this area to learn more about how the ocean environment (which is changing) may affect marine mammals.

In addition, four animals of our collection developed a secondary epidemic eye disease, which set in early in 2009 and in some cases persists still. Diagnosing, developing and testing various treatments while carefully documenting the progression of the disease became the major pursuit of our program during 2009. A probable diagnosis indicates a novel herpes virus affected the animals; however, this is not absolutely certain. We were able to test various treatments and eventually developed a novel treatment never before tested on marine mammals which apparently successfully cured the final animal who developed the disease (Sake). After a year of research and treatment, two animals are cured of the disease, one is 80% improved and one animal remains significantly affected. This work has involved collaboration with several veterinary ophthalmologists as well as human ophthalmologists. Once the last animals are stabilized, we intend to write up and present this work to the community of veterinary ophthalmologists as we have a significant amount of data on treatment options and disease progression.

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

### Publications

- The staff as a whole wrote and published 2 volumes of our *Inspiring Minds* Newsletter (8/09 and 12/09).
- Heather Yeager updated the ATR website to include pages for merchandise sales (sea lion paintings, nose prints, children's books, pint glasses, and hats). The new website links were launched in November 2009 as a fundraising push to help offset the costs of medical treatments for the sea lion eye disease.
- The Standard Operating Procedures Manuals for the SLEWTHS primary and public outreach facilities underwent major updates and revisions this year to include many changes and upgrades.

### Presentations and conference participation

Dr. Jenifer Zeligs attended and made a formal presentation entitled "Behavioral Deterrence Response of Captive California Sea Lions Exposed to a Mild Electric Voltage Gradient at Moss Landing Marine Labs, CA" to a meeting of the Sea Lion Project Partners in Vancouver, Washington from January 27-29 regarding the use of electronic barriers as a predator deterrent method to protect salmon species at the Bonneville Dam on the Columbia River.

### Proposals

Smith-Root, Inc applied and was awarded a continuance grant for the electronic barrier research at Bonneville Dam. The Bonneville Power Administration awarded Smith-Root, Inc a grant to include funding for SLEWTHS and Dr.Zeligs to develop a draft plan for marine mammal permitting associated with the proposed barrier.

### Permits

- Renewed our APHIS public display license.
- Renewed IACUC protocols #863, 887

## **Education and Public Outreach**

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

Conducted 17 Sea Lion Stewards half-day programs for over 500 participants who collected over 200 lbs of garbage from our local beach in the process.

This year we overhauled the Sea Lion Stewards program with many exciting new items: including a seal head costume, movable seal flippers, flash cards showing differences between seals and sea lions, and a Monterey Bay Sanctuary map. The seal head shows

the difference in ear structure between a seal and a sea lion. The seal flippers demonstrate the seal's use of their rear flippers for propulsion. The flash cards address many of the answers that the students give when asked about the differences between seals and sea lions (such as whiskers as a difference, or difference in color). The sanctuary map illustrates the size of the MBNMS, as well as pinpointing Moss Landing's location in the sanctuary, and showing photographs of many of the marine mammals native to the sanctuary. We are very proud to continue to serve so many students in our community and improve our educational programs.

### Sea Lion Encounters Public Outreach Program

Based on daily performance tallies, approximately 48,000 people attended performances of *Sea Lion Encounters* in 2009.

*Sea Lion Encounters* was featured at:

- The Yuma County Fair in Yuma, AZ: March 31-April 5
- The Stockton Asparagus Festival in Stockton, CA: April 23-25
- The Sonoma-Marín Agricultural Fair in Petaluma, CA: June 24-28
- The Oregon State Fair in Salem, OR: August 28-September 7
- The Santa Cruz County Fair in Watsonville, CA: September 15-20

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

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

- 1/21/09: MLML new student orientation tour
- 3/22/09: Cystic Fibrosis Gala Winner tour and demonstration
- 6/12/09: Two MLML tours (for John Cusik)
- 6/18/09: CSU Provosts tour and demo (with Kenneth Coale)
- 6/23/09: Tour for Marlene Martin
- 7/11/09: Cress Optical (Ophthalmologic supply donors) tour and demonstration
- 8/13/09: SJSUF employees and family tour
- 8/20/09: MLML new student tour and demonstration
- 10/13/09: SJSU Alumni Tour
- 10/22/09: provided a half day tour and elaborate training demonstration for Moorpark college's Exotic Animal Training and Management Program's Class of 09.
- 12/14/09: Tour provided for two international (German) zoo employees

### Classes

-A total of 31 undergraduate students from the all over US attended 2 intensive immersion classes in marine mammalogy through CSUMB extended education department and 1 additional student audited the classes for no college credit.

### Internships

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

#### Student projects

- Nancy Wenkel continued the molting research project for another year for eventual incorporation into her capstone project.
- Bob Dirado did a service learning project for CSUMB with SLEWTHS, helping us to reach Spanish speaking students by translating our Sea lion Stewards pamphlet into Spanish.

#### Media

- Numerous interviews for local media were provided by SLEWTHS staff at each of our public outreach events.

### **Consulting and Contract Work**

- Dr. Zeligs continued, in 2009, 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.
- Skywalker Sound (George Lucas's sound company) came to the facility on August 11, 2009, to record the vocalizations of all of the sea lions to be modified as voices of carton dragons for the animated film "How to Train Your Dragon". Recordings took place during and outside of training sessions throughout a day-long process. These sea lion voices will be immortalized for all times as part of the official "library" of sounds of the prestigious Skywalker Sound Company and as such may be incorporated into future films produced by Skywalker. We are very proud of this honor.

### **Facilities**

#### Projects

- We overhauled and strengthened the fair trailer axels (multiple times) this year in response to failures but also to make improvements. As a result the trailer is much stronger.
- We also extensively waterproofed, repaired exterior, and fixed the hydrolics of Encounters trailer from normal wear and tear issues.
- We had the bed of the dually truck (used to tow the trailer) intensely reinforced to help it support the payload of towing the trailer and coated underneath to prevent rusting in the salt water environment and it got all new tires this year.
- We finished the new T3 enclosure, which involved Rhino-lining the edges of the new aluminum stages in order to ensure durability, as well as measuring, cutting, and installing PVC fence posts and fencing.

- We installed grip strips on trailer ramp (to provide a safer surface during packing and unpacking the trailer).
- The staff constructed many new items for use in our Sea Lion Stewards programs: including a seal head costume, movable seal flippers, flash cards and a Monterey Bay Sanctuary map.
- Created a PVC top fence rim to go around the top of N4 pool fencing (in order to help support fencing and create an anchor for shade cloth coverage over the pool).
- We added shade cloth coverage to all of the enclosures both at MLML and in the Sea Lion Encounters primary facility(over top and along the sides) in order to minimize animals' UV exposure (thought to exacerbate the eye disease).
- Installed bracers on 4"x4" enclosure fence posts in multiple areas to help support these posts under the strain of the overhead shade cloths
- The staff trailer, fish kitchen and office doors required many repairs in the doorknobs and catch mechanisms this year.
- Overhauled the animal's platform scale with new scale feet and rewiring the readout.
- Installed new UV filtration systems in both Encounters and MLML facilities and created multiple sample ports along our inflow lines in order to better monitor the quality of our incoming water.
- We built a third sea lion seat for use at our home facility, so that the two Sea Lion Encounters seats can remain packed in the fair trailer.
- Randolph Skrovan created a removable deck platform which sits in the N3 pool, effectively capping it off and creating a dry pen in the N3 enclosure (termed D3). This dry pen allows for more variable training sessions and environmental enrichment, as well as allowing us to create a large, flat, dry docking area for extended eye drop sessions, surgical recovery, birthing or other health and separation related needs.
- Shelby Peters' with the help of her mother created new fish kitchen curtains, which secure to the fish kitchen walls using snaps and provide a dark room for sea lion eye pictures and examinations.
- We designed new SLEWTHS logo baseball caps and began offering them as merchandise.
- We started a new program offering sea lion paintings made by Sake, Jonah and Ariel for fundraising.
- We made extensive minor repairs to the fish kitchen by caulking several areas that were leaking water in the floor and windows, and making window and refrigerator repairs.
- Created a new entrance sign for the MLML facility.
- Several of the staff overhauled our staff trailer shelves using paint and photographs to decorate them in splendor.

### Acquisitions

- Purchased and installed new UV filtration in both home facility and Encounters
- Purchased a second chlorine test kit for use at our home facility while the primary kit is on the road with Sea Lion Encounters
- Received a new vacuum pump for running water quality samples

- Purchased new sea lion feeding pouches for Sea Lion Encounters training demonstrations
- Received Seafood Watch cards in both English and Spanish (for giving out at public outreach events)
- Received many donations of medications for the sea lion eye disease ☺

## Animals

Beginning in early November 2008 we suffered repeated illness in our sea lion collection, with 5 separate illness events involving 5/6 of our collection, some of whom lost up to 12% of their body mass before recovering and then being hit again by this unknown wild disease.

As the events unfolded we came to recognize that the pathogen came into our salt water supply (from the ocean) after rainfall, and we began to sterilize the incoming water, first by hand with chlorine and then with a UV filtration system to purify the water. We have now, as a result, succeeded in protecting the sea lions from further illness of this kind. Unfortunately the damage may be long term and continues in the form of an undescribed eye disease (possibly herpes) that presumably took advantage of the immune-compromised state of our poor animals and severely infected the eyes of 4 out of 6 of them (Nemo, Cali, Ariel, and Sake) causing partial blindness and severe corneal damage.

All of 2009 was spent battling this mysterious disease (see Research section above). This eye disease is very poorly understood and we are working with top veterinary and human ophthalmologists from all over the country. The good news is that most of the animals have made excellent progress in their battle against the mysterious eye disease. Sake and Ariel are completely cured of the disease, and Cali continues to make steady improvement in her progression and is about 70% improved by the end of 2009. Nemo, by far the hardest hit by the disease, remains steady in his progression. He is more susceptible to periodic flare-ups and inflammatory processes, however he shows improvement overall.

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*.

### Beaver

Beaver is in retirement where maintaining medical and husbandry behaviors (and happiness) are his primary objectives. He completed his final year of molting research this year due to his increasing aged condition.

- Working on tooth brushing

- Working on look
- Started PC blood sample training
- Started to line up to trapdoor on liedown
- Started PC needle aspiration of lump on neck

### Sake

At the end of 2009 Sake developed a severe tooth abscess that required the removal of 2 infected teeth. Anesthesia was necessary as the procedure involved a deep tissue extraction. Since we were already anesthetizing her, we removed 2 other cracked teeth as well before they had the chance to develop infections. Sake recovered beautifully from the surgery.

- Working on down spin
- Learned eye presents PC
- Learned to self mask in restraint cage for anesthetic induction
- Finished breaststroke swim
- Working on dry dock training
- Working on hydration during stomach tube

### Nemo

- Working on follow-me
- Working on water work
- Learned eye present
- Learned fish kitchen exam
- Started vogue
- Started embarrassed
- Learned PC eye drops
- Learned FC eye drops
- Learned slit lamp exam

### Jonah

- Working on follow-me
- Working on spin-jump
- Finished balance handstand
- Working on not
- Working on tongue
- Working on water work
- Learned how to paint
- Working on Sea Lion Encounters Performance
- Learned eye present
- Learned fish kitchen exam
- Learned FC eye drops
- Learned slit lamp exam
- Started PC eye present

### Ariel

- Finished protected contact body exam (line-up to fence, back flippers outside of fence, front flippers, open mouth, eye present, stomach present)
- Finished bounce
- Finished shoulder target
- Working on tandem kiss
- Working on blood stick
- Working on tactile desensitization
- Learned how to paint

- Working on water spirals
- Working on compound training
- Working on look
- Started slap
- Started yes
- Finished eye present
- Finished PC eye drops
- Learned FC eye drops
- Learned slit lamp exam

### Cali

Cali traveled to multiple Sea Lion Encounters public outreach events this year, including the Oregon State Fair and the Santa Cruz County Fair. She also took part in the vocalization recording process for Skywalker Sound as her first film work!

- Started seal
- Learned bounce
- Working on balance/handstand
- Working on slide
- Finished put
- Working on Encounters show performances
- Finished look
- Working on harness
- Working on stomach tubing
- Learned eye present
- Learned fish kitchen exam
- Learned PC eye drops
- Learned FC eye drops
- Learned slit lamp exam
- Started yes
- Started follow-me
- Started bark

### Fluffy

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

### Smitty

Smitty was adopted by Amanda Meyer, one of Dr. Jenifer Zeligs' students, in October 2009. He is now living in Southern California, where he enjoys the company of other horses and continues to receive daily training and enrichment.

## Staff

7 new people were hired into *Animal Care*

(Sara Pipes, Raquel Bahrami, Arielle Romero, Daniel Holsapple, Shaylyn Rasmussen, Sarah Day, Tiana Hanna)

3 people left the project after an average longevity of 2.0 years.

(Jessica Arvidson (1.3yrs), Ryan Thompson (2.33yrs), Nicole March (1.9yrs), Brandi Dolph (2.25yrs))

6 people became *Senior Animal Care*

(Sara Pipes, Kate Collins, Raquel Bahrami, Arielle Romero, Ashley Acridge, Camille Sierra)

4 people became *Assistant Trainers*

(Ari Smith, Sara Pipes, Kate Collins, Raquel Bahrami)

2 people became *Trainers*

(Sophie Darling, Shelby Peters)

1 person received their *Multi-year Senior Trainer* anniversary Badges

(Nancy Wenkel (2))

BMD was hired into a full time temporary position Feb-April

SMD was hired into a full time temporary position from July-Oct

AR, ANL, SMD, and BMD all worked short-term single events on contract with SLEWTHS this year