

ANNUAL MEETING

SOUTHERN CALIFORNIA ACADEMY OF SCIENCES

and

***SOCIETY FOR ENVIRONMENTAL TOXICOLOGY AND
CHEMISTRY***

May 12-13, 2006



Pepperdine University

Malibu, CA.

Contents:

Student Awards
Acknowledgements of Meeting sponsors
Student Grants
SCAS and Meeting Committees and Officers
SETAC Officers
Program Overview
Complete Program Schedule
Complete Abstracts, in order of presentation
Alphabetical list of all Presenters, keyed to abstract number

Student Awards for Best Paper and Poster

Undergraduate or graduate students working towards a degree who elect to participate are eligible for best paper or poster awards in several categories, the categories are;

E – Ecology and Evolution
F – Fishery biology
M – Molecular Biology and physiology
P – Physical Science

The American Institute of Fishery Research Biologists will present the awards in Fishery Biology. The Southern California Academy of Sciences will present the other awards.

SETAC will also present awards for papers from their member students.

Future SCAS Meetings

2007 – California State University, Fullerton

Membership

The academy is always seeking new members and members who would like to become more involved in our activities by serving on our Board of Directors. The board meets once a month to plan and direct the society's activities, which include the annual meeting, publication of the bulletin, offering financial support to graduate students, and operating a Research Training Program for high school students.



**SOUTHERN
CALIFORNIA
ACADEMY OF
SCIENCES**

**c/o W.M. Keck Science Bldg.
925 N. Mills Ave
Claremont, Ca. 91711
909 607 2836
<http://scas.jsd.claremont.edu/>**

May 1, 2006

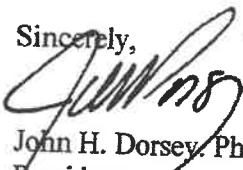
Dear Colleagues:

On behalf of the Board of directors, welcome to the Southern California Academy of Sciences (SCAS) 2006 Annual Meeting at Pepperdine University.

Our Academy's mission focuses on promoting research and scholarship, and enhancing the communication of science among its members and the public. To this end, we once again have assembled an outstanding collection of symposia, contributed papers and speakers representing a wide spectrum of disciplines, and will be joined by members of the Society of Environmental Toxicologists & Chemists (SETAC). Two eminent scientists will deliver plenary presentations: Dr. Mark Gold will speak Friday and Dr. Stuart Sumida on Saturday. During Friday's plenary session, we will be announcing recipients of post-graduate and undergraduate research scholarships. Later that day you can view posters during the Social, and applaud winners of awards for student posters. During Saturday's plenary session, we will be presenting awards for the best student oral presentations. Also during Saturday, I encourage you to attend presentations given by high school students in our Junior SCAS's Research Training Program (RTP). All our RTP students conduct excellent research with their mentor scientists, so take the opportunity to visit with them and exchange ideas during the meeting.

On behalf of the Board of Directors, I wish thank you for your continued support of the Academy, and for participating in the 2006 annual Meeting.

Sincerely,



John H. Dorsey, Ph.D.
President

Acknowledgements

The Southern California Academy of Sciences wishes to acknowledge the following organizations and people for their support of the 2004 Annual Meeting.

The Port of Los Angeles

Weston Solutions

The National Science Foundation

PSOMAS

MBC Applied Environmental Sciences

ABC Labs

Pacific Eco Risk

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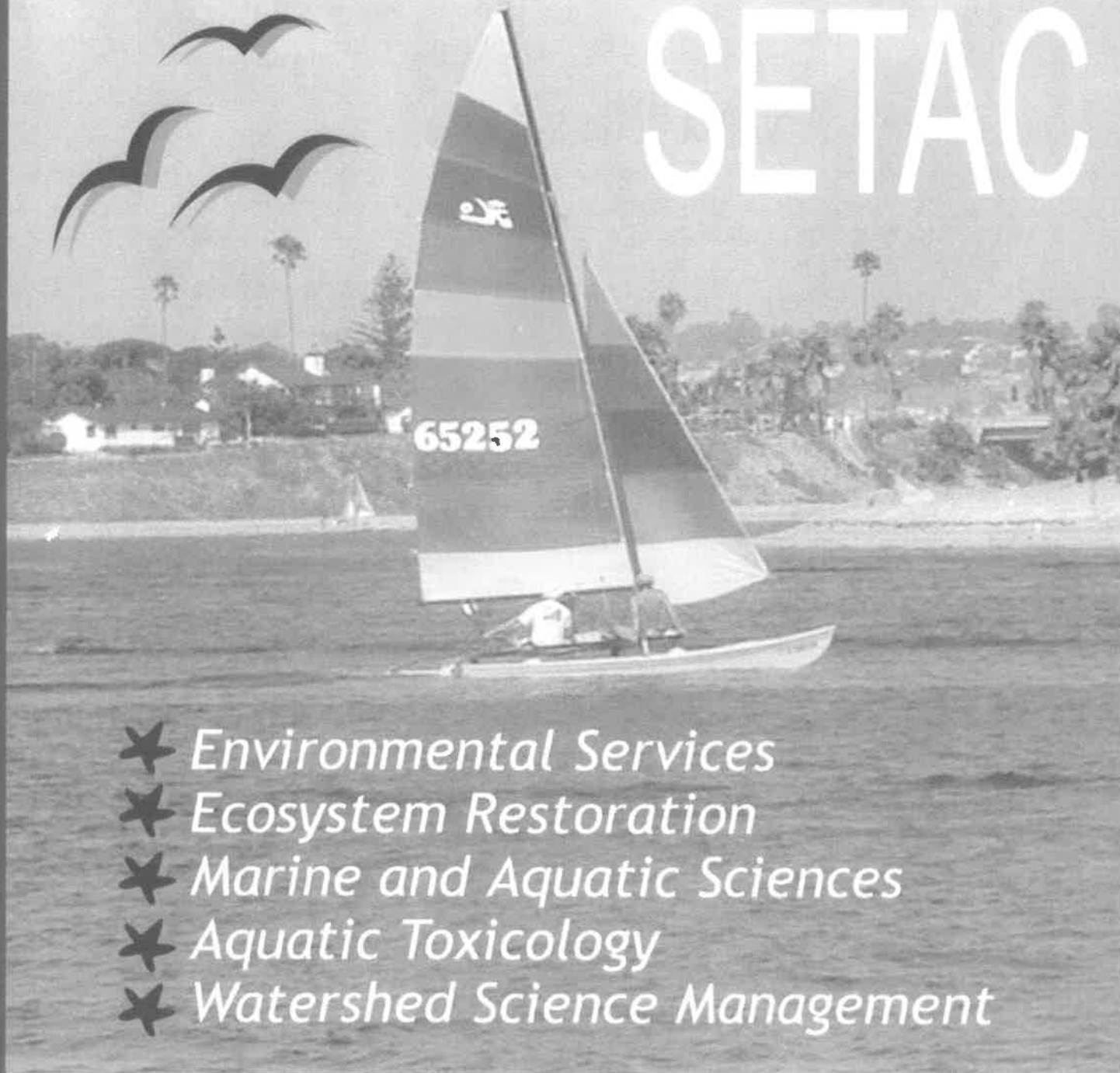
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CONSULTING SERVICES

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- Site-specific Water Quality Criteria Studies
- Agricultural Runoff (Ag Waiver) Monitoring
- Support for Ecological Risk Assessments
- Support for TMDL Development
- Expert witness testimony

AQUATIC TESTING SERVICES

- NPDES compliance testing
- Effluents/Ambient Waters/ Chemical Products
- Acute and chronic toxicity testing
- Freshwater, estuarine and marine tests
- Static, static-renewal and flow-through
- *In situ* monitoring & testing
- Title 22 hazardous waste testing
- Water Effects Ratio (WER) studies

SEDIMENT TESTING SERVICES

- Testing with freshwater, estuarine and marine species
- Bioaccumulation studies with freshwater, estuarine, and marine species
- Whole sediment, sediment elutriate, sediment porewater testing
- Sediment-Water Interface Core testing
- Static, static-renewal and flow-through
- *In situ* monitoring & testing

DREDGE MATERIALS EVALUATIONS

- Preparation of Sampling & Analysis Plans (SAPs)
- Client representation with regulators
- Chemical and biological evaluation of proposed dredge material
- Preparation of reports and facilitation of permits
- Tier I, Tier II, Tier III, and Tier IV evaluations

TOXICITY IDENTIFICATION/REDUCTION EVALUATIONS (TIEs, TREs)

- Phase I, Phase II, & Phase III
- Industrial and Municipal Effluents
- Ambient surface waters
- Stormwater runoff
- Whole sediment, sediment elutriate, and sediment porewater matrices
- Preparation of TRE workplans

FIELD SERVICES

- Ambient water quality monitoring
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- Pesticide application monitoring
- Physical/Habitat characterization



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Martinez, CA 94553
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fax : 925.313.8089

CENTRAL VALLEY
6820 Pacific Avenue, Ste. 3D
Stockton, CA 95207
phone : 209.952.1180
fax : 209.952.1180

SOUTHERN CALIFORNIA
2792 W. Loker Avenue, Ste. 100
Carlsbad, CA 92010
phone : 760.602.7919
fax : 760.602.9119



**Award for Best Student Paper in Fisheries Biology
Southern & Baja California, Mexico District**

May 12 & 13, 2006

For the past 15 years the Southern and Baja California, Mexico, District of the AIFRB has made cash awards to honor graduate and undergraduate student authors of fisheries-related papers presented at the annual meeting of the Southern California Academy of Sciences. Once again, we are pleased to be able to award the efforts of student fishery research biologists at this 2006 annual meeting. A panel of AIFRB members will judge both oral and poster student presentations, and the winner will receive a check for \$200.

PAST AWARD RECIPIENTS:

2005	BARBARA ZIEGLER, CALIFORNIA STATE UNIVERSITY, LONG BEACH
2004	KIMBERLY JOHNSON, CALIFORNIA STATE UNIVERSITY, LONG BEACH
2003	MATTHEW NEILSON, CALIFORNIA STATE UNIVERSITY, LONG BEACH
2002	DANIEL CARTIMAL, CALIFORNIA STATE UNIVERSITY, LONG BEACH
2001	DARIN TOPPING, CALIFORNIA STATE UNIVERSITY, LONG BEACH
2000	KRISTINA LOUIE, UNIVERSITY OF CALIFORNIA, LOS ANGELES
1999	FREDRICK STENGARD, UNIVERSITY OF SOUTH FLORIDA, ST. PETERSBURG
1998	THOMAS EVEN, UNIVERSITY OF CALIFORNIA, SANTA BARBARA
1997	MASON POSNER, UNIVERSITY OF SOUTHERN CALIFORNIA/NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
1996	INGO GAIDA, UNIVERSITY OF CALIFORNIA, LOS ANGELES
1995	SABRINA DRILL, UNIVERSITY OF CALIFORNIA, LOS ANGELES
1994	BLAISE EITNER, UNIVERSITY OF CALIFORNIA, LOS ANGELES
1993	JOSEPH SISNEROS, CALIFORNIA STATE UNIVERSITY, LONG BEACH
1992	REFIK ORHUN, SAN DIEGO STATE UNIVERSITY/HUBBS SEA WORLD RESEARCH INSTITUTE
1991	CHRISTINA SWANSON, UNIVERSITY OF CALIFORNIA, LOS ANGELES

AIFRB OBJECTIVES:

The chief function of the Institute is to foster professional development and performance of its members, and to recognize their competence and achievements. The Institute was incorporated to advance the theory and practice of fishery science and thereby to promote the conservation and wise utilization of natural resources, and to establish and maintain high professional standards through recognition of achievement and adherence to a code of Ethics, known as Principles of Professional Conduct for Fishery Biologists. The Membership consists of professional scientists of proven achievement in the field of fishery biology who by meeting certain standards of achievement may attain the rank of Associate, Member, or Fellow; student memberships are also available. Presently, the Institute includes approximately 1000 fishery biologists from the United States, Canada, and Mexico, as well as other nations.

SOUTHERN CALIFORNIA DISTRICT ACTIVITIES:

The Southern & Baja California, Mexico District of the AIFRB conducts two to four dinner business meetings per year that includes a presentation of a topic of interest to the members. At one of those meetings, the student winner of this AIFRB award may be invited to present his or her talk to the District membership. The meetings are typically held at the El Adobe Restaurant in San Juan Capistrano, centrally located between Los Angeles and San Diego. The District occasionally sponsors symposia and short courses on pertinent fisheries issues, sponsors awards for excellence in fisheries work at both the student and professional level, attends the National Board of Control meetings, and maintains the national AIFRB web site (<http://www.iattc.org/aifrb/default.htm>).

The Southern & Baja California, Mexico District of the AIFRB is a 501(c)(3) tax-exempt nonprofit organization (EIN 91-2145620). In planning your charitable donations this year, please consider making a donation to our District to help build our scholarship and award programs. Send a check payable to the Southern & Baja California, Mexico, District, of the AIFRB to: Traci Bishop, Secretary-Treasurer, California Department of Fish & Game, 4665 Lampson Ave, Suite C, Los Alamitos, CA 90720

For more information on local meetings and activities, contact the District Director, Dr. Raymond Wilson, Department of Biological Sciences, California State University, Long Beach; (562) 985-5767; rwilson1@csulb.edu

Student Grants

The Southern California Academy of Sciences supports a program of Grants to graduate students. One stipulation for the winners is that they present their research at the following year's Annual Meeting. Last years award winners were

Samantha Galasso. Chapman University.

Investigation of Acids as Biomarkers for Crude Oil Degradation in the Environment.

Julie Kalman. UCLA. Parasites of Demersal Fishes Associated with Wastewater Discharge in the Southern California Bight.

Erica Jarvis. CSU Long Beach. The effects of barotrauma in catch & release survivorship of shelf rockfishes

Kurt Karageorge. CSU Long Beach. Reproductive natural histories of female Pacific rockfishes, microsatellite assessment of multiple paternity (polyandry

Winners of Grants for 2006-07, and their projects, are as follows.

Lynne Wetmore, Occidental College

The Effects of Size Selective Fishing Pressure on the Life-History Parameters and Sex-Change Dynamics of the California Sheephead, *Semicossyphus pulcher* -\$750

Mike Blazevic, CSU Fullerton

Characterizing and interpreting macro- and micro-scale sediment features in a mountain playa (Baldwin Lake, Southern California): is there a climate connection?

Levi Lewis, San Diego State University

The Effects of Trophic Diversity on Ecosystem Function in a Subtropical Seagrass Habitat

Christopher Mull , CSU Long Beach

Temporal Reproductive Cycling of the Round Stingray (*Urobatis halleri*)

Special thanks to SCAS member **Dr. Karen Martin**, and her students at Pepperdine University whose work arranging facilities at Pepperdine and SETAC member **Lan Wiborg** for making arrangements for the SETAC portion of the meeting.

SCAS Board Members and Officers

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Position	Name & Affiliation	Responsibilities
Past President	Lan Wiborg City of San Diego LWiborg@sandiego.gov	Advisor/Stand-in for President and Vice-President Program Committee Chair for SoCal SETAC Annual Meeting
President	Daniel Schlenk UC Riverside Daniel.schlenk@ucr.edu	National SETAC Liaison Board Agenda & Action Items
Vice-President	Jeff Armstrong Orange County Sanitation District daniel.schlenk@ucr.edu	Newsletter Editor
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Secretary	Kat Prickett Port of Los Angeles kprickett@portla.org	Membership Maintenance Recording board meeting minutes Election Coordinator
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Historian	Open	Maintains So Cal SETAC archives

SoCal SETAC Board of Directors

Board Member (2004-2006)	Mary Ann Rempel UC Riverside mirwi002@student.ucr.edu	Board Member (2005-2007)	Susan Gardner CIBNOR Sgardner04@cibnor.mx
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SOUTHERN CALIFORNIA ACADEMY OF SCIENCES and SETAC
Annual Meeting, May 12 - 13, 2006, Pepperdine University, Malibu
Sessions are in Graziadio Executive Center of the Drescher Graduate Campus

FRIDAY, May 12, 2006

<u>Event</u>	<u>time</u>	<u>room</u>	<u>Abstracts</u>
Registration	8:00 - 2:00	Foyer	
SCAS Events			
Plastics in the Marine Environment	9:00 - 2:40	Room SPP 175	1-9
Contributed papers	9:00 - 10:40	Room SPP 188	10 - 14
Rocky Reefs	1:20 - 5:00	Room SPP 188	15 - 24
Contributed Papers	9:00 - 5:00	GSBM 138	25 - 36,139, 140,142
Invasive Species	9:00 - 10:40	Room SPP 185	38 - 41,141
Fresh Water Vertebrates	1:20 - 5:00	Rm 150 LC GSBM	42 - 50
Urban Watershed, Runoff Sampling	9:00 - 10:40	Room SPP 179	51 - 55
River Dynamics and Runoff Plumes	1:20 - 2:20	Room SPP 179	56 - 58
Red Tides	2:20 - 5:00	Room SPP 179	59 - 65
SCAS Plenary Speaker: Friday	12:00 - 1;00	Rm 150 LC GSBM	
Dr. Mark Gold	Executive director, Heal the Bay		
Impact Science: Its role in Natural Resource and Environmental Protection			
SETAC EVENTS			
Sediment Quality Objectives	1:20 - 3:00	Room SPP 171	66 - 70
Volunteer Monitoring	3:20 - 4:40	Room SPP 171	71 - 75
Atmospheric Deposition	3:00 - 4:40	Room SPP 175	152 - 155
SCAS AND SETAC			
Poster Session and Social	5:00 - 7:00	Student Cafeteria	76 - 117

SOUTHERN CALIFORNIA ACADEMY OF SCIENCES and SETAC
Annual Meeting, May 12 - 13, 2006, Pepperdine University, Malibu
Sessions are in Graziadio Executive Center of the Drescher Graduate Campus

SATURDAY, May 13, 2006

<u>Event</u>	<u>time</u>	<u>room</u>	<u>Abstracts</u>
Registration	8:00 - 2:00	Foyer	

SCAS Events

Plastics in the Marine Environment	9:00 - 2:40	Room SPP 175	118 - 124
Fresh Water Vertebrates	9:00 - 5:00	150 LC GSBM	125 - 138
SCAS Plenary Speaker: Saturday	12:00 - 1:00	150 LC GSBM	

Dr. Stuart Sumida Professor, Cal. State Univ. San Bernardino
 From Traditional Comparative Anatomy to Digital Special Effects:
 Why you Need the 'Old Dog' to do New Tricks

SETAC EVENTS

Endocrine Disruptors	9:00 - 10:40	Room GSBM 138	143 - 147
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SETAC Plenary Session 12:10 - 1:40 Student Cafeteria

 Roundtable on the Palos Verdes Shelf - see inside program for details 148 - 151

Environmental Pollution	2:00 - 3:40	Room GSBM 138	156 - 160
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Research Training Program	9:00 - 5:00	SPP 171 and 179	161 - 187
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Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Room 175

Session: Plastics in the Marine Environment

Chair: Capt. Charles Moore, Algalita Marine Research Foundation

- 1 9:00 **STANDARDIZED METHODS FOR MONITORING PLASTIC IN THE MARINE ENVIRONMENT**
Zellers, Ann, Algalita Marine Research Foundation 1021 N Harbor Dr. Redondo Beach, CA 90277

- 2 9:20 **PLASTIC DEBRIS, RIVERS TO SEA: AN OVERVIEW OF THE PROP 13 FUNDED PROJECT "ASSESS AND REDUCE SOURCES OF PLASTIC AND TRASH IN URBAN AND COASTAL WATERS".**
C. J. Moore, G. L. Lattin, A. F. Zellers. Algalita Marine Research Foundation, 148 N. Marina Drive, Long Beach, CA 90803

- 3 9:40 **UNRESOLVED TECHNICAL ISSUES IN PLASTICS IN THE MARINE ENVIRONMENT**
Tony Andrady PhD. Senior Research Scientist, Research Triangle Institute, Durham, NC 27709

- 4 10:00 **MICROBIAL ACTIVITIES IN THE DEEP SEA**
C. O. Wirsen, Woods Hole Oceanographic Institution, Biology Department Woods Hole, MA 02543

- 5 10:20 **BIODEGRADATION TESTING METHODS FOR POLYMERS IN THE MARINE ENVIRONMENT**
J. A. Ratto, R. Stote, J. Herbert, **C. Thellen**, U. S. Army Natick Soldier Center, Natick, MA C. Wirsen, Woods Hole Oceanographic Institution, Woods Hole, MA

10:40 – 11:00 BREAK

11:00 – 11:15 Welcome, Student Grant Awards

11:15 – 12:15 Plenary Talk : Dr. Mark Gold

12:15 – 1:20 LUNCH BREAK

Session: Plastics in the Marine Environment (cont.)

Chair: Capt. Charles Moore Algalita Marine Research Foundation

- 6 1:20 SEABIRDS AS INDICATORS OF PLASTIC POLLUTION IN THE NORTH PACIFIC**
D. Hyrenbach. Duke University Marine Laboratory, Beaufort, NC 28516. C. Keiper. Oikonos Ecosystem Knowledge P.O. Box 979, Bolinas, CA 94924. H. Nevins. BeachCOMBERS, Moss Landing Marine Laboratories, Moss Landing, CA 95039 and Oikonos Ecosystem Knowledge. M. Hester. Oikonos Ecosystem Knowledge. C. Moore. Algalita Marine Research Foundation, 148 N Marina Drive, Long Beach, CA 90803. J. Harvey. BeachCOMBERS, Moss Landing Marine Laboratories, Moss Landing, CA 95039
- 7 1:40 DISTRIBUTION OF ANTHROPOGENIC AND NATURAL DEBRIS ON THE MAINLAND SHELF OF THE SOUTHERN CALIFORNIA BIGHT**
S.L. Moore¹ and S. M. Walther². ¹Southern California Coastal Water Research Project, Westminster, CA, 92683. ²Los Angeles County Sanitation Districts, Carson, CA 90745.
- 8 2:00 INTEGRATING CURRENT SCIENCE INTO SCHOOL CURRICULUMS**
Marcus Eriksen. Algalita Marine Research Foundation, 148 N. Marina Drive, Long Beach, CA 90803 Amv Frame. Environmental Charter High School, 4234 W. 147th St., Lawndale, CA 90260 .
- 9 2:20 HEALTH EFFECTS OF PLASTICS: AN OVERVIEW**
S. S. Mosko. Earth Resource Foundation, Costa Mesa, CA 92627

5:00 – 7:00 POSTER SESSION AND SOCIAL

Society of Environmental Toxicology and Chemistry-2006

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 175

Session: Atmospheric Deposition

Chair: Lisa Sabin, SCCWRP

- 152 3:20 **NITROGEN DEPOSITION IN SOUTHERN CALIFORNIA: IMPACTS ON PLANT AND FOREST HEALTH, NUTRIENT CYCLING, WATER QUALITY, AND ECOSYSTEM SUSTAINABILITY.**
Fenn, M.E.* , USDA Forest Service, Pacific Southwest Experiment Station, Riverside, CA
- 153 3:40 **DRY AND WET ATMOSPHERIC DEPOSITIONS OF SELECTED INSECTICIDES IN THE SAN DIEGO CREEK-NEWPORT BAY WATERSHED.**
Jay Gan,* Wenjian Lao, Svetlana Bondarenko, and Fredrick Ernst. Department of Environmental Science, University of California, Riverside.
- 154 4:00 **THE DRY DEPOSITION AND RESUSPENSION OF PARTICLE-ASSOCIATED TRACE METALS NEAR A FREEWAY IN LOS ANGELES.**
Lisa D. Sabin* and Kenneth C. Schiff. Southern California Coastal Water Research Project, Westminster, CA. Jeong Hee Lim, Maria Teresa Venezia, Arthur M. Winer^c, and Keith D. Stolzenbach. University of California, Los Angeles, CA.
- 155 4:20 **DEPOSITION AND RESUSPENSION PROCESSES ON SURFACE CONTAMINATION AND AIR CONCENTRATION PROFILES.**
Jeong Hee Lim*, Keith D. Stolzenbach. Civil and Environmental Engineering Department, University of California, Los Angeles, CA.

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Room 188

Session: Contributed Papers

Chair: Judy Loino Lemus, Sea Grant

- 10 9:00 CLUES IN A MATCHMAKING MYSTERY: LINKING THE SEXES OF GNATHIID ISOPODS**
L. Hanev. Los Angeles County Sanitation Districts, Marine Biology Laboratory, Carson, CA, 90745
- 11 9:20 HOLOTHUROID AND ECHINOID AGGREGATE BEHAVIOR ON THE EASTERN PACIFIC ABYSSAL PLAIN**
K.D. Trego, Nautilus Oceanic Institute, La Jolla, CA 92037
- 12 9:40 SCALES OF VARIATION IN SMALL FISH MERCURY CONTENT – INITIAL FINDINGS**
Jahn, A., B. K. Greenfield, J. L. Grenier. and S. Shonkoff. San Francisco Estuary Institute
- 13 10:00 DISTRIBUTION AND IMPORTANCE OF AGE-0 ATHERINOPSIS FISHES IN SOUTH-CENTRAL SAN FRANCISCO BAY**
A. Jahn, C. Ehrler, and M. L. Elliott. Andrew Jahn Consulting, Ukiah, CA, Tenera Environmental, and PRBO Conservation Science
- 14 10:20 INVESTIGATION OF THE VIRTUAL ELECTRIC CHARGE EFFECT**
Jennifer Nguven, Milpitas High School, 1285 Escuela Parkway, Milpitas, CA 95035

10:40 – 11:00 BREAK

11:00 – 11:15 Welcome, Student Grant Awards

11:15 – 12:15 Plenary Talk : Dr. Mark Gold

12:15 – 1:20 LUNCH BREAK

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 188

Session: Rocky Reefs

Chair: Daniel Pondella III, Occidental College

- 15 E 1:20 **EFFECTS OF VERTICAL DISTRIBUTION ON DISPERSAL POTENTIAL OF KELP SPORES. D.K. Cie and M.S. Edwards.** San Diego State University, Department of Biology, San Diego, CA 92182.
- 16 E 1:40 **CHANGES IN LATITUDES, CHANGES IN...MORPHOLOGY? STIPE HOLLOWING IN *EISENIA ARBOREA* (PHAEOPHYCEAE). P.G. Matson and M.S. Edwards,** San Diego State University, Department of Biology, San Diego, CA, 92182
- 17 2:00 **DELAYED RECOVERY OF GIANT KELP NEAR ITS SOUTHERN RANGE LIMIT IN THE NORTH PACIFIC FOLLOWING EL NIÑO. M.S. Edwards¹ and G.Hernández-Carmona** ¹Department of Biology, San Diego State University, San Diego, CA 92182 USA ²Centro Interdisciplinario de Ciencias Marinas. Ap. Postal 592. La Paz, Baja California Sur 23000. México
- 18 2:20 **SANTA MONICA BAY NEEDS YOUR KELP! Tom Ford and Laura Bodensteiner,** Kelp Restoration and Monitoring Project, Santa Monica Baykeeper, P.O. Box 10096 Marina Del Rey, CA, 90295
- 19 2:40 **CAN WE SAVE THE BIG FISH? D. J. Pondella, II¹ and L. G. Allen².** ¹Vantuna Research Group, Department of Biology, Occidental College, Los Angeles, CA 90041. ²Department of Biology, California State University, Northridge, CA 91330-8303.
- 3:00 **BREAK**
- 20 3:20 **REEF CHECK CALIFORNIA – A TROPICAL MODEL OF COMMUNITY MONITORING IN A TEMPERATE ENVIRONMENT. C. S. Shuman.** Reef Check Foundation, 17575 Pacific Coast Highway, Pacific Palisades, CA, 90272.
- 21 F 3:40 **THE VALUE OF NET-CAGE MARICULTURE AS A FAD IN SOUTHERN CALIFORNIA. C.T. Oakes and D.J. Pondella, II.** Vantuna Research Group, Occidental College, Department of Biology, Los Angeles, CA, 90041.
- 22 4:00 **PRELIMINARY OBSERVATIONS ON THE LIFE HISTORY OF SALEMA *Xenistius californiensis* FROM SOUTHERN CALIFORNIA. Eric Miller¹, Daniel Pondella², and Kevin Herbinson³.** ¹MBC Applied Environmental Sciences, Costa Mesa, CA, ²Vantuna Research Group, Occidental College, Los Angeles, CA, ³Southern California Edison, Rosemead, CA

23 F 4:20 INDICATORS OF GONAD STATE IN CALIFORNIA SHEEPHEAD
(*Semicossyphus pulcher*).
Kerri A. Loke, Michael A. Sundberg, Kelly A. Young and Christopher G. Lowe,
California State University Long Beach, Long Beach California

24 4:40 DISTRIBUTION OF PLANKTON NEAR THE MONTEREY
UPWELLING FRONT: RETHINKING THE CONCEPT OF PLANKTON
AS INACTIVE "DRIFTERS".
A.K. Morris, Department of Ecology and Evolutionary Biology, University of
California, Los Angeles, CA, 90095.

5:00 – 7:00 POSTER SESSION AND SOCIAL

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Rm GSBM 138

Session: Contributed Papers

Chair: Andrea Murray, CSU Fullerton

25 9:00 THE EFFECT OF THE SEA WATER WARMING TREND IN THE
EASTERN PACIFIC OCEAN ON THREE DIFFERENT BREEDING
TYPES OF DEMERSAL MARINE FISHES
Mike McCarthy, CSU Fullerton

26 E 9:20 THE RELATIONSHIP BETWEEN EL NIÑO/SOUTHERN
OSCILLATION EVENTS AND GROWTH OF JUVENILE WHITE
SEABASS (*TRACTOSCION NOBILIS*)
Jonathan P. Williams, California State University, Northridge, Department of
Biology, 18111 Nordhoff St., Northridge, CA, 9

27 E 9:40 LIFE HISTORY PARAMETERS AND COURTSHIP BEHAVIOR OF
BLACK PERCH (*EMBIOTOCA JACKSONI*) WITHIN THE SOUTHERN
CALIFORNIA BIGHT
Froeschke, Bridgette F. Nearshore Marine Fish Research Program, California
State University, Northridge, Department of Biology, 18111 Nordhoff St.
Northridge CA, 91330.

28 E 10:00 THINK SMALL: BENEFITS OF APPROACHING THE POPULATION
GENETICS OF THE TIDEWATER GOBY (*EUCYCLOGOBIUS
NEWBERRYI*) FROM THE LEVEL OF THE INDIVIDUAL.
Dent A. Earl, David K. Jacobs, Kristina D. Louie, Carolyne Bardeleben, Carles
Vila & Camm C. Swift. Presenter's Contact: UCLA, Ecology and Evolutionary
Biology Department, 621 Charles E. Young Drive South, Los Angeles, CA
90095. 310-206-7885, daearl@ucla.edu

29 E 10:20 THE EFFECTS OF DIEL AND TIDAL CYCLES ON THE ABUNDANCE OF HARBOR SEALS, *Phoca vitulina richardsi*, IN CHALK COVE, SANTA CATALINA ISLAND.

A. Floyd, Dept. of Biological Sciences, California State University Long Beach, Long Beach, CA 90840.

10:40 – 11:00 BREAK

11:00 – 11:15 Welcome, Student Grant Awards

11:15 – 12:15 Plenary Talk : Dr. Mark Gold

12:15 – 1:20 LUNCH BREAK

Session: Contributed Papers (cont.)

Chair: Andrea Murray, CSU Fullerton

30 M 1:20 PLASMA TESTOSTERONE LEVELS CORRELATE WITH SPERMATOGENESIS BUT NOT GSI IN MALE ROUND STINGRAYS (*UROBATUS HALLERI*)

C.G. Mull, C.G. Lowe, and K.A. Young. Department of Biology, California State University, Long Beach 90840

31 M 1:40 CRANIAL ENDOTHERMY IN THE MOONFISH (*LAMPRIS GUTTATUS*)

Runcie, Rosa M.¹, Dickson, Kathryn A.¹, Dewar, Heidi², and Hawn, Don³

¹Department of Biological Science, CA State University Fullerton, Fullerton, CA 92831 ²Inter-American Tropical Tuna Commission, La Jolla, CA 92037

³National Marine Fisheries Service, Honolulu, HI 96814

32 M 2:00 THE POTENTIAL FOR LACTATE PROCESSING IN WHITE MUSCLE OF ENDOTHERMIC AND ECTOTHERMIC SHARKS

J.M. Backey and K.A. Dickson. California State University, Department of Biological Science, Fullerton, CA, 92831.

33 2:20 'BUT YOU CAN'T TAKE THE COUNTRY OUT OF THE LARVA': SITE EFFECTS IN CALCIFIED STRUCTURES USEFUL FOR LARVAL TRACKING STUDIES

D.C. Lloyd and D.Z. Zacherl, Department of Biological Science, California State University, Fullerton, CA 92831, Georges Paradis and Mike Sheehy, MSI, University of California Santa Barbara, and Robert Warner, EEMB, University of California, Santa Barbara 93106

34 E 2:40 ECTOPARASITES OF FISHES ASSOCIATED WITH WASTEWATER DISCHARGE IN THE SOUTHERN CALIFORNIA BIGHT.

J. E. Kalman. University of California Los Angeles, Department of Ecology and Evolutionary Biology, Los Angeles, CA 90095 and Orange County Sanitation District, Fountain Valley, CA 92708

3:00 BREAK

- 35 M 3:20 **THE OPTIC NERVE SHEATH DIAMETER IN ASSOCIATION WITH INCREASED INTRACRANIAL PRESSURE**
Jarrold Larson, Mauricio Arcila, Elana Neches, John C. Fox, and Lynn Lulloff,
 University of California, Irvine Medical Center, Department of Emergency
 Medicine, Orange, CA, 92868
- 36 3:40 **THE RESPONSE OF FLYING INSECTS TO SCORPION FLUORESCENCE**
C.T. Kloock, California State University, Bakersfield, Department of Biology,
 Bakersfield CA, 93311
- 139 M 4:00 **USE OF ULTRASOUND TO RISK-STRATIFY PREGNANCY OUTCOME IN EMERGENCY DEPARTMENT PATIENTS WITH FIRST TRIMESTER VAGINAL BLEEDING**
 John Christian Fox, MD. Department of Emergency Medicine University of
 California, Irvine research group, **Choi, Hee Sun**, 200 South Manchester
 Orange, CA 92868
- 140 M 4:20 **RAPID RETURN OF OVARIAN FUNCTION IN SIBERIAN HAMSTERS (PHODOPUS SUNGORUS) FOLLOWS LONG DAY STIMULATION**
G.E. McMichael, and K.A. Young. Department of Biology, California State
 University, Long Beach, CA, 90840.
- 142 E 4:40 **MUSCULATURE OF THE MODIFIED RIB FOUND IN CYPRINIFORM FISHES**
R.L. Perry. California State University Bakersfield, Department of Biology,
 Bakersfield, CA 93311.

5:00 – 7:00 POSTER SESSION AND SOCIAL

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006 Location: Drescher Graduate Campus, Graziadio
 Executive Center, Room 185

Session: Invasive Species

Chair: Shelley Luce, Santa Monica Bay Restoration Commission

- 38 9:00 **CHEMICAL AND NON-CHEMICAL METHODS FOR REMOVING INVASIVE PLANTS: TWO CASE STUDIES**
 Nat Cox, Environmental Scientist, California State Parks, Angeles District
- 39 9:20 **THE BRADLEY METHOD OF "BUSH" REGENERATION**
 Jo Kitz, Program Director, Mountains Restoration Trust
- 40 9:40 **USING INTEGRATED VEGETATION MANAGEMENT TO CONTROL NON-NATIVE INVASIVE SPECIES AND RESTORE NATIVE ECOSYSTEMS IN THE SANTA MONICA MOUNTAINS"**
 Marti Whitter, Fire Ecologist, National Parks Service.

- 41 10:00 **Ellen Mackey**, Field Ecologist/Biologist, Los Angeles & San Gabriel Rivers Watershed Council
- 141 10:20 **HAS THE STATE BAN ON AQUARIUM *CAULERPA* SPECIES BEEN EFFECTIVE IN SOUTHERN CALIFORNIA?**
J.R. Smith¹, S.F. Zaleski², S. Diaz¹, L.J. Walters³, K. Brown³, and S.N. Murray¹.
¹Department of Biological Science, California State University, Fullerton, CA 92834; ²Sea Grant Program, University of Southern California, Los Angeles, CA 90089; ³Department of Biology, University of Central Florida, Orlando, FL 32816
- 10:40 **Panel Discussion: Selecting Methods for Invasive Plant Management**
Moderated by Shelley Luce, Director, Santa Monica Bay Restoration Commission

10:40 – 11:00 **BREAK**

11:00 – 11:15 **Welcome, Student Grant Awards**

11:15 – 12:15 **Plenary Talk : Dr. Mark Gold**

12:15 – 1:20 **LUNCH BREAK**

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: **Drescher Graduate Campus, Graziadio Executive Center, Room 150 GSBM**

Session: Southern California Coastal Stream Vertebrates: Biology and Conservation

Session Chair: **Jonathan Baskin**, California State Polytechnic University, Pomona.

Introduction: **Jonathan Baskin**, California State Polytechnic University, Pomona.

- 42 1:40 **ROLE OF WATERSHED-SCALE PHYSICAL PROCESSES IN SHAPING HABITAT REQUIREMENTS OF RIPARIAN DEPENDENT FAUNA**
E.D. Stein, Southern California Coastal Water Research Project, 7171 Fenwick Lane, Westminster, CA, 92683
- 43 2:00 **STATUS AND DISTRUBUTION OF THE INLAND FISHES OF COASTAL SOUTHERN CALIFORNIA**
Camm C. Swift, ENTRIX, Inc., 2140 Eastman Avenue, Suite 200, Ventura, CA 93003. (626) 447-5846; Jonathan N. Baskin, Biological Sciences Department, Cal Poly Pomona University, 3801 W. Temple Ave., CA 91768, 909 869-4045 and San Marino Environmental Associates, 560 South Greenwood Ave. San Marino, CA 91108; Robert Fisher, USGS, San Diego Field Station, U. S. Geological Survey, 4165 Spruance Road, Suite 200, San Diego, CA 92101-0812, 619-225-6422; Thomas Haglund, Biological Sciences Department, Cal Poly Pomona University, 3801 W. Temple Ave., CA 91768, 818-906-3440 and

San Marino Environmental Associates, 560 South Greenwood Ave. San Marino, CA 91108.

- 44 2:20 **STATUS, DISTRIBUTION, HABITAT AND POPULATION SIZE-STRUCTURE ESTIMATES FOR THE THREATENED SANTA ANA SUCKER (*CATOSTOMUS SANTAANAE*)**
J. N. Baskin, S. H. Bryant, T. R. Haglund, Biological Sciences Department, Cal Poly Pomona University, 3801 W. Temple Ave. Pomona, CA 91768, and San Marino Environmental Associates, 560 South Greenwood Ave. San Marino, CA 91108; Camm C. Swift, ENTRIX, Inc., 2140 Eastman Avenue, Suite 200, Ventura, CA 93003.
- 45 2:40 **STATUS OF THE SANTA ANA SUCKER (*CATOSTOMUS SANTAANAE*) IN SOUTHERN CALIFORNIA: PATTERNS AND TRENDS IN CONDITION INDEX AND HABITAT PREFERENCE THROUGHOUT ITS RANGE.**
J.N. Baskin, S. H. Bryant, T. R. Haglund, Biological Sciences Department, Cal Poly Pomona University, 3801 W. Temple Ave. Pomona, CA 91768, and San Marino Environmental Associates, 560 South Greenwood Ave. San Marino, CA 91108.
- 3:00 **BREAK**
- 46 3:20 **RARE OCCURRENCES OF A COMMON SPECIES: SPECKLED DACE AND THEIR STRUGGLE FOR SURVIVAL IN SOUTHERN CALIFORNIA.**
G. Abbas, San Bernardino National Forest, 1824 S Commercenter Cir, San Bernardino, CA 92408,
- 47 3:40 **TIDEWATER GOBY SEASONAL HABITAT PREFERENCES IN A NORTHERN CALIFORNIA LAGOON, WITH REFERENCE TO ARTIFICIAL BREACHING.**
C.A. Page and B. R. Norman, Aquatic Resource Specialists, Environmental Consultants, 12580 HWY 101, Smith River CA, 95567.
- 48 4:00 **IMPACTS OF EXOTIC SPECIES ON NATIVE AQUATIC SPECIES DISTRIBUTION IN TWO SOUTHERN CALIFORNIA RIVER SYSTEMS**
T P Keegan. ECORP Consulting, Inc., 2260 Douglas Blvd., Suite 160, Roseville, CA 95661.
- 49 4:20 **EXTENT OF FISHING AND FISH CONSUMPTION IN VENTURA AND LOS ANGELES COUNTY WATERSHEDS IN 2005**
M. J. Allen, E. T. Jarvis, V. Raco-Rands, and G. Lyons. Southern California Coastal Water Research Project, Westminster, CA 92683;
- 50 E 4:40 **THE CALIFORNIA NEWT: NATURAL HISTORY AND CHEMICALLY-MEDIATED INTERACTIONS**
R.P. Ferrer and R.K. Zimmer. Zimmer Laboratory, UCLA, Department of Ecology and Evolutionary Biology, Los Angeles, CA 90095.

5:00 – 7:00 **POSTER SESSION AND SOCIAL**

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 179

Session: Urban Watershed, Runoff Sampling

Chair: Eric Stein, SCCWRP

- 51 9:00 USING STREAM CHEMISTRY TO UNDERSTAND WATERSHED DYNAMICS**
Helen Jung, Terri Hogue, University of California at Los Angeles; Laura Rademacher, University of Pacific; Sheila Morrissey, University of California at Santa Barbara; Tom Meixner, University of Arizona
- 52 9:20 INNOVATIVE MONITORING TECHNIQUES TO ASSESS WATER QUALITY LOADINGS FROM NATURAL LANDSCAPES**
Sean A. Porter and Jay Shrake, MACTEC Engineering and Environmental Consulting, Inc., San Diego, CA. 92123
- 53 9:40 WATERSHED-BASED SOURCES OF TOTAL COPPER, LEAD AND ZINC IN URBAN STORMWATER**
L.L. Tiefenthaler, E.D. Stein and K.Schiff, Southern California Coastal Water Research Project, 7171 Fenwick Lane, Westminster, CA, 92683
- 54 10:00 STORMWATER TOXICITY EVALUATION OF MAJOR RIVERS ENTERING THE SOUTHERN CALIFORNIA BIGHT.**
John Rudolph¹, Chris Stransky¹, Howard Bailey¹, Steve Bay², and Darrin Greenstein² ¹Nautilus Environmental, San Diego, CA, 92121 and ²Southern California Coastal Water Research Project, Westminster, CA, 92683.
- 55 10:20 QUANTITATIVE MICROBIAL SOURCE TRACKING USING BACTEROIDALES AND HUMAN VIRUS MONITORING IN CALLEGUAS CREEK WATERSHED**
Beverly Kildare and Stefan Wuertz. Department of Civil and Environmental Engineering, University of California, Davis, CA 95616 **Dustin Bambic**, Larry Walker Associates, 250 Lafayette Circle Suite 200, Lafayette, CA 94549

10:40 – 11:00 BREAK

11:00 – 11:15 Welcome, Student Grant Awards

11:15 – 12:15 Plenary Talk : Dr. Mark Gold

12:15 – 1:00 LUNCH BREAK

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 179

**SESSION: RIVER DYNAMICS AND RUNOFF PLUMES IN MARINE
ENVIRONMENTS**

Chair: **Burton Jones, University of Southern California**

- 56 1:20 **DRY WEATHER RIVER RUNOFF IN THE SOUTHERN CALIFORNIA
BIGHT**
Burton Jones Marine Environmental Biology University of Southern California
- 57 1:40 **SATELLITE VIEW OF STORMWATER RUNOFF PLUMES IN
SOUTHERN CALIFORNIA**
Nikolay P. Nezlin Southern California Coastal Water Research Project 7171
Fenwick Lane, Westminster, CA 92683-5218 USA
- 58 2:00 **THE EFFECTS OF STORMWATER RUNOFF IN SANTA
MONICA BAY**
K. M. Reifel and B. H. Jones, University of Southern California,
Department of Biology, Los Angeles, CA 90089-0371

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 179

Session: Red Tides

Moderator: **Rick Pieper, Southern California Marine Institute**

- 59 2:20 **HARMFUL ALGAE IN THE SOUTHERN CALIFORNIA BIGHT:
PRESENT THREATS AND FUTURE CONCERNS**
David A. Caron, Astrid Schnetzer, Rebecca Schaffner, Steffi Moorthi, Peter
Countway, Beth Stauffer, Adriane Jones, Diane Kim and Billy Pan. Department
of Biological Sciences, University of Southern California, 3616 Trousdale
Parkway, Los Angeles, CA 90089-0371.
- 60 2:40 **PSEUDO-NITZSCHIA AND DOMOIC ACID IN THE LOS ANGELES
HARBOR AND ADJACENT COASTAL WATERS**
Astrid Schnetzer, David A. Caron, Peter E. Miller, Rebecca Schaffner, Adriane
Jones, Diane Kim and Billy Pan, Department of Biological Sciences, University
of Southern California, 3616 Trousdale Parkway, Los Angeles, CA 90089-0371
and Stephen Weisberg, Southern California Coastal Water Research Project,
Westminster, CA 92683.
- 3:00 **BREAK**

- 61 3:20 **DOMOIC ACID TOXICITY IN CALIFORNIA SEA LIONS (*ZALOPHUS CALIFORNIANUS*) STRANDED IN ORANGE COUNTY, CA, 2002-2006**
Richard Evans, Michele Hunter and Meg Jones, Pacific Marine Mammal Center, 20612 Laguna Canyon Road, Laguna Beach, CA 92651.
- 62 3:40 **DOMOIC ACID POISONING IN SEABIRDS**
Susan Kaveggia, International Bird Rescue Center, 3601 South Gaffey Street, San Pedro, CA 90731.
- 63 4:00 **RED TIDE BLOOMS (*LINGULODINIUM POLYEDRA*) IN SAN PEDRO BAY**
Ivona Cetinic, Astrid Schnetzer, David A. Caron and Burt Jones. University of Southern California, Los Angeles, CA 90089 USA.
- 64 4:20 **THE WATER QUALITY TASK FORCE IN REDONDO BEACH; HOW A SMALL COASTAL CITY IS DEALING WITH RED TIDES AND FISH KILLS**
Chris Cagle, Councilman, City of Redondo Beach, 415 Diamond Street, Redondo Beach, CA 90277.
- 65 4:40 **SOME ASPECTS OF MONITORING FOR TOXIC AND NONTOXIC BLOOMS (THE HABS AND THE HAB-NOTS) IN CALIFORNIA**
Gregg W. Langlois, California Department of Health Services, 850 Marina Bay Parkway, Richmond, CA. 94804.

5:00 – 7:00 POSTER SESSION AND SOCIAL

Society of Environmental Toxicology and Chemistry-2006

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 171

Session: Sediment Quality Objectives

Chair: Steve Bay, SCCWRP

- 66 1:20 **GOALS AND OBJECTIVES OF CALIFORNIA'S SEDIMENT QUALITY OBJECTIVES PROGRAM**
Beegan, Chris. State Water Resources Control Board, Sacramento, California
- 67 1:40 **COMPARISON AND SELECTION OF SUBLETHAL SEDIMENT TOXICITY TESTS FOR USE IN EVALUATING SEDIMENT QUALITY**
Young, D.* Bay, S.M., and D. Greenstein. Southern California Coastal Water Research Project, Westminster CA
- 68 2:00 **A MEASURE OF BENTHIC INVERTEBRATE COMMUNITY CONDITION FOR CALIFORNIA BAYS AND ESTUARIES**
J.A. Ranasinghe¹, S.B. Weisberg¹, R.W. Smith², D.E. Montagne³, B. Thompson⁴, J.M. Oakden⁵, D.D. Huff⁶, and C. Beegan⁷. ¹SCCWRP, Westminster, CA; ²Deceased; ³County Sanitation Districts of Los Angeles County, Whittier, CA; ⁴San Francisco Estuary Institute, Oakland, CA; ⁵Moss Landing Marine Laboratory, Moss Landing, CA; ⁶Oregon Dept. of Environmental Quality, Portland, OR; ⁷State Water Resources Control Board, Sacramento, CA.
- 69 2:20 **DEVELOPMENT AND EVALUATION OF CHEMICAL SQGS BASED ON BENTHIC MACROFAUNA RESPONSES TO SEDIMENT CHEMISTRY.**
Kerry J. Ritter*. Steven M. Bay, and Robert W. Smith. Southern California Coastal Water Research Project, Westminster, CA.
- 70 2:40 **DEVELOPMENT AND VALIDATION OF A MULTIPLE LINE OF EVIDENCE FRAMEWORK FOR INTEGRATING SEDIMENT QUALITY DATA.**
Steven M. Bay*, Stephen B. Weisberg, and Jeff Brown. Southern California Coastal Water Research Project, Westminster, CA.
- 3:00 **BREAK**

Society of Environmental Toxicology and Chemistry-2006

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 171

Session: Volunteer Monitoring

Chair: Lan Wiborg, City of San Diego

- 71 3:20 **CITIZEN MONITORING STATUS AND TRENDS**
Erick Burres, State Water Resources Control Board
- 72 3:40 **CITIZEN VOLUNTEER BASED BENTHIC MACROINVERTEBRATE
WATER QUALITY SAMPLING.**
Rob Roy*, Coordinator, San Diego Stream Team, San Diego, CA.
- 73 4:00 **RECOVERY OF THE WESTERN SNOWY PLOVER AT SAND'S
BEACH, COAL OIL POINT RESERVE, SANTA BARBARA,
CALIFORNIA.**
Jennifer Stroh, Santa Barbara Audubon Society & University of California's
Natural Reserve System, Santa Barbara, California.
- 74 4:20 **RAPID ACQUISITION OF CITIZEN SCIENTIST DATA ACROSS
LARGE DISTANCES: GRUNION GREETERS AND THE INTERNET
ALONG THE CALIFORNIA COAST.**
K.L. Martin, B. Cupp, C. Stivers, M. Studer. Pepperdine University, Natural
Science Division, Malibu, CA 90263-4321.
- 75 4:40 **A THREE YEAR STUDY OF SEASONAL BACTERIAL
CONCENTRATIONS USING VOLUNTEER ASSISTANCE.**
L. Gilbane, K.A. Snow, S. Aizawa, K.E. Flaherty, Y.J. Ralph, C.V. Wolfe, K.
Kull and R.E. Pieper, Southern California Marine Institute, Terminal Island, CA,
90731.

5:00 – 7:00 POSTER SESSION AND SOCIAL

Southern California Academy of Sciences 2006 Session Schedule

Friday, May 12, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Student Cafeteria

Session: Poster Session – Presenting SCAS and SETAC Posters

- 76 **FIRE-FLOOD-FISH: LOSS AND PERSISTENCE OF UPPER SANTA ANA RIVER SPECKLED DACE (*RHINICHTHYS OSCULUS*) IN SOUTHERN CALIFORNIA AND THE VALUE OF TIMELY HUMAN INTERVENTION.**
G. Abbas¹, J.N. Baskin², R.N. Fisher³, R. Maloney-Rames⁴, A.E. Metcalf⁵, R. Rodriguez⁶ and C.C. Swift⁷, Southern California Native Freshwater Fauna Working Group. ¹San Bernardino National Forest, 1824 S Commerce Center Cir, San Bernardino, CA 92408, (909) 382-2620, gabbas@fs.fed.us; ²Cal Poly University Pomona, 3801 W. Temple Ave. Pomona, CA 91768, and San Marino Environmental Associates, (626) 826-8226, jnbaskin@csupomona.edu; ³U. S. Geological Survey, San Diego Field Station, 4165 Spruance Road, Suite 200, San Diego, CA 92101-0812, 619-225-6422, rfisher@usgs.gov; ⁴California Department of Fish and Game, 3602 Inland Empire Blvd., Ste C-220, Ontario, CA 91764, (909) 980-3818, rmaloney@dfg.ca.gov; ⁵California State University San Bernardino, 5500 University Parkway San Bernardino, CA 92407, (909) 537-7501, ametcalf@csusb.edu; ⁶California Department of Fish and Game, 3602 Inland Empire Blvd., Ste C-220, Ontario, CA 91764, (909) 484-0523, rrodriguez@dfg.ca.gov; ⁷ENTRIX, Inc., 2140 Eastman Avenue, Suite 200, Ventura, CA 93003, (626) 447-5846, cswift@entrix.com.
- 77 E **TOOTH FRACTURE AND WEAR COMPARED IN A RANCHO LA BREA SABERTOOTHED CAT AND THE DIRE WOLF.**
J.E. Abellera, E.A. Ibrahim and W.J. Binder. Loyola Marymount University, Department of Biology, Los Angeles, CA, 90045.
- 78 E **EFFECTS OF OFF-HIGHWAY VEHICLE ACTIVITY ON THE MOJAVE DESERT BIOTA**
Amy J. Arispe and Stephanie H. Diaz. Southern California Ecosystems Research Program, Department of Biological Sciences, California State University, Fullerton.
- 79 P **LATE CENOZOIC VOLCANISM NEAR BAKER, CA.**
Baltzer, Suzanne M. and Jessey, David R. Geological Sciences Department, California State Polytechnic University-Pomona, Pomona, CA 91768.
- 80 E **THE EFFECT OF FEMALE CRICKET CHEMICAL CUES ON THE AGGRESSIVE BEHAVIOR OF MALE CRICKETS, *ACHETA DOMESTICUS*.**
Leslie J. Buena and Sean E. Walker, California State University, Fullerton
- 81 **WATER AND SEDIMENT QUALITY EVALUATION OF THE SANTA CLARA RIVER ESTUARY - ANALYSIS OF IMPACTS ASSOCIATED WITH THE DISCHARGE OF TREATED WASTEWATER.**
Colvin, Molly; Bailey, Howard C.; and Stransky, Chris. Nautilus Environmental, San Diego, CA.

- 82 E **COMPARATIVE ANALYSES OF THE ENTIRE MITOCHONDRIAL *cox-I* GENE SEQUENCE ACROSS VARIOUS GENERA OF CHITONS**
N.V. Dabbousi and D.J. Eernisse. Department of Biological Science, California State University, Fullerton, Fullerton, CA 92834-6850.
- 83 **SEX DIFFERENCES AND GEOGRAPHIC VARIATION IN BODY SIZE IN THE WOLF SPIDERS *RABIDOSA RABIDA* AND *RABIDOSA PUNCTULATA* (ARANEAE: LYCOSIDAE)**
Gerry Del Rio Cortes and Sean E. Walker Department of Biological Sciences, California State University, Fullerton, Fullerton, CA 92831
- 84 M **DIFFERENTIAL EFFECTS TO DOPAMINE OXIDATION IN PC12 CELLS AND PRIMARY ASTROCYTES: A MODEL FOR NEURODEGENERATION?**
Jessica De Giacomo¹, Jerome Garcia¹, and Enrique Cadenas² ¹ Biology Department, School of Arts & Sciences, University of La Verne, Los Angeles, CA 91750, USA ² Molecular Pharmacology & Toxicology, School of Pharmacy, University of Southern California, Los Angeles, CA 9008, USA
- 85 P **PLEISTOCENE STRATIGRAPHY AND PALEOENVIRONMENT OF BAHIA SAN QUINTIN, BAJA CALIFORNIA, MEXICO**
R.V. Di Fiori, Ecology and Paleocology Research Group, Pasadena City College, Natural Science Division, Pasadena, CA. 91106
- 86 **EVALUATION OF ECOLOGICAL AND HYDROLOGICAL CONDITIONS IN THE SANTA CLARA RIVER ESTUARY WITH RESPECT TO DISCHARGE OF TREATED EFFLUENT.**
Douglass, Sarah^{1*}; Bailey, Howard C.¹; Kamman, Greg²; and Pfeifer, Dan³. ¹Nautilus Environmental, San Diego, CA. ²Kamman Hydrology and Engineering, Inc., San Rafael, CA. ³City of San Buenaventura, Ventura, CA.
- 87 **TIERED AQUATIC LIFE USES FOR SOUTHERN CALIFORNIA COASTAL STREAMS**
Jerry Diamond, Ph.D., Tetra Tech, Inc., 400 Red Brook Boulevard, Suite 200, Owings Mills, MD 21117, jerry.diamond@tetratech.com; Renee Purdy DeShazo, Los Angeles Regional Water Quality Control Board, 320 W. 4th Street, Suite 200, Los Angeles, CA 90013, , rdeshazo@waterboards.ca.gov; **Sabrina Drill**, University of California Cooperative Extension, 4800 E. Cesar Chavez Ave., Los Angeles, CA 90022, sldrill@ucdavis.edu
- 88 M **DETAILED COMPOSITIONAL COMPARISON OF ACIDIC NSO COMPOUNDS IN BIODEGRADED VERSUS NON-BIODEGRADED ENVIRONMENTAL SAMPLES USING NEGATIVE ION ELECTROSPRAY FOURIER TRANSFORM ION CYCLOTRON RESONANCE MASS SPECTROMETRY.**
S.A. Galasso and C.A. Hughey, Chapman University, Department of Physical Sciences, 1 University Dr. Orange, CA 92866

- 89 **EFFECTS OF SALINITY CONCENTRATION ON RATES OF POLYP CLONING, GROWTH, AND STROBILATION IN THE *AURELIA LABIATA* (CNIDARIA, SCYPHOZOA)**
Julie A. Guerin. Cabrillo Marine Aquarium, San Pedro, CA 90731; Palos Verdes Peninsula High School, Rolling Hills Estates, CA 90274
- 90 **E ASSESSMENT OF THE SELF-PURIFICATION OF A CONSTRUCTED WETLANDS AND THE EFFECTS OF POLLUTION ON THE BIOLOGICAL COMMUNITY.**
I.R. Hajjali, S.A. Cardenas, T.A. Voung, R.B. Shah, J.Z. Liu, W.S. Liang, M.R. Robles, J.E. Krayner, L.A. Del Valle, and A. Lam, Ecology and Paleoecology Research Group, Pasadena City College, Natural Science Division, Pasadena, CA. 91106
- 91 **E A PRELIMINARY STUDY OF PLASTICS POLLUTION IN THE COASTAL WATERS AND BEACHES OF BAJA CALIFORNIA PENINSULA**

ESTUDIOS PRELIMINARES DE CONTAMINACIÓN POR PLÁSTICOS EN AGUAS COSTERAS Y PLAYAS DE LA PENÍNSULA DE BAJA CALIFORNIA MÉXICO
Oce. **A. Raúl Herrera-Gutiérrez,** Cap. Charles Moore, M. C. Gustavo Riaño-Sánchez. Algalita Research Foundation and Asesores en Biología Pesquera, S.A. de C.V, BIOPESCA
- 92 **F ANGLING-INDUCED BAROTRAUMA AND INITIAL CATCH SURVIVAL OF SOUTHERN CALIFORNIA NEARSHORE AND SHELF ROCKFISHES (SCORPAENIDAE, *SEBASTES* SPP.)**
Jarvis, E.T. and C.G. Lowe. California State University, Long Beach, Department of Biology, Long Beach, CA, 90840.
- 93 **M CAN MEDICAL STUDENTS LEARN AND RETAIN BEDSIDE ULTRASOUND? THE EVALUATION OF A FOURTH YEAR MEDICAL STUDENT ELECTIVE IN EMERGENCY ULTRASOUND.**
Jarrod Larson, Graciela Barajas and John C. Fox, University of California, Irvine Medical Center, Department of Emergency Medicine, Orange, CA, 92868
- 94 **F ECTOPARASITES OF THE CALIFORNIA SCORPIONFISH, *SCORPAENA GUTTATA*, IN THE SOUTHERN CALIFORNIA BIGHT.**
J. E. Kalman. University of California Los Angeles, Department of Ecology and Evolutionary Biology, Los Angeles, CA 90095 and Orange County Sanitation District, Fountain Valley, CA 92708
- 95 **M MICROSATELLITE DNA ASSESSMENT OF MULTIPLE PATERNITY IN THE VIVPAROUS ROCKFISH *SEBASTES MELANOPS***
Kurt W. Karageorge. Department of Biological Sciences, California State University, Long Beach, Long Beach, CA 90840.

- 96 E **THE INFLUENCE OF ARTICHOKE THISTLE ON HUMMINGBIRD POPULATIONS**
R.J. Keber and S.A. Banack. Southern California Ecosystems Research Program, California State University, Fullerton, Department of Biological Science, Fullerton, CA, 92834
- 97 **A RETROSPECTIVE ANALYSIS OF GALLBLADDER PATHOLOGY USING BEDSIDE ULTRASOUND**
Jarrold Larson, Graciela Barajas, John C. Fox, and William Scruggs, University of California, Irvine Medical Center, Department of Emergency Medicine, Orange, CA, 92868
- 98 E **EUPHAUSIID SWARMS IN THE MONTEREY SUBMARINE CANYON AS SAMPLED WITH A REMOTELY OPERATED VEHICLE**
J. J. Lee, University of California, Los Angeles, Department of Ecology and Evolutionary Biology, Los Angeles, CA, 90095. J. Ryan, Monterey Bay Aquarium Research Institute, Moss Landing, CA, 95039. W. M. Hamner, University of California, Los Angeles, Department of Ecology and Evolutionary Biology, Los Angeles, CA, 90095. G. Matsumoto, Monterey Bay Aquarium Research Institute, Moss Landing, CA, 95039. B. Robison, Monterey Bay Aquarium Research Institute, Moss Landing, CA, 95039.
- 99 F **EFFECTS OF ALTERED SALINITY DURING INCUBATION ON CALIFORNIA GRUINION, *LEURESTHES TENUIS***
J.K. Matsumoto and K.L. Martin. Natural Science Division, Pepperdine University, Malibu, 90263
- 100 E **RELATIONSHIPS BETWEEN BODY SIZE AND SOUND PRODUCING STRUCTURES IN CRICKETS: DO BIG MALES HAVE BIG HARPS?**
N.R. Moradian and S.E. Walker. Department of Biological Sciences, California State University, Fullerton, Fullerton, CA 92831
- 101 E **LINKING THE STATOLITH CHEMISTRY OF *APLYSIA CALIFORNICA* TO WATERSHED DISCHARGE PLUMES ALONG THE OPEN COAST**
M.O. Navarro, G. Paradis, D.W. Lea, M. Sheehy, R.R. Warner, S.D. Gaines and D.C. Zacherl. California State University Fullerton, University of California Santa Barbara.
- 102 F **PHYLOGENETIC STUDY OF THE FLATFISH GENUS *PLEURONICHTHYS***
J.D. Olson. University of California, Los Angeles, Department of Ecology and Evolutionary Biology, Los Angeles, CA 90095-1606.
- 103 M **AN *IN VITRO* RISK ASSESSMENT MODEL FOR THE IMPACT OF PESTICIDES ON THE DEVELOPMENT OF T CELLS IN C57BL/6 MICE.**
Joan Ordonez* and Christine Broussard, Ph. D., Department of Biology, The University of La Verne, La Verne, California 91750
- 104 M **DETECTION OF QUORUM-SENSING COMPOUNDS IN PLANT-ASSOCIATED MICROORGANISMS.**
M.R. Oseguera, N. Chinchillas and G. Brelles-Mariño. Biological Sciences Department, California State Polytechnic University, Pomona, CA 91766.

- 105 F THE USE OF MICROSATELLITE MARKERS TO EVALUATE THE GENETIC POPULATION STRUCTURE OF THE ROUND STINGRAY AT SEAL BEACH, CA**
S.M. Plank, C. G. Lowe, J.A. Brusslan, California State University Long Beach, Department of Biological Sciences, Long Beach, CA 90840-3702
- 106 M GSNO FORMATION IN ASTROCYTES AND NEURONS-IMPLICATION FOR NEUROTOXICITY**
Taylor Pupka¹, Li-Peng Yap², Jerome Garcia¹, and Enrique Cadenas² ¹ Department of Biology, University of La Verne, 1950 3rd St. La Verne, CA 91750-4401 ² Molecular Pharmacology and Toxicology, School of Pharmacy, University of Southern California, Los Angeles, CA 90089-121
- 107 M GLUTATHIONE TRANSFERASE ACTIVITY IN 3 SPECIES OF SEA TURTLES, CHELONIA MYDAS AGASSIZII, LEPIDOCHELYS OLIVACEA, AND CARETTA CARETTA, FROM THE BAJA CALIFORNIA PENINSULA**
Kristine L. Richardson^{*1}, Susan C. Gardner², and Daniel Schlenk^{1,1} ¹ University of California – Riverside, Riverside, CA 92521, USA ² Centro de Investigaciones Biológicas del Noroeste, S.C., La Paz, Baja California Sur CP 23090, Mexico
- 108 E FIREBREAKS AND INVASIVE PLANT SPECIES**
Mov Mckayla Sab, Ayse Bassari and Cheryl Swift. Department of Biology, Whittier College, Whittier, CA, 90608.
- 109 E AN OBSERVATION OF OYSTER SETTLEMENT OVER SEASONS FOR THE WEST COAST OYSTER, OSTREA CONCHAPHILA.**
E. M. Seale and D. Zacherl. Southern California Ecosystems Research Program, California State University, Fullerton, Department of Biological Sciences, Fullerton, CA, 92831.
- 110 E AN APPLICATION OF ISLAND BIOGEOGRAPHY THEORY TO RIPARIAN RESTORATION**
Jane Shevtsov and Richard F. Ambrose. UCLA, Department of Ecology and Evolutionary Biology and Department of Environmental Health Sciences, Los Angeles, CA 90095.
- 111 P PETROLOGY AND GEOCHEMISTRY OF THE BIG PINE VOLCANIC FIELD, INYO COUNTY, CALIFORNIA**
Varnell, Ashley E., and Jessey, David R. Geological Sciences Department, California State Polytechnic University – Pomona, Pomona, CA 91768
- 112 P REAL-TIME OCEANOGRAPHIC MONITORING NEAR POINT FERMIN AND THE LOS ANGELES RIVER MOUTH.**
A. Vaux, L. Gilbane, R. E. Pieper, A. Willingham, K. Grubert, S. Kelly, Southern California Marine Institute, Terminal Island, CA, 90731.
- 113 F THE EFFECTS OF SELECTIVE FISHING PRESSURE ON THE POPULATION DYNAMICS AND LIFE HISTORY PARAMETERS OF THE CALIFORNIA SHEEPHEAD, SEMICOSSYPHUS PULCHER**
Lynne Wetmore. Vantuna Research Group, Occidental College, Department of Biology, Los Angeles, CA, 90041.

- 114 **CHANGES IN DENSITIES OF FECAL INDICATOR BACTERIA (FIB) OVER DIFFERING TIDAL FLOWS IN THE BALLONA WETLANDS, LOS ANGELES, S. Yanamadala¹ and John H. Dorsey². ¹Chadwick High School, 26800 S. Academy Drive, Palos Verdes Peninsula, CA, 90274, and ²Loyola Marymount University, Department of Natural Sciences, Los Angeles, CA, 90045.**
- 115 **USING SOLID-PHASE MICROEXTRACTION TO DETERMINE THE BIOAVAILABILITY OF PYRETHROID INSECTICIDES IN SEDIMENT. Hunter, Wesley S.* and Gan, Jay. University of California, Riverside, CA.**
- 116 **ENANTIOSELECTIVE INHIBITION OF ACETYLCHOLINESTERASE BY CHIRAL ORGANOPHOSPHORUS INSECTICIDES Mae Grace Nillos*, Gabriela Rodriguez-Fuentes, Daniel Schlenk and Jay Gan. University of California, Riverside, CA.**
- 117 **AN ANOLE LIZARD (SQUAMATA: POLYCHROTIDAE) PRESERVED IN COLOMBIAN COPAL. W. Chun, University of California, Los Angeles, Department of Ecology and Evolutionary Biology, Los Angeles, CA, 90095.**

Southern California Academy of Sciences 2006 Session Schedule

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 175

Session: Plastics in the Marine Environment

Chair: Capt. Charles Moore Algalita Marine Research Foundation

- 118 9:00 SYNTHETIC POLYMERS IN THE MARINE ENVIRONMENT
WHAT WE KNOW-WHAT WE NEED TO KNOW**
Charles Moore, Algalita Marine Research Foundation, 148 N. Marina Drive,
Long Beach, CA 90803
- 119 9:20 CHARACTERIZING AND SURVEYING OCEANIC SOURCES AND
SINKS OF MARINE DEBRIS**
D.G. Foley, Joint Institute for Marine and Atmospheric Research, University of
Hawaii, 1000 Pope Rd., Honolulu, HI. 96822
T. Veenstra, Airborne Technologies Inc, Wasilla, AK.
- 120 9:40 LONG-TERM TRAJECTORIES OF PLASTIC FLOTSAM IN THE
NORTH PACIFIC OCEAN CALCULATED BY THE "OCEAN SURFACE
CURRENT SIMULATOR"-- OSCURS.**
W. James Ingraham, Jr. (NOAA Fisheries, retired) DriftBusters Co., 720
Camano View Road, Camano Island, WA 98282.
- 121 10:00 QUANTITATIVE ANALYSIS OF POPS IN PLASTIC DEBRIS IN THE
OCEAN.**
Lorena M. Rios¹, Urja V. Narayan¹, Gerardo Castillo¹, Charles Moore² and
Patrick R. Jones¹. ¹University of the Pacific, Stockton, CA. ²Algalita Marine
Research Foundation, Long Beach, CA.
- 122 10:20 INTERNATIONAL PELLET WATCH : GLOBAL MONITORING OF
PERSISTENT ORGANIC POLLUTANTS (POPs) BY USING BEACHED
PLASTIC RESIN PELLETS.**
H. Takada, S. Iwasa, S. Endo. Laboratory of Organic Geochemistry (LOG),
Institute of Symbiotic Science and Technology, Tokyo University of Agriculture
and Technology, Fuchu, Tokyo 183-8509, Japan
- 10:40 – 11:00 BREAK**
- 11:00 – 12:00 Plenary Talk : Dr. Stuart Sumida**
- 12:10 – 1:40 SETAC PLENARY SESSION**

Session: Plastics in the Marine Environment (cont.)

Chair: Capt. Charles Moore Algalita Marine Research Foundation

- 123 1:40 **SHIPS FOR SCRAP AT ALANG-SOSIYA: LOOMING OF SMALL PLASTICS IN MARINE SEDIMENTS**
M. Srinivasa Reddy, S. Bhasha, S. Adimurthy and G. Ramachandraiah*
Central Salt and Marine Chemicals Research Institute, Gijubhai Badheka
Marg, Bhavnagar 364 002, Gujarat, India.
- 124 2:00 **WHAT THE PLASTIC INDUSTRY MUST DO IF WE ARE TO KEEP PLASTIC OUT OF MARINE DEBRIS AND GET TO ZERO WASTE**
R.V. Anthony. Richard Anthony Associates, Zero Waste Management, San
Diego California 92109

Southern California Academy of Sciences 2006 Session Schedule

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 150 GSBM

Session: Fresh Water Vertebrates

Chair: Jim Edmundson, California Trout, Inc.

- 125 9:00 **LAMPREYS SOUTH OF POINT CONCEPTION AND PERSPECTIVES FROM THE NORTH**
S.B. Reid and D. Goodman. Western Fishes, 2045 East Main, Ashland, OR,
97520; U.S. Fish and Wildlife, 1655 Heindon Road, Arcata, CA, 95521.
- 126 9:20 **THERMAL ECOLOGY OF STEELHEAD IN A WARM-WATER ENVIRONMENT**
A. P. Spina, National Marine Fisheries Service, 501 W. Ocean Blvd., Suite 4200,
Long Beach, California 90802
- 127 9:40 **SOUTHERN CALIFORNIA STEELHEAD: WHERE AND WHAT ARE THEY?**
Mark H. Capelli. National Marine Fisheries Service, Protected Resources
Division, Santa Barbara, CA
- 128 10:00 **HABITAT EVALUATION FOR SOUTHERN POPULATIONS OF STEELHEAD TROUT, *ONCORHYNCHUS MYKISS***
Sabrina L. Drill, University of California Cooperative Extension, 4800 E. Cesar
Chavez Ave., Los Angeles, CA 90022; Mark Abramson, Heal the Bay, 1444 9th
Street Santa Monica, CA 90401; Michelle Bates, TetraTech Inc., 4213 State St.,
Santa Barbara, CA, 93101; Rosi Dagit, RCD of the Santa Monica Mountains,
122 N. Topanga Bl., Topanga, CA, 90290; Jim Edmonson, California Trout,
Inc., 5436 Westview Court, Westlake Village, CA 91362; Elise Kelley, UC Santa

Barbara, 619 Empire Ave., Ventura, CA 93003; John O'Brien, California Dept. of Fish and Game, 4665 Lampson Ave. C, Los Alamitos, CA 90720; Matt Stoecker, Stoecker Ecological, 135 Campo, Portola Valley, CA 94028; Scott Volan, Cachuma Conservation and Release Board, 3301 Laurel Canyon Rd., Santa Barbara, CA 93105.

- 129 10:20 **SURVIVAL ON THE EDGE: THE PLIGHT OF THE SAN MATEO CREEK SOUTHERN STEELHEAD**
T. E. Hovey, Native Fisheries Monitoring Program, California Department of Fish and Game, Santa Clarita, CA 91390

10:40 – 11:00 **BREAK**

11:00 – 12:00 **Plenary Talk : Dr. Stuart Sumida**

12:10 – 1:40 **SETAC PLENARY SESSION**

Session: Southern California Coastal Stream Vertebrates: Biology and Conservation (Cont.)

Chair: Glen Stewart, California State Polytechnic University, Pomona

- 130 1:40 **STATUS OF THE THREESPINE STICKLEBACK IN SOUTHERN CALIFORNIA**
T.R. Haglund and J.N. Baskin, Biological Sciences Department, Cal Poly Pomona University, 3801 W. Temple Ave. Pomona, CA 91768, and San Marino Environmental Associates, 560 South Greenwood Ave. San Marino, CA 91108.
- 131 2:00 **UPDATE ON *RANA MUSCOSA* IN SOUTHERN CALIFORNIA**
R. N. Fisher, A. R. Backlin, C. J. Hitchcock, and S. A. Hathaway, USGS Western Ecological Research Center, San Diego Field Station, San Diego, CA
- 132 2:20 **AN UPDATE: ECOLOGY, STATUS, AND CONSERVATION OF THE WESTERN SPADEFOOT TOAD, *SPEA HAMMONDII***
Edward L. Ervin, Merkel and Associates, 5434 Ruffin Road, San Diego, CA 02123
- 133 2:40 **STATUS OF THE CALIFORNIA RED-LEGGED FROG (*RANA DRAYTONII*) IN SOUTHERN CALIFORNIA**
Norman J. Scott, U.S. Geological Survey-Retired, Creston, California 93432.
- 3:00 **BREAK**
- 134 3:20 **CONSERVATION IMPLICATIONS OF INTRODUCED AMPHIBIAN SPECIES IN SOUTHERN CALIFORNIA: INSATIABLE PREDATORS OR PLENTIFUL PREY**
Edward L Ervin, Merkel & Associates, Inc. 5434 Ruffin Road, San Diego, CA 02123

- 135 E 3:40 **A PLACE-SPECIFIC EDUCATION PROGRAM TO INCREASE AWARENESS OF INTRODUCED STREAM PREDATORS AND THEIR ROLE IN NATIVE AMPHIBIAN DECLINE.**
L.H. Jones, T.S. Watters, S.D. Dudley, G.J. Van Dragt, R.V. Van Dragt, and L.B. Kats. Pepperdine University, Natural Science Division, Malibu, CA, 90263.
- 136 4:00. **GROWTH AND DEMOGRAPHY OF WESTERN POND TURTLES AT VANDENBERG AIR FORCE BASE, CALIFORNIA.**
D. J. Germano. Department of Biology, California State University, Bakersfield, CA 93311-1022, and G. B. Rathbun. Department of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, c/o P.O. Box 202, Cambria, CA. 93428
- 137 4:20 **THE GARTER SNAKES OF SOUTHERN CALIFORNIA.**
G. R. Stewart. California State Polytechnic University, Pomona, Biological Sciences Department, Pomona, CA, 91768
- 138 4:40 **GENETIC STRUCTURE IN SOUTHERN CALIFORNIA COASTAL STREAM VERTEBRATES: SANTA ANA SPECKLED DACE, THREESPINE STICKLEBACK, AND CALIFORNIA TREE FROG**
A. E. Metcalf, Dept. of Biology California State University, San Bernardino 92407; and I. Phillipsen, Dept. of Zoology, Oregon State University, Corvallis, 97331

GROUP/PANEL DISCUSSION AS TIME ALLOWS

This symposium grew out of discussions in the Southern California Native Freshwater Fauna Working Group. This is an informal group of individual biologists that meets several times per year at Cal Poly University Pomona to discuss issues relating to the freshwater fauna of Southern California. Its goal is to promote the understanding and long term survival of the Southern California freshwater fauna in its natural habitat.

Society of Environmental Toxicology and Chemistry-2006

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 138 GSBM

Session: Endocrine Disruptor Compounds in the Southern California Bight

Chair: Daniel Schlenk, U. C. Riverside

- 143 9:00 **STRESS AND CONSEQUENCES IN THE URBAN OCEAN – ENVIRONMENTAL ENDOCRINOLOGY OF MARINE FISHES OF THE SOUTHERN CALIFORNIA BIGHT**
K. M. Kelley¹, J. A. Reyes¹, J. E. Kalman^{1,2}, A. W. Hamilton¹, M. M. Galima¹, K. Sak¹, C. G. Lowe¹ and J. L. Armstrong² ¹Environmental Endocrinology Lab, Dept. of Biological Sciences, California State University, Long Beach, Long Beach, CA 90840; ²Environmental Assessment Division, Orange County Sanitation District (OCSD), Fountain Valley, CA, 92708
- 144 9:20 **EVALUATION OF RELATIONSHIPS BETWEEN REPRODUCTIVE METRICS, GENDER AND VITELLOGENIN EXPRESSION IN DEMERSAL FLATFISH COLLECTED NEAR THE MUNICIPAL WASTEWATER OUTFALL OF ORANGE COUNTY, CALIFORNIA, USA.**
Rempel, Mary Ann^{1*}; Reyes, Jesus²; Steinert, Scott³; Hwang, Wendy¹; Armstrong, Jeff⁴; Sakamoto, Ken⁴; Kelley, Kevin²; Schlenk, Daniel¹
¹University of California Riverside, Riverside, CA ²California State University of Long Beach, Long Beach, CA ³CSC Biomarker Laboratory, San Diego, CA ⁴Orange County Sanitation District, Fountain Valley, CA
- 145 9:40 **SEASONAL EVALUATION OF REPRODUCTIVE STATUS AND EXPOSURE TO ENVIRONMENTAL ESTROGENS IN HORNYHEAD TURBOT AT THE MUNICIPAL WASTEWATER OUTFALL OF ORANGE COUNTY**
Xin Deng, Mary Ann Rempel and Daniel Schlenk *Department of Environmental Sciences, University of California, Riverside, CA 92507*
- 146 10:00 **REGION-ASSOCIATED DISRUPTION OF FLATFISH ENDOCRINE SYSTEMS – STUDIES IN THE SOUTHERN CALIFORNIA BIGHT**
Jesus A. Reyes, Dawn M. Petschauer, and Kevin M. Kelley. Environmental Endocrinology Lab, Marine Biology Program, California State University, Long Beach, Long Beach, CA 90840
- 147 10:20 **IN VIVO BIOASSAY GUIDED FRACTIONATION OF MARINE SEDIMENT EXTRACTS FROM THE SOUTHERN CALIFORNIA BIGHT FOR ESTROGENIC ACTIVITY.**
D. Schlenk^{1*}, Y. Sapozhnikova¹, M. Irwin¹, L. Xie¹, W. Hwang¹, S. Reddy², B.J. Brownawell², J. Armstrong³, M. Kelly⁴, D. E. Montagne⁵, E. P. Kolodziej⁶, D. Sedlak⁶, S. Snyder⁷ ¹Department of Environmental Sciences, University of

California, Riverside, CA, USA²Marine Sciences Research Center, Stony Brook University, Stony Brook, New York, USA³Ocean Monitoring, Orange County Sanitation District, Fountain Valley, CA USA⁴Ocean Monitoring, City of San Diego, San Diego, CA, USA⁵Ocean Monitoring & Research Group, Los Angeles County Sanitation Districts, Whittier, CA, USA⁶Department of Civil and Environmental Engineering, University of California, Berkeley⁷Water Quality Research and Development Division, Southern Nevada Water Authority, Las Vegas, Nevada

10:40 – 11:00 BREAK

11:00 – 12:00 Plenary Talk : Dr. Stuart Sumida

12:10 – 1:40 SETAC PLENARY SESSION

Society of Environmental Toxicology and Chemistry - 2006

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Student Cafeteria

Session: Plenary Session 12:10 – 1:40

Palos Verdes Shelf Remediation and Restoration

Moderator: Joseph Gully, Los Angeles County Sanitation Districts

148 HISTORICAL AND LEGAL OVERVIEW
John Saurenman, California Department of Justice

A discussion of the history of DDT/PCB contamination on the shelf, the legal battles which were settled for 140 M dollars, and how that money was divided among the various remediation/restoration entities.

149 INSTITUTIONAL CONTROLS
Sharon Lin, Public Outreach and Education, USEPA Region 9

The institutional control (IC) program is focused on the protection of human populations at risk to DDT and PCB exposure from eating contaminated fish. The ICs program consists of public outreach to at risk populations, fish contamination monitoring, and white croaker commercial catch ban and bag limit enforcement. The ICs program has been in full implementation phase since 2002. The stakeholders of the PV Shelf project completed a series of workshops to develop a revised strategic plan for the ICs components in Fall 2005. The presenter will show a video describing the ICs program with an emphasis on the public outreach component of the program, the Fish Contamination Education Collaborative. The presenter will give a status update on the program and discuss any related subjects that are of interest to the meeting attendees.

150 RESOURCE RESTORATION
Dave Witting, Montrose Settlement Restoration Program

Provide an overview of the recently released final plan for restoring natural resource injuries caused by DDTs and PCBs discharged onto the Palos Verdes shelf. The plan details how they intend to restore fishing services, fish habitat, bald eagles, peregrine falcons, and seabirds to the Southern California Bight. The presentation will describe the status of a comprehensive fish contamination study for DDTs, PCBs and mercury and how results from this study will guide resource restoration projects.

151 SITE REMEDIATION
Carmen White, Superfund Division, USEPA Region 9

Provide an overview of the studies conducted regarding characterization of the site and a discussion of the options being considered for site remediation. EPA is getting ready to release its remedial investigation report, which will show why there are no easy answers to cleaning up Palos Verdes Shelf.

Society of Environmental Toxicology and Chemistry-2006

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room GSBM 138

Session: Environmental Pollution

Chair: Lan Wiborg, City of San Diego

- 156 2:00 USE OF *IN SITU* HATCHBOX STUDIES TO EVALUATE WATER QUALITY EFFECTS
Howard Bailey^{1*}, Ben Chalmers², and James Elphick¹ ¹Nautilus Environmental, San Diego, CA. ²Myra Falls Mine, Campbell River, British Columbia
- 157 2:20 EVALUATION OF IMPACTS AND BENEFITS ASSOCIATED WITH DISCHARGE OF TREATED EFFLUENT TO THE SANTA CLARA RIVER ESTUARY.
Bailey, Howard C.¹; Stransky, Chris¹; Kamman, Greg²; and Pfeifer, Dan³.
Nautilus Environmental, San Diego, CA. ²Kamman Hydrology and Engineering, nc., San Rafael, CA. ³City of San Buenaventura, Ventura, CA.
- 158 2:40 CHARACTERIZATION OF CHOLINESTERASES FROM TWO DEMERSAL FLATFISH COLLECTED NEAR A MUNICIPAL WASTEWATER OUTFALL IN SOUTHERN CALIFORNIA
Gabriela Rodriguez-Fuentes^{1*}, Daniel Schlenk¹ and Jeff Armstrong².
¹University of California Riverside, Riverside CA ; ²OCSD, Fountain Valley, CA.
- 3:00 Break
- 159 3:20 TOXICITY IDENTIFICATION EVALUATION (TIE) CASE STUDY OF A GEOTHERMAL ELECTRIC PLANT LOCATED IN SOUTHERN CALIFORNIA.
John Rudolph, Chris Stransky, and Howard Bailey. Nautilus Environmental, San Diego, CA 92121.
- 160 3:40 EXTENT AND MAGNITUDE OF COPPER CONTAMINATION IN MARINAS OF THE SAN DIEGO REGION
Kenneth Schiff^{*}, Jeff Brown and Dario Diehl, Southern California Coastal Water Research Project, Westminster, CA

Southern California Academy of Sciences 2006 Session Schedule

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio
Executive Center, Room 171

Session: RESEARCH PARTICIPATION PROGRAM

Chair: Richard Schwartz, RTP

- 161 9:00 **PHYSICAL ASPECTS OF SOUTHERN CALIFORNIA BEACHES AND HOW PEOPLE PERCEIVE THEM: CONSIDERATIONS FOR BEACH NOURISHMENT PLANNING**
Scott H. Grove, Sonora High School, La Habra, CA
- 162 9:20 **TRANSPLANTED XY SPERMATOGONIA STEM CELLS COLONIZE IN THE SEMINIFEROUS TUBULES OF XXY MICE**
B. Chuck, Calif. Inst. of Math and Science and Y. Lue, Department of Medicine, LABiomed at Harbor-UCLA Medical Center, Torrance, CA 90502
- 163 9:40 **COUNTING THE MICROINFARCT(S) IN SECTION R-19 OF A HUMAN BRAIN**
Huynh, Tommy, Alhambra H.S. and Neuroscience Method Research Group, University of Southern California, Department of Neurology, Los Angeles, CA, 90242
- 164 10:00 **MUTAGENIC ANALYSIS OF THE CYTOCHROME P450 14 α -DEMETHYLASE (CkCyp51p) TO AZOLE RESISTANCE IN *CANDIDA KRUSEI*.**
Da Eun Im, Calif. Inst. of Math and Science, Trang Phan, Hyunsook Park, and Scott G. Filler. Division of Infectious Diseases, Department of Medicine, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, CA 90502.
- 165 10:20 **FACTORS AFFECTING BALANCE AND PCP DISORDERS: THE INFLUENCE OF NATURAL STIMULI IN MICE UTRICLES YEAR 2.**
D. E. Lluncor Palos Verdes Peninsula High School and David Geffen School of Medicine at UCLA. Division of Neurobiology Head and Neck Surgery Laboratory of Vestibular/Sensory Neurobiology, Los Angeles, CA 90095.
- 10:40 – 11:00 **BREAK**
- 11:00 – 12:00 **Plenary Talk : Dr. Stuart Sumida**
- 12:10 – 1:40 **SETAC PLENARY SESSION**

Session: RESEARCH PARTICIPATION PROGRAM

Chair: Martha Schwartz, RTP

- 166 1:40 **EFFECTS OF STRESS AND EXERCISE IN BRAIN-DERIVED NEUROTROPHIC FACTOR EXPRESSION**
H. T. Luu, Alhambra High School, M. J. Chen, and A. Russo-Neustadt. Department of Biological Sciences, California State University, Los Angeles, CA, 90032.
- 167 2:00 **CAPILLARY ELECTROPHORESIS-BASED SELECTION OF APTAMERS WITH AFFINITY FOR PLATELET-DERIVED GROWTH FACTOR (PDGF)**
Hilary Ruiz, La Habra H.S., Arwen Brown, and Christina D. Smolke. Smolke Research Group, California Institute of Technology, Department of Chemical Engineering, CA, 91125
- 168 2:20 **MICRO PATHOLOGY LAB CHIP FOR DETECTING MOLECULAR LESIONS OF GLIOBLASTOMA**
C.Y. Suh Palos Verdes Peninsula H.S., and H. Tseng, University of California Los Angeles, Department of Pharmacology, Los Angeles, CA, 90096
- 169 2:40 **BIOARTIFICIAL HEART TISSUE: AN ELECTROACTIVE POLYMER FOR CARDIAC PATCHES**
Karis R. Tang-Quan, Palos Verdes Peninsula High School, Rolling Hills Estates, CA 90274. Mentor: Dr. Ben Wu, UCLA, Department of Bioengineering, Los Angeles, CA 90095
- 3:00 **BREAK**
- 170 3:20 **MYOSTATIN EFFECT ON BODY COMPOSITION IN GENETICALLY MODIFIED MICE**
D. Wu, Cypress H.S., B.D. Harvey, S. Porszasz-Reisz. College of Science and Health, Charles R. Drew University of Medicine and Science, 1731 E. 120th Street, Los Angeles, CA 90059
- 171 3:40 **HEAT SHOCK PROTEIN 70 (HSP70) EXPRESSION IN MULTIPLE SCLEROSIS**
Young, Amy. Alhambra H.S., Multiple Sclerosis Research Group. University of Southern California, Keck School of Medicine, McKibben Hall, 1333 San Pablo Street, Los Angeles, CA, 90033.
- 172 4:00 **DETECTION OF METAL FATIGUE AND DEFECTS BY ELECTRON WORK FUNCTION TOPOGRAPHY AND GRADIENT**
Geoffrey Woo. Palos Verdes Peninsula High School, Mentor Dr. Seth Putterman, UCLA, Department of Physics and Astronomy, Los Angeles, CA 90095.

- 173 4:20 **EXPOSURE TO HYPEROXIA DURING PERINATAL PERIOD DISRUPTS SPECIFIC PULMONARY ALVEOLAR EPITHELIAL-MESENCHYMAL SIGNALING PATHWAYS**
Sanvi Kabre, Sharon Sugano, Dr. John S. Torday, Dr. Virender K. Rehan
Dept. of Pediatrics and Obstetrics & Gynecology, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, CA.

Southern California Academy of Sciences 2006 Session Schedule

Saturday, May 13, 2006

Location: Drescher Graduate Campus, Graziadio Executive Center, Room 179

Session: Research Training Program.

Chair: Mrs Phelan

- 174 9:00 **INVESTIGATING PROTOCOLS FOR *HALIOTIS RUFESCENS* EGG CRYOPRESERVATION**
Julie A. Guerin. Cabrillo Marine Aquarium, San Pedro, CA 90731; Palos Verdes Peninsula High School, Rolling Hills Estates, CA 90274
- 175 9:20 **MEASURING THE PERCEIVED PREDATION RISKS IN HOUSE FINCHES IN DIFFERENT HABITAT TYPES.**
Singh, Deepak H., Whitney H.S., Fernandez-Juricic, Esteban, and Valcarcel, Anna. Department of Biological Sciences, California State University, Long Beach, Long Beach, CA 90840-3702
- 176 9:40 **EFFECTS OF TIDAL FLUCTUATIONS ON THE AVAILABILITY OF NITROGEN COMPOUNDS IN THE LOS ANGELES HARBOR**
Sanjit Datta. Palos Verdes Peninsula H.S., Cabrillo Marine Aquarium, 3720 Stephen White Drive, San Pedro, CA 90731
- 177 10:00 **A STUDY OF FECAL INDICATOR BACTERIA (FIB) IN THE BALLONA WETLANDS AND DEL REY LAGOON, LOS ANGELES COUNTY, CALIFORNIA.**
S. Yanamadala¹ and John H. Dorsey². ¹Chadwick High School, 26800 S. Academy Drive, Palos Verdes Peninsula, CA, 90274, and ²Loyola Marymount University, Department of Natural Sciences, Los Angeles, CA, 90045.
- 178 10:20 **ANALYSIS OF PHYSICAL PROPERTIES OF LINEAR ACCELERATORS USING MATHEMATICAL AND EXPERIMENTAL METHODS.**
J. Luo Alhambra H.S., and O. O. Bernal, California State University Los Angeles, Department of Physics, Los Angeles, California, 90032.

10:40 – 11:00 **BREAK**

11:00 – 12:00 Plenary Talk : Dr. Stuart Sumida

12:10 – 1:40 SETAC PLENARY SESSION

Session: RESEARCH PARTICIPATION PROGRAM (cont.)

Chair: John Dorsey, LMU

- 179 1:40 **THE NEW AND INNOVATIVE OPTIC ACCELEROMETER SENSOR**
R. Purasinghe, Alhambra H.S., Dr. Feng, and Dr. Kim, University of California
Irvine, Department of Structural Engineering, Irvine, CA, 92697
- 180 2:00 **ATAXIA TELANGIECTASIA AND DOSAGES OF BLEOMYCIN**
Sunghye Kim Calif. Inst of Math and Science, and Helen Chun California State
University of Dominguez Hills, Department of Biology, Carson, CA 90747
- 181 2:20 **A SCREEN FOR MUTANTS IN *DROSOPHILA MELANOGASTER***
WHICH AFFECTS TRIGLYCERIDE LEVELS.
Ryan Tam Alhambra H.S., and Daniel Yeh. Benzer Laboratories, California
Institute of Technology, Department of Biology, Pasadena, CA, 91125
- 182 2:40 **PERCENT METHYLATION AND ITS RELATIONSHIP WITH AGING**
Shelly Tat Alhambra H.S., and Dr. Shibata. USC Norris Cancer Center, 1441
Eastlake Ave. Los Angeles, CA 90033, Topping Tower 6410
- 3:00 **BREAK**
- 183 3:20 **COMPUTATIONAL ANALYSIS OF GRAINYHEAD-LIKE EPITHELIAL**
TRANSACTIVATOR (GET1) REGULATED GENES
Madhvi Venkatesh, University H.S., Ambica Bhandari, and Bogi Andersen,
University of California, Department of Biological Chemistry, Irvine, CA,
92697.
- 184 3:40 **MAKING CAMKII δ A BY THE ADENOVIRUS SYSTEM**
Tea, Nicky-Chai, Yan Bai, University of Southern California, Institute for
Genetic Medicine, Los Angeles, 90033
- 185 4:00 **PHOTOOXIDATION OF COBALT-BOUND THIOLATO LIGANDS**
May Chow, Alhambra High School. Mentor:
- 186 4:20 **THE EFFECTS OF THE HSR-OMEGA GENE IN *DROSOPHILA***
MELANOGASTER
William Martin, Benzer Lab, California Institute of Technology, Pasadena, CA,
91125
- 187 4:40 **FUNCTIONAL ANALYSIS OF THE MBNL3 PROTEIN**
Dan Qing Yan, University of Southern California, Institute of Genetic Medicine,
Los Angeles, CA 90033

ABSTRACTS – Program Order

1 STANDARDIZED METHODS FOR MONITORING PLASTIC IN THE MARINE ENVIRONMENT

Zellers, Ann, Algalita Marine Research Foundation 1021 N Harbor Dr.
Redondo Beach, CA 90277

As marine debris has become the focus of an increasing number of studies since the 1970's it has been found that this debris has a ubiquitous presence in almost every marine niche. At a 2005 conference titled "Plastic Debris Rivers to Sea" scientists from around the world confirmed the overwhelming presence of plastic in the marine environment. However, as a global problem, the quantification of plastic marine debris is too large for any company or government agency to handle alone.

In order to facilitate future analyses AMRF would like to propose a standardization of the data collection process, including guidelines for exchange of data and findings among interested parties. We propose such a "strawman" protocol for sorting plastic pollutants in water samples and in beach sand samples, based upon our experience over the last 7 years. Our suggested protocol addresses separating samples into their organic and non organic components, establishing size classes, color characteristics, material characteristics, etc. In the event pertinent data is acquired, either as a specific objective or as a by-product of other data collections in the field, we believe use of such a protocol would benefit a global body of researchers on an economical and timely basis. We would like to encourage the coordination and discussion of the use of such a standardized protocol.

2 PLASTIC DEBRIS, RIVERS TO SEA: AN OVERVIEW OF THE PROP 13 FUNDED PROJECT "ASSESS AND REDUCE SOURCES OF PLASTIC AND TRASH IN URBAN AND COASTAL WATERS".

C. J. Moore, G. L. Lattin, A. F. Zellers. Algalita Marine Research Foundation, 148 N. Marina Drive, Long Beach, CA 90803

Policies in California have been established to restrict trash and plastic greater than 5 mm in size through the process of regulating Total Maximum Daily Loads (TMDLs). In order to quantify debris not subject to regulation by TMDLs, a study was conducted by the Algalita Marine Research Foundation and the California Coastal Commission with funding by the State Water Resources Control Board to analyze plastic trash between 1 and 5mm in size as well as that >5mm from two Southern California Rivers; the Los Angeles River and the San Gabriel River. One of the most notable components of the plastic debris studied that is less than 5 mm was pre-production pellets. The results will be presented from the three areas of interest in the study: (1) Plastic industrial sites, (2) Mass Emission sites, and (3) Analysis of plastic particles for the sorption of POPs (Persistent Organic Pollutants). Plastic industry sites were studied to determine if voluntary Best Management Practices (BMP) had any affect on the amount of plastic debris found at the facility. The industrial site grounds where there was a potential for any runoff to reach the storm drain system and the nearest storm drain to each facility were sampled both pre and post BMP implementation and during both wet and dry weather conditions. Three mass emission stations; one on the Los Angeles River, and two on the San Gabriel River, were sampled using a Manta Trawl, Hand Nets, and a Streambed Sampler. Plastic particles and pre-production pellets between one and five millimeters in diameter were sampled from river banks and beaches

in the Los Angeles and San Gabriel Rivers' Watersheds, and subjected to Gas Chromatography-Mass Spectrometry (GCMS) analysis.

3 UNRESOLVED TECHNICAL ISSUES IN PLASTICS IN THE MARINE ENVIRONMENT

Tony Andrady PhD. Senior Research Scientist, Research Triangle Institute,
Durham, NC 27709

Despite the widespread interest in plastics as a persistent pollutant in the world's oceans, little is reported in the technical literature on the fate of the material in marine environments. The effectiveness of the environmental degradation mechanisms when operating under marine conditions has not been studied in sufficient detail.

This presentation will review what is known about the routes for degradation of plastics debris in the marine environment, the fate of common plastics likely to find their way into the world's oceans, and the impact of the partially-degraded plastic materials on marine life. Particular emphasis will be placed on the effect of microparticulate plastics on the marine ecosystem. While little is known on their interaction with marine life, the potential hazards associated with the material can be serious. There is an urgent need to generate the necessary data to either support or disprove these potential routes of damage to the marine ecosystem, the food web, and ultimately the fisheries resource.

4 MICROBIAL ACTIVITIES IN THE DEEP SEA

C. O. Wirsen, Woods Hole Oceanographic Institution, Biology Department Woods Hole, MA 02543

The deep sea is the largest continuous biosphere on earth. The understanding of microbial processes and biodegradation activities occurring in the deep sea is fundamental to questions of both a basic and applied nature. Over the past 30 years our research has concentrated on studying microbial populations both *in situ* and as pure cultures of isolated microbes. While metabolic processes are significantly reduced (several fold to more than an order of magnitude) in the deep sea compared to surface waters due to cold temperatures and high hydrostatic pressures, many microbes (psychrophilic and barophilic) found in this environment are specifically adapted to function well under these conditions. The deep sea is an oligotrophic or nutrient poor environment and it has been one of our approaches to study the growth of these populations and specific microbes using a variety of high pressure sampling and incubation equipment. A high degree of pressure adaptation can be found in organisms isolated from both nutrient rich (e.g. intestinal tracts) and nutrient poor environments in the deep sea. Certain biopolymers such as polyhydroxyalkanoates (PHA) and polycaprolactone (PCL) as potential substitutes for conventional plastics have been shown to biodegrade in the marine environment, albeit faster under optimum laboratory conditions in comparison to open marine conditions. If these materials are to be discharge into the marine environment along with conventional organic wastes, their biodegradability needs to be demonstrated and the discharge amounts should not follow previous examples of concentrated discharge in any one designated area (e.g. organic sludge disposal sites).

5 BIODEGRADATION TESTING METHODS FOR POLYMERS IN THE MARINE ENVIRONMENT

J. A. Ratto, R. Stote, J. Herbert, C. Thellen, U. S. Army Natick Soldier Center, Natick, MA C. Wirsén, Woods Hole Oceanographic Institution, Woods Hole, MA

The U.S. Army Natick Soldier Center (NSC) and Woods Hole Oceanographic Institution have done extensive research supported by the Naval Inventory Control Point (NAVICP), to evaluate biodegradability and toxicity of polymers in the marine environment. The goal for the U.S. Navy is to replace some of the conventional plastic used on board ship with biodegradable plastics, therefore, diverting some of the current plastic waste to the food/paper category so it can be disposed of in the marine environment. A laboratory respirometry test, ASTM-6691-01, "Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in the Marine Environment by a Defined Microbial Consortium" was developed to measure percent biodegradation as a function of time, using a consortium of marine microorganisms in an aerobic marine environment. Some of the biodegradable polymers tested to date exhibit acceptable biodegradation in comparison to some paper products currently being discharged into the ocean. ASTM D7081-05, "Standard Specification for Non-Floating Biodegradable Plastics in the Marine Environment" was also established to define plastic biodegradability in the marine environment. Closed (static) and open (dynamic) incubations, as well as coastal and deep sea mooring incubations can also be performed in conjunction with the ASTM method to evaluate levels of biodegradation. Data for each type of test method will be presented. Environmental Protection Agency approved toxicity tests have also been performed for a variety of polymers and none of the samples evaluated have shown any toxicity under the test conditions. Additionally, these biodegradable materials could be nutrient sources for microbes, plants and animals in the ocean.

6 SEABIRDS AS INDICATORS OF PLASTIC POLLUTION IN THE NORTH PACIFIC

D. Hyrenbach. Duke University Marine Laboratory, Beaufort, NC 28516. C. Keiper. Oikonos Ecosystem Knowledge P.O. Box 979, Bolinas, CA 94924. H. Nevins. BeachCOMBERS, Moss Landing Marine Laboratories, Moss Landing, CA 95039 and Oikonos Ecosystem Knowledge. M. Hester. Oikonos Ecosystem Knowledge. C. Moore. Alalita Marine Research Foundation, 148 N Marina Drive, Long Beach, CA 90803. J. Harvey. BeachCOMBERS, Moss Landing Marine Laboratories, Moss Landing, CA 95039

A variety of surface feeding seabirds that feed on fish, squid and zooplankton incidentally ingest floating plastic debris. Adults often feed these items to their chicks, with potentially detrimental effects on their growth and survival. Because far-ranging seabirds sample vast areas of the ocean, they can provide useful information about the incidence and distribution of marine plastic pollution. In the North Pacific Ocean, several surface-feeding seabirds, including the Laysan Albatross (*Phoebastria immutabilis*), Black-footed Albatross (*Phoebastria nigripes*), Northern Fulmars (*Fulmarus glacialis*) and Red Phalaropes (*Phalaropus fulicarius*) are especially susceptible to plastic ingestion. We review the literature for known impacts of plastic ingestion on selected North Pacific seabirds and identify several factors which contribute to increasing their susceptibility, including foraging mode, habitat, and body size. To illustrate the use of seabirds as bio-indicators of marine pollution, we present results of two studies: (1) plastic ingestion by beach-cast Northern Fulmars collected in California during 2003-2004 and (2) overlap of satellite-tracked Black-footed albatross (July-September 2004-2005) with the "Eastern Garbage

Patch”, a major area of debris accumulation in the Eastern North Pacific. The harmful effects of plastic ingestion, including the death of chicks and higher pollutant loads in adults, may further jeopardize the survival of the Black-footed Albatross, a species listed as endangered due to other human related sources of mortality associated with by-catch from longline fishing. Because plastic debris ingestion is a pervasive and increasing problem for seabirds, the study and remediation of marine pollution has important implications for global conservation.

7 DISTRIBUTION OF ANTHROPOGENIC AND NATURAL DEBRIS ON THE MAINLAND SHELF OF THE SOUTHERN CALIFORNIA BIGHT

S.L. Moore¹ and S. M. Walther². ¹Southern California Coastal Water Research Project, Westminster, CA, 92683. ²Los Angeles County Sanitation Districts, Carson, CA 90745.

Many studies have been conducted to quantify debris found along beaches; however, little information has been compiled about debris found on the seafloor. Here we summarize three trawl studies done in the Southern California Bight in the summers of 1994, 1998, and 2003 and one trawl study done quarterly since 1996 off the Palos Verdes Peninsula. For each of these studies debris was categorized, counted, and weighed. For the summer studies, natural and anthropogenic debris was widespread on the mainland shelf but was generally found in small amounts at any given site. Anthropogenic debris was most common in the southern and central regions, on the outer shelf and upper shelf, and in areas near publicly owned treatment works (POTWs). Plastic was the most common anthropogenic debris item found in both summer and quarterly trawls followed by metal debris and cans. Quarterly trawls show that anthropogenic debris is most commonly collected during the winter and least during the fall. The amount of debris collected during winter trawls is dependent upon the amount of rainfall for any given year. The deeper distribution of terrestrial debris for both summer and quarterly trawls, suggests that most of the anthropogenic debris in these areas may come from terrestrial sources.

8 INTEGRATING CURRENT SCIENCE INTO SCHOOL CURRICULUMS

Marcus Eriksen. Algalita Marine Research Foundation, 148 N. Marina Drive, Long Beach, CA 90803 **Amy Frame**. Environmental Charter High School, 4234 W. 147th St., Lawndale, CA 90260 .

High school textbooks are typically the last place current scientific knowledge is published. Educators that rely on textbooks as a primary resource to integrate science into the classroom may lose opportunities to interact with scientists and involve students in ongoing research. A partnership between the Algalita Marine Research Foundation (AMRF) and the Environmental Charter High School in Lawndale, California, provides a model for integration of marine science into school curriculum. AMRF investigates the impact of marine debris on watersheds and the marine environment. Since 2004, under the direction of AMRF staff, the inner-city high school students have investigated plastic debris on California beaches, wetlands, and inside seabirds. Results for students include greater interest and participation in science activities, relevance to their daily lives, and increased community activism. The success of this partnership relies on four characteristics: adequate funding, proximity between school and research lab, and receptivity of teachers and scientists. Several suggestions to create these partnerships include: (1) write both science and education components into grants, (2) create low-level internships for teachers or students, and (3) make student data significant to current research or community issues.

9 HEALTH EFFECTS OF PLASTICS: AN OVERVIEW

S. S. Mosko. Earth Resource Foundation, Costa Mesa, CA 92627

Numerous potential health risks stemming from petroleum-derived plastics have come to light in the last decade based on a wealth of animal and human studies. Depending on the type of resin in question, plastics can represent health threats at all three stages in their life cycle: synthesis, period of use and disposal. Either the actual building blocks of the resins or various additives later “mixed-in” (i.e. non-covalently bonded, allowing migration to occur) can be the focus of concern. An overview is presented of the literature on toxicities (endocrine disruption, developmental toxicity, carcinogenicity) associated with four common plastics.

a) Polyvinyl chloride

- vinyl chloride monomer, a known carcinogen, is released during manufacture.
- endocrine disrupting phthalate esters are added in large quantities as plasticizers.
- toxic heavy metals additives serve as heat/UV light stabilizers.
- dioxins are produced during manufacture and incineration.

b) Polycarbonates

- the building block is bisphenol-A, a synthetic estrogen.

c) Non-stick (e.g. Teflon) coatings

- perfluorooctanoate (PFOA or C-8), a known carcinogen that is used and produced during manufacture, is building up in human tissues.
- dangerous vapors and particulates are released at high cooking temperatures.

d) Polystyrene

- polymerization is never complete, allowing leaching of the carcinogenic styrene monomer.
- flame retardants (polybrominated diphenyl ethers or PBDEs), known to act as carcinogens and developmental toxins, can be present in high concentrations.

10 CLUES IN A MATCHMAKING MYSTERY: LINKING THE SEXES OF GNATHIID ISOPODS

L. Hanev. Los Angeles County Sanitation Districts, Marine Biology Laboratory, Carson, CA, 90745

Currently, 10 genera and 172 species of gnathiid isopods are recognized worldwide. These animals are widely distributed in marine habitats. They are found as free-living adults in benthic environments and as parasitic larvae on many teleost and elasmobranch fishes. In most instances, species designations are based solely on the morphology of the adult male; generally, the female and larval stages are unresolved. Male gnathiids have specific characters that help distinguish species rather easily. Conversely, females share similar gross morphologies and lack obvious defining characters. The same is true for larval forms. For this reason, identifications of females and larval forms are typically left at Gnathiidae sp. This leads to a loss of reported diversity, numerical abundance, and ecological data for this family of isopods. An extensive review of gnathiid morphology has provided clues to matching the males and females of particular species in the Northeast Pacific (NEP). The NEP fauna includes two genera and 12 species, four of which are new to science. While specimens of all forms of each species have not been attainable, sufficient material was found to make trends within the family clearer. A suite of morphological characters, used in combination, exhibit high fidelity between males and females. Based on these patterns and material available, it was possible to link the sexes for roughly half of the species. Using similar character combinations may provide useful clues to identifying the remaining NEP species couplets, once material for those are encountered.

11 HOLOTHUROID AND ECHINOID AGGREGATE BEHAVIOR ON THE EASTERN PACIFIC ABYSSAL PLAIN

K.D. Trego, Nautilus Oceanic Institute, La Jolla, CA 92037

Trawl samples and benthic imagery indicate that certain holothurians (*Abyssocucumis abyssorum*, *Oneirophanta mutabilis*, *Psychropotes longicauda*, *Scotoplanes globosa*) and echinoids (*Aporocidaris milleri*, *Cystechinus loveni*, *Cystocrepis setigera*, *Echinocrepis rostrata*, Echinothuridae) are found on the abyssal plain of southern California and Baja California. Abyssal trawl samples rarely contain large numbers of these species (e.g. *A. abyssorum*, *A. milleri*, *E. rostrata*) and may indicate the presence of aggregate numbers. Benthic imagery indicates that aggregate behavior of these echinoderms may take place on the abyssal plain. Holothurian and echinoid aggregations in response to food supply (kelp falls, detritus deposits, cold seeps, whale falls) have been seen in shallower depths. Kelp falls on the abyssal plain are rare and consist only of fragments. Detritus deposits on the abyssal plain have been seen to attract the holothuroid *A. abyssorum* and the echinoid *E. rostrata*. The holothuroid *S. globosa* has been seen at a cold seep location in the Peru-Chile Trench. Benthic ecologist Linda Kuhnz of the Monterey Bay Aquarium Research Institute reported the holothuroid *S. globosa* and the echinoid *C. setigera* were found at the whale fall in Monterey Canyon at a depth of 2890 meters. The holothuroid *P. longicauda* may be found in the vicinity of hydrothermal activity. A yellow color form of *P. longicauda* has been found in the Clarion Clipperton Fracture Zone at 5000 meters and this modification of the normal purple color may be due to exposure to sulfur in the substrate from a low hydrothermal flow.

12 SCALES OF VARIATION IN SMALL FISH MERCURY CONTENT – INITIAL FINDINGS

Jahn, A., B. K. Greenfield, J. L. Grenier. and S. Shonkoff. San Francisco Estuary Institute

Significant management actions are underway that have the potential to change mercury (Hg) concentrations in fish from San Francisco Bay. There is concern that extensive tidal marsh restoration could increase mercury in the food web. Small fish are a useful tool for monitoring inter-annual changes in methylmercury in aquatic ecosystems. They integrate finer-scale spatial and temporal patterns of methylmercury uptake into the food web, while providing more localized data than large fish. From November through December of 2005, we sampled small fish (Atherinopsidae and Gobiidae) from two basic mobility types (vagile and sedentary) at eight locations in the Estuary. Multiple composite samples of five to ten individuals each were collected at each sampling location, weighed, measured, and sent for whole-body analysis of total mercury concentration. Sampling location and fish size both affected Hg tissue concentration. With these factors accounted for, Mississippi silverside still had higher Hg concentration than other species tested, and silversides at southern sites had more Hg than fish in northern reaches of the bay. Cheekspot goby had higher Hg at Alviso Slough than at other south bay sites, but was not captured in North Bay. In topsmelt, samples from Alviso slough and Eden landing were highest in Hg, and those from Oakland Harbor were lowest, but fish from the most northern site, Benicia, were indistinguishable from those sampled at Newark Slough and Bird Island in the south. Bay goby, the only strictly subtidal species tested, had significantly lower Hg concentration than the intertidal species.

13 DISTRIBUTION AND IMPORTANCE OF AGE-0 ATHERINOPSID FISHES IN SOUTH-CENTRAL SAN FRANCISCO BAY

A. Jahn, C. Ehrler, and M. L. Elliott. Andrew Jahn Consulting, Ukiah, CA, Tenera Environmental, and PRBO Conservation Science

Through 20 years of dropped fish collections at the Alameda Point (San Francisco Bay) least tern colony, atherinopsids combined (but mainly jacksmelt) have comprised > 60% by number and (when measured) biomass. A sampling program using beach seines, purse seines, and neuston nets complemented a four-year study of tern chick provisioning. Fish accepted by chicks were mostly ≤ 83 mm TL and averaged about 15 mm smaller than the collected dropped fish. The median length of fish accepted by newly hatched chicks was about 40 mm. We rarely captured atherinopsids of this size in deep (> 8 m) areas of the bay. Larvae and small juveniles of all three native atherinopsids (jacksmelt, topsmelt, grunion) were captured in highest numbers throughout the summer in the intertidal zone and in two small embayments. The thalweg of San Leandro Bay, bordered by mudflat, produced the highest purse seine catches per unit effort, comparable to the highest densities taken by beach seine. At Crown Beach, the longest sand beach within the known foraging area for terns nesting at Alameda, catch rates of atherinopsids in the tern-diet size range were about 100 times greater at high tide than at low tide. The inferred, periodic movements of these fish appear to be a mechanism to avoid stranding on the adjacent tidal flat. Age-0 jacksmelt lose their affinity for the shoals, becoming ubiquitous over the bay after reaching about 70 mm TL. Their wider distribution and larger size-at-age appears to account for the numerical dominance of jacksmelt in the dropped-fish collections.

14 INVESTIGATION OF THE VIRTUAL ELECTRIC CHARGE EFFECT

Jennifer Nguyen, Milpitas High School, 1285 Escuela Parkway, Milpitas, CA 95035

The purpose of this investigation is to document the behavior and characteristics of a newly observed magnetic effect on charged particles. Based upon the behavior of electrons interacting with the effect, it is termed the Virtual Electric Charge Effect (VECE). Traditionally, the motion of charged particles in magnetic fields is governed by the Lorentz Force and visualized with the Right Hand Rule. Observations showed that the effect occurs under limited conditions and does not follow the Lorentz Force Law. The discovery of this new effect may explain other phenomenon involving magnetism, including the AB effect.

This project used directed testing to evaluate the nature of the Virtual Electric Charge Effect. A particle accelerator was improvised using an Oscilloscope CRT. In addition, magnetic field simulation software was used to validate expected results. Several permanent magnets of varying strength were tested repeatedly to show the effect of the magnet's poles on the motion and shape of the electron beam. The VECE had the North Pole repel electrons away from the pole and the South Pole attract electrons to the pole. The North and South Poles had distinctly opposite effects (i.e. one pole attracts and one repels). Notably, under VECE conditions, the Right Hand Rule demonstration fails when the magnet's pole is against the screen of the oscilloscope. Basically, when the VECE is apparent, electrons are affected by the pole in contrast to the typical demonstrations. Moreover, I discovered that as the strength of the magnet increased, the new effect became more pronounced.

15 EFFECTS OF VERTICAL DISTRIBUTION ON DISPERSAL POTENTIAL OF KELP SPORES

D.K. Cie and M.S. Edwards. San Diego State University, Department of Biology, San Diego, CA 92182.

Kelp forests are among the world's most productive ecosystems and serve as a key source of food and shelter for a wide range of species. Presently, the widely accepted theory of kelp propagation is that reproductive spores are passively dispersed along the benthos via advective and diffusive transport. However, it is possible that these spores can also be dispersed vertically towards the surface, encountering stronger unidirectional flow which may allow them to travel away from an existing kelp stand. The aim of this study is to address the effects of vertical distribution on dispersal potential of kelp spores. To address this theory, we developed a novel technique employing a vertical spore profiler (VSP) to collect settled spores at various heights off the substrate. Our preliminary data has shown that in addition to being dispersed within the first meter above the substrate, spores were able to travel as high as 10 meters from the benthos. To our knowledge, this is the first report of its kind. Currently, we are also investigating the effects of irradiance and grazing pressure throughout various levels in the water column. Information gained from this research may help elucidate the methods of vertical dispersal and the recovery of kelp populations, thereby contributing to the proper management of these natural ecosystems, and the understory communities that rely upon them.

16 CHANGES IN LATITUDES, CHANGES IN...MORPHOLOGY? STIPE HOLLOWING IN *EISENIA ARBOREA* (PHAEOPHYCEAE).

P.G. Matson and M.S. Edwards, San Diego State University, Department of Biology, San Diego, CA, 92182

Morphological variation is common in kelps (Phaeophyceae, Laminariales) and often results from differences in environmental conditions. Stipe hollowing, in particular, occurs in several kelp species worldwide but to date has been investigated for only a few species and primarily at local scales. Here we describe the patterns of stipe hollowing both within and among populations of *Eisenia arborea* across 800 km of its distribution along the west coast of North America. Our results indicate that there are large latitudinal differences among populations in both the occurrence of stipe hollowing (*i.e.* frequency of hollow stipes within a population) and hollowing extent (*i.e.* length of the hollow cavity relative to stipe length) in *E. arborea* sporophytes. Stipe length varied among our study locations with the most southern population exhibiting the tallest stipes, the most northern population exhibiting the shortest stipes, and the three central populations exhibiting intermediate stipe lengths. The occurrence of stipe hollowing and hollowing extent also varied along a latitudinal gradient, with the more southern populations exhibiting both increased frequencies of hollowing and greater hollowing extents. In fact, while hollowing occurred in almost all (97%) of the sporophytes examined at the most southern location, it was absent in the sporophytes examined at the most northern location. Finally, although stipe hollowing was more common in larger stipes across all locations, due to the overwhelming effect of location on the occurrence of stipe hollowing, stipe length alone is not a suitable predictor when considered across this species range.

17 DELAYED RECOVERY OF GIANT KELP NEAR ITS SOUTHERN RANGE LIMIT IN THE NORTH PACIFIC FOLLOWING EL NIÑO

M.S. Edwards¹ and G.Hernández-Carmona ¹Department of Biology, San Diego State University, San Diego, CA 92182 USA ²Centro Interdisciplinario de Ciencias Marinas. Ap. Postal 592. La Paz, Baja California Sur 23000. México

The giant kelp *Macrocystis pyrifera* forms extensive forests along the coastal zones of North America from central California, USA to central Baja California, México. Although the northern limit of the species' range is relatively stable near Point Año Nuevo, California, its southern limit has been dynamic during the past 20 years, varying over hundreds of kilometers along the Baja California peninsula. El Niño Southern Oscillations are a major source of this variability, causing devastating losses to giant kelp over hundreds of kilometers of coastline. Recovery following El Niño can be delayed and generally reduced by competition from the stipitate kelp, *Eisenia arborea*, which appears more tolerant of El Niño's low nutrient conditions and is able to recover more rapidly, form dense canopies, and prevent giant kelp from recovering to its pre-El Niño southern limit following El Niño. Following the experimental removal of the *E. arborea* canopies, however, *M. pyrifera* can recover to its pre-El Niño southern limit and form thick surface canopies. Results from this study suggest that while *M. pyrifera*'s long-term 'true' southern limit is set by unfavorable temperature and nutrient conditions and the availability of rocky substrates, shorter-term variability near this limit is regulated by increased mortality and recruitment failure from unfavorable temperature and nutrients, episodic events such as El Niños, and competition with *E. arborea*.

18 SANTA MONICA BAY NEEDS YOUR KELP!

Tom Ford and Laura Bodensteiner, Kelp Restoration and Monitoring Project, Santa Monica Baykeeper, P.O. Box 10096 Marina Del Rey, CA, 90295

The Kelp Restoration and Monitoring Project continues to expand its efforts both spatially and temporally along the rocky subtidal of Santa Monica Bay. Descriptions of our efforts and results will be the focus of the presentation. The first generation of giant kelp, *Macrocystis pyrifera*, individuals in our restoration sites off of Escondido Beach Malibu has reached maturity in two years. A one acre kelp bed has been produced through a combination of sea urchin relocation actions and assisted natural recruitment of kelp. This restored bed has been noted by aerial surveys performed by the Central Region Kelp Survey Consortium in 2004 and 2005. Restoration of another historic kelp bed was initiated off of Long Point, Palos Verdes in October 2005, where early results are already being realized.

19 CAN WE SAVE THE BIG FISH?

D. J. Pondella, II¹ and L. G. Allen². ¹Vantuna Research Group, Department of Biology, Occidental College, Los Angeles, CA 90041. ²Department of Biology, California State University, Northridge, CA 91330-8303.

Fisheries collapse and the decline of large fishes in marine ecosystems is a critical debate on a global scale. To address one aspect of this debate, we report on a single event, the removal of gill nets from the nearshore arena in the southern California bight, and examine this effect on large marine fishes from this ecosystem. The populations of four apex predators from coastal reef communities had either completely collapsed or severely declined due to over fishing prior to this management action. Both fisheries dependent and independent monitoring programs

demonstrated a return of white seabass (Sciaenidae: *Atractoscion nobilis*), soupfin shark (Triakidae: *Galeorhinus galeus*), leopard shark (Triakidae: *Triakis semifasciata*) and giant seabass (Polyprionidae: *Stereolepis gigas*).

20 REEF CHECK CALIFORNIA – A TROPICAL MODEL OF COMMUNITY MONITORING IN A TEMPERATE ENVIRONMENT

C.S. Shuman. Reef Check Foundation, 17575 Pacific Coast Highway, Pacific Palisades, CA, 90272.

For nine years, the Reef Check Foundation has trained volunteers to monitor coral reefs around the world and has engaged local communities in sustainable management programs. Noting that the threats to California's nearshore rocky reef ecosystem are similar to those faced by coral reefs, Reef Check is developing a new community-based rocky reef monitoring program in California. The development of the new monitoring protocol has involved important decisions such as which organisms could serve as the best indicators and the level of scientific rigor that is suitable for volunteer divers. Utilizing teams of trained volunteers, Reef Check California is building a statewide monitoring network to help collect the data needed to make informed management decisions while simultaneously building a constituency supportive of science-based management.

21 THE VALUE OF NET-CAGE MARICULTURE AS A FAD IN SOUTHERN CALIFORNIA.

C.T. Oakes and D.J. Pondella, II. Vantuna Research Group, Occidental College, Department of Biology, Los Angeles, CA, 90041.

Aquaculture impact studies are only beginning to assess the value of net-cages as habitats for wild fishes. Divers conducted monthly fish surveys for one year, from October 12, 2004 to November 17, 2005, determining species composition, abundance and size of all conspicuous fishes aggregating at a net-cage mariculture site in Catalina Harbor, California. Researchers observed high diversity ($H' = 2.29$) and abundance of fishes below the net-cage; 10,234 total with a mean annual density of 142 (SE ± 30)/100 m². At an adjacent reference reef, we counted 8,452 fishes with a mean annual density of 117 (SE ± 20). The second reference reef was a control located 500 m away that had 8,958 total fishes with a mean density of 124 (SE ± 20).

The soft-bottom habitat below the net-cage shared 1/3 of its species with both reference reefs, and mean density was not statistically different between the net-cage and reference reef 2, however it was greater than reference reef 1 ($H_{2,360} = 13.25$; $p = 0.0013$), suggesting fish attraction from the nearby habitat. Data on exploited fishes like *Paralabrax clathratus*, suggest an increase in species biomass at the reference reef adjacent the net-cage compared to the net-cage and distant reference reef ($H_{2,120} = 3.76$; $p < 0.01$). The net-cage also attracted a greater biomass of planktivores such as *Chromis punctipinnis* ($z'_{2,120} = 2.60$; $p = 0.03$). Similar densities with increased biomass may represent enhancement of the resources available to the fish community. This also represents a possible increase in fishing potential of the area outside the immediate impact zone of this mariculture operation.

22 **PRELIMINARY OBSERVATIONS ON THE LIFE HISTORY OF SALEMA
Xenistius californiensis FROM SOUTHERN CALIFORNIA.**

Eric Miller¹ Daniel Pondella ², and Kevin Herbinson ³. 1, MBC Applied Environmental Sciences, Costa Mesa, CA, 2, Vantuna Research Group, Occidental College, Los Angeles, Ca, 3. Southern California Edison, Rosmead, Ca.

Despite their commonality within southern California kelp beds, little information regarding the life history of salema (*Xenistius californiensis*) is available. Preliminary investigations into the age and growth of southern California salema suggest a species experiencing principal growth within the first two years before leveling off. The maximum verified age in southern California samples is 10 years. The von Bertalanffy growth parameters for all samples analyzed were $k = 1.9$, $t_0 = 0.332$, and $L_\infty = 162.209$ mm. Analysis of growth parameters by sex indicates females are typically larger than their male counterpart in each age class. Analysis of abundances per net from a nearshore gillnet survey ranging from Newport Beach to Santa Barbara, including Santa Catalina Island, conducted from 1995 – 2004 suggests denser aggregations ranging from Palos Verdes Peninsula south as well as relatively robust aggregations around Santa Catalina Island. Annual abundances per net also suggest greater reproductive output during ENSO events, as indicated by marked increases in the years following the 1997-1998 El Niño. Further indications of this warm-water preference are exhibited by the sharp decline in mean standard length of gillnet collected individuals in 1999, before a gradual increase over the next three years. Impingement sampling at local generating stations shows similar results with Age-II sized individuals constituting the majority of the 2000 sample. Females comprised a significant proportion of the sample observed during 2004. Gonosomatic indices suggest spawning principally occurs from late spring through summer before noticeably diminishing in early fall.

23 **INDICATORS OF GONAD STATE IN CALIFORNIA SHEEPHEAD
(*Semicossyphus pulcher*).**

Kerri A. Loke, Michael A. Sundberg, Kelly A. Young and Christopher G. Lowe
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California sheephead, *Semicossyphus pulcher*, are commercially valuable, protogynous hermaphrodites whose external morphology (color and head shape) changes as they transition. This study determined the reliability of using external morphology and sex steroid concentrations to predict gonad state and sought to find morphometric measures that would make sex determination in the field more accurate. Thirty sheephead were collected at Santa Catalina Island, external morphology was documented and gonads and blood were collected. A histological assessment of gonadal tissue was used to determine whether the fish was immature, female, transitional, or male, and whether they possessed functional gonads. Analysis of morphometric data showed morphology cannot be accurately used to sex sheephead; however, testosterone and estradiol concentrations, determined by radioimmunoassays on blood plasma were correlated to gonadal sex. Contrary to previous findings, non-breeding transitional fish were found during the breeding season. Estradiol concentrations were not detected among immature nor transitional fish; however, estradiol was detected in active males. Breeding female sheephead had the highest levels of estradiol. Testosterone concentrations were observed in all sexes caught during summer and did not differ among immature, female, and transitional fish; however, testosterone concentrations increased 4.4-fold in male blood samples as compared to these other groups. Therefore, steroid concentrations during the breeding season may be used to determine sexual state in this hermaphrodite. In addition, the presence of transitionals in the summer

suggests that fishing pressure may have skewed sex change during the breeding season, which could reduce overall reproductive output. [Supported by CA Dept. of Fish & Game 07304905].

24 DISTRIBUTION OF PLANKTON NEAR THE MONTEREY UPWELLING FRONT: RETHINKING THE CONCEPT OF PLANKTON AS INACTIVE "DRIFTERS".

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The accumulation of zooplankton at fronts has been known to science for centuries. However, zooplankton behavior is generally under-appreciated as a factor contributing to the observed aggregation of species. I examined zooplankton distributions in the vicinity of the Monterey Bay upwelling shadow front in an effort to resolve whether or not passive advection was the only factor in determining the distribution of different species along the front. On three transects, physical data were gathered to characterize the flow field within the study site, and vertical net tows were gathered in an array encompassing the front to reveal distributional patterns of plankton species. The distribution of planktonic eggs of both fish and invertebrates, which served as passive tracers, demonstrated that the front was strongly convergent along two of the transects, but exhibited transverse shear flow along the third transect where eggs skewed away from the front. Despite differences in flow patterns along the transects, the aggregation of zooplankton always occurred along the front, and the aggregation was stronger in some species than in others. Additionally, the extent to which particular species exhibited a distributional bias near the front was generally correlated with swimming speeds reported in the literature, whether the taxa was holoplanktonic or meroplanktonic, and the ontogenetic stage in question. These data indirectly suggest that plankton behavior, rather than passive advection alone, might account for some of the distributional bias near the front.

25 THE EFFECT OF THE SEA WATER WARMING TREND IN THE EASTERN PACIFIC OCEAN ON THREE DIFFERENT BREEDING TYPES OF DEMERSAL MARINE FISHES

Mike McCarthy, Dept of biology, CSU Fullerton

Sea water temperature change may be the single most important ecological parameter in the life cycle of marine fishes. It is well documented that sea water temperatures in the eastern Pacific have increased significantly over the last 40 to 50 years. An attempt was made to examine the effect of this warming trend on three different breeding types of demersal fishes - the viviparous (live bearing) Pink Seaperch (*Zalembeus rosaceus*), the ovoviviparous (larvae bearing) Stripetail Rockfish (*Sebastes saxicola*) and the oviparous (release of unfertilized sperm and eggs) Pacific Sanddab (*Citharichthys sodidus*). The data examined for this study were water temperature from Orange County Sanitation District (OCSD), Scripps Institute of Oceanography Newport Beach sea surface data, and fish abundance data from OCSD. Correlation analyses were conducted with historical sea surface temperature data from Newport Beach dating back to the 1930s with OCSD's more recent historical data. The correlation analysis between the two water temperature data bases was excellent. A warming trend as stated in other documentation was revealed, although more recent data countered with cooler temperatures. Fish abundance was definitely affected by ENSO events, but a clear advantage to one breeding type of fish was not established.

26 THE RELATIONSHIP BETWEEN EL NIÑO/SOUTHERN OSCILLATION EVENTS AND GROWTH OF JUVENILE WHITE SEABASS (*TRACTOSCION NOBILIS*)

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Since 1995, the Nearshore Marine Fish Research Program (NMFRP) at CSUN has been under contract with the California Department of Fish and Game and the Ocean Resources Enhancement and Hatchery Program to sample and determine the spatial and size distributions, seasonality, and abundance of white seabass (*Atractoscion nobilis*) in the shallow, nearshore waters of Southern California. One hundred sagittal otoliths were aged from each sampling year between 1997 and 2004. The hatch year of each fish was back calculated using the age at catch and the catch year. Growth rates are determined by using the means of standard length at age for each hatch year. Linear regression equations for each set of hatch year data provide a general growth rate for the first few years of life. The large time span of this study includes several El Niño/Southern Oscillation (ENSO) events of varying strengths, all of which caused noticeable changes in the sea surface temperature in the Southern California Bight. This study relates the growth rate of juvenile white seabass and the changes in the local ocean temperatures due to ENSO conditions.

27 LIFE HISTORY PARAMETERS AND COURTSHIP BEHAVIOR OF BLACK PERCH (*EMBIOTOCA JACKSONI*) WITHIN THE SOUTHERN CALIFORNIA BIGHT

Froeschke, Bridgette F. Nearshore Marine Fish Research Program, California State University, Northridge, Department of Biology, 18111 Nordhoff St. Northridge CA, 91330.

Black perch (*Embiotoca jacksoni*) are a common reef fish associated with nearshore habitats along California with the majority of the population occurring within the southern California Bight. Black perch were collected monthly from January 2004 to January 2005 with a Hawaiian Sling, as by-catch from the Ocean Resources Enhancement and Hatchery Program (OREHP) for white seabass and as by-catch from power plant collections. Animals were collected throughout southern California from Santa Barbara to Carlsbad including Santa Catalina Island. Specimens were collected and processed to determine their physical characteristics, growth, sex ratio, periodicity of reproduction and gestation. Additionally, courtship observations were conducted on SCUBA along the King Harbor Breakwall in Redondo Beach, California from January 2004 to December 2005 to verify periodicity of courting and the associated behaviors. Specimens ranged from 75-215 mm standard length and from 18-487 g in total body weight. Seven age classes were determined with the majority of the growth occurring between age class zero and one. The majority of specimens captured ranged from age class one to three. Pregnant individuals were recorded from December to May with the youngest pregnant female being age class one. Mean monthly GSI for males peaked from July to November with the highest mean occurring in October (GSI = 1.47). Courtship behaviors were seen among aggregations and in pairs from July to November, with the males being the primary aggressors. Courtship postures occurred along the bottom of the reef with pairs departing into caves for final copulation.

28 THINK SMALL: BENEFITS OF APPROACHING THE POPULATION GENETICS OF THE TIDEWATER GOBY (*EUCYCLOGOBIUS NEWBERRYI*) FROM THE LEVEL OF THE INDIVIDUAL.

Dent A. Earl, David K. Jacobs, Kristina D. Louie, Carlyne Bardeleben, Carles Vila & Camm C. Swift. Presenter's Contact: UCLA, Ecology and Evolutionary Biology Department, 621 Charles E. Young Drive South, Los Angeles, CA 90095. 310-206-7885, daearl@ucla.edu

In traditional population genetics, population level statistics have been used to describe relationships between populations. These traditional metrics, such as FST, can provide insight into levels of gene flow between populations.

However, in complex and dynamic population settings, such as seen in the tidewater goby (*Eucyclogobius newberryi*, Federally Endangered) metapopulation, these traditional metrics do not describe relationships between populations with sufficient resolution and the metrics can make no statements at the individual level. As a result of these limitations we have applied methods that consider individual fish in addition to traditional whole population metrics.

To this end we have applied the software package STRUCTURE to microsatellite data from tidewater gobies collected in the Santa Barbara region of California. Both of these packages make use of assignment tests, which cluster individual samples due to genetic similarity. We have compiled a detailed picture of apparent movement between goby populations using the output of this program, field data and natural processes information. These findings reveal a genetic structure that reflects the extinction-recolonization metapopulation process rather than a simple geographic structure. Approaching the data with more sensitive tests has helped further our understanding at both the level of individual migration and also within the scale of metapopulation dynamics.

29 THE EFFECTS OF DIEL AND TIDAL CYCLES ON THE ABUNDANCE OF HARBOR SEALS, *Phoca vitulina richardsi*, IN CHALK COVE, SANTA CATALINA ISLAND.

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The abundance and behavior of Pacific harbor seals (*Phoca vitulina richardsi*) was observed at Chalk Cove, Santa Catalina Island to determine how the seals use the cove. Seals were counted and observed over 24 hr periods and their behaviors were analyzed to determine whether there was evidence of diel or tidal cyclicity. There was no difference in the number of seals hauled out versus in the water; however, there were significantly more seals in the cove during the daylight hours than during dawn/dusk or night hours. The highest abundance of seals hauled out were observed during medium to medium-low falling tides and no seals hauled out during high tides due to the submerged rocks. Harbor seals show distinct diel and tidal patterns, which do not appear to be affected by human related activities (boating and kayaking) immediately adjacent to or within Chalk Cove.

30 PLASMA TESTOSTERONE LEVELS CORRELATE WITH SPERMATOGENESIS BUT NOT GSI IN MALE ROUND STINGRAYS (*UROBATIS HALLERI*)

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Round stingrays are a common near shore elasmobranch in southern California and are known to breed annually during the late spring- early summer. While breeding behavior, gonadosomatic index (GSI), and hormone levels correlate in some species, this is not true of all elasmobranchs. Previous studies have characterized the life history of the round stingray, while this is the first study to concurrently examine androgen levels and gonadal development in this species. We hypothesized that the annual cycle of testosterone in a wild population of male round stingrays was correlated with seasonal gonad development and spermatogenesis. Round rays were collected monthly for 12 months in Seal Beach, CA. Gonadal tissue and blood samples were collected for each ray, and processed for histological examination and analyses by radioimmunoassay, respectively. Seasonal changes in testes structure were categorized into three phases: inactive (May-July), recrudescing (August-October), and degenerative (November-April). The inactive phase is characterized by suppressed androgen levels and reduced GSI. During the recrudescing phase testosterone and GSI increases, and spermatogenesis is characterized by a transition from primary spermatogonia to later stages. The degenerative phase is characterized by a reduction in GSI and a further increase in testosterone levels. Interestingly, GSI peaked in October, 5 months before the established mating season, and peak sperm production occurred in December, two months after peak GSI and 3 months prior to mating. These results suggest that plasma testosterone is a more reliable indicator of seasonal maturation of testes in round stingrays than GSI.

31 CRANIAL ENDOTHERMY IN THE MOONFISH (*LAMPRIS GUTTATUS*)

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Billfishes, butterfly mackerel, tunas and lamnid sharks have evolved cranial endothermy by convergence. The moonfish (*Lampris guttatus*) shares certain behaviors and characteristics with these fishes: they migrate vertically within the water column, experiencing a wide range of seawater temperatures and rapid ambient temperature changes. The purpose of this study was to identify the heat producing structure and the heat retention mechanism necessary for cranial endothermy in moonfish. To identify the heat source and the heat retention mechanism we dissected several moonfish heads, and examined tissue samples using light microscopy and electron microscopy. To visualize and document the three-dimensional arrangement of these structures we used magnetic resonance imaging (MRI). To identify highly aerobic tissue that may serve as the heat source we measured citrate synthase (CS) activity from each extra-ocular muscle. The proximal lateral rectus extra-ocular muscle (PLRM) appears to be the primary heat source because it is adjacent to the brain, it has a high CS activity (an index of mitochondrial density and oxidative capacity), and it is perfused by blood vessels arranged as a putative counter-current heat exchanger (made up of numerous sets of thick-walled arteries surrounded by thinner-walled veins). We also found that the PLRM is well insulated by a thick layer of adipose tissue that reduces conductive heat loss from the PLRM to the water. By showing that moonfish possess a heat source and a heat retention mechanism necessary for cranial endothermy, this

study contributes to our understanding of the convergent evolution of endothermy in fishes.

32 THE POTENTIAL FOR LACTATE PROCESSING IN WHITE MUSCLE OF ENDOTHERMIC AND ECTOTHERMIC SHARKS

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During burst swimming, powered by anaerobic metabolism, lactate accumulates in the fast, glycolytic (white) locomotor muscle (WM) of fishes. Lactate dehydrogenase (LDH) activity, an index of fish anaerobic capacity, is higher in the shortfin mako shark than in leopard and blue sharks. The purpose of this study was to determine if the mako shark has a correspondingly higher capacity to reconvert lactate to glycogen during recovery from burst activity and if the WM has a higher capacity to resynthesize glycogen than the liver, red muscle (RM), or heart. Glycogen resynthesis requires pyruvate carboxylase (PC) or malic enzyme (ME) and phosphoenolpyruvate-carboxykinase (PEPCK) to synthesize phosphoenolpyruvate (PEP), and fructose-1,6-bisphosphatase (FBPase) to synthesize fructose-6-phosphate (F6P). We found no evidence that the WM can convert lactate to PEP because there was no detectable PC or PEPCK activity in any of the three shark species. Furthermore, PC was not detected in any tissue studied. In both mako and blue sharks, the liver, RM, and heart all had measurable ME, PEPCK, and FBPase activities, and thus should be able to resynthesize glycogen from lactate, but at low rates. In the leopard shark, RM and heart can convert lactate to PEP (both have ME and PEPCK), and the liver and WM can synthesize F6P (both have FBPase). Liver PEPCK and heart ME activities were significantly higher in the mako than in the blue and leopard sharks, indicating that the mako shark may have a higher capacity for glycogen resynthesis, corresponding with its higher ability to produce lactate.

33 'BUT YOU CAN'T TAKE THE COUNTRY OUT OF THE LARVA': SITE EFFECTS IN CALCIFIED STRUCTURES USEFUL FOR LARVAL TRACKING STUDIES

D.C. Lloyd and D.Z. Zacherl, Department of Biological Science, California State University, Fullerton, CA 92831, Georges Paradis and Mike Sheehy, MSI, University of California Santa Barbara, and Robert Warner, EEMB, University of California, Santa Barbara 93106

Statolith chemistry can be used to discriminate between sites of origin in *Kelletia kelletii* larvae. Previously, scientists assumed that variation in calcified part chemistry was largely determined by factors such as seawater element concentration and temperature. This assumption is well supported by laboratory culturing experiments; however recent field studies show weak concordance between seawater and calcified part chemistry. We hypothesize that natal site may affect statolith chemistry, and performed field and laboratory culturing studies to examine the effects of natal site, temperature and seawater element concentration on statolith chemistry. We reciprocally transplanted egg cases among three sites (Salta Verde Pt, Catalina, White Point, Palos Verdes, and Los Angeles Harbor) in the field, and among water from those sites in the laboratory. Culture temperatures varied from 10 to 18 °C. Newly laid eggs were used for culturing, and a subset was frozen prior to analysis to tease apart effects of intra-capsular element content versus other site effects. Analyses were via laser-ablation or solution-based inductively coupled plasma mass spectrometry. Seawater element concentration significantly affected barium and lead, and temperature was negatively correlated to strontium, barium and lead concentrations in statoliths. Site significantly affected lead and magnesium; L.A. Harbor statoliths had lower lead concentrations regardless of the temperature or seawater they were

cultured in, possibly due to physiological exclusion of lead. We show that temperature, seawater and natal site influence statolith chemistry, with important implications for environmental history reconstruction, and for use of calcified structures in larval tracking studies.

34 ECTOPARASITES OF FISHES ASSOCIATED WITH WASTEWATER DISCHARGE IN THE SOUTHERN CALIFORNIA BIGHT.

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The southern California coastal marine environment has been subjected to numerous inputs of pollution, however little is known about pollution effects on infestation of parasites on fishes. Pollution exposures may result in stress, potentially decreasing the immune response in fishes and increasing their susceptibility to diseases and parasites. A variety of marine organisms and tissues have been evaluated as potential biological indicators of pollution. However, due to the range of contaminants, contaminant concentrations, and exposure time that marine organisms experience, it is unclear which fishes and/or anomalies are relevant. During the Southern California Bight 2003 Regional Marine Monitoring Survey (Bight'03), selected marine fishes were collected using otter trawls from 79 stations adjacent to and away from four large wastewater outfalls and inspected for ectoparasites. This study evaluated the conditions around wastewater outfalls in terms of infestation of ectoparasites on fishes and examined if specific parasite and/or host species could be used as bioindicators of environmental stress in the Southern California Bight. Results showed many parasites had high host specificity, implying coevolution with their fish hosts, and high attachment-site specificity. Parasite prevalence and intensity varied according to host species, which suggests that some host species may be more resistant to parasitization or have evolutionarily lost their parasites. Hosts examined totaled 15,848 individuals representing 34 species, and ectoparasites removed totaled 14,620 individuals, comprised of monogeneans, leeches, branchiurans, copepods, and isopods.

35 THE OPTIC NERVE SHEATH DIAMETER IN ASSOCIATION WITH INCREASED INTRACRANIAL PRESSURE

Jarrold Larson, Mauricio Arcila, Elana Neches, John C. Fox, and Lynn Lulloff, University of California, Irvine Medical Center, Department of Emergency Medicine, Orange, CA, 92868

The objective of this research project is to determine if emergency department (ED) physicians can use bedside ultrasound (BUS) to accurately diagnose elevated intracranial pressure (ICP). Elevated ICP often forms from intracranial hemorrhages, cerebral edemas, or intracranial masses, such as tumors. Previous studies conducted have shown a correlation between elevated ICP and an increase in the size of the optic nerve sheath diameter (ONSD); however, only a limited amount of research has been performed in which BUS is used to determine the ONSD. In this research study BUS was used to measure the ONSD. The BUS results were then compared to the head CT scan results to determine whether a correlation was evident between the BUS scan and any elevated ICP findings from the head CT scan. Both BUS and head CT scans suggest that a patient with an ONSD greater than 5.1mm may have elevated ICP. From April 2005 to September 2005, 100 patients met the study's inclusion criteria. The study results determined that the mean ONSD of the left and right eyes were 4.7869mm (Standard Deviation [SD] 1.1779) and 4.7364mm (SD 1.2381) respectively. Five of the study's patients were found to have elevated ICP, and the mean ONSD of their left and right eyes were 5.08mm (SD 1.3554) and

5.12mm (SD 0.8349) respectively. The results from this research are ongoing, as not enough patients have been enrolled to positively conclude whether or not measuring the ONSD by use of BUS can be an effective modality in the diagnosis of elevated ICP.

36 THE RESPONSE OF FLYING INSECTS TO SCORPION FLUORESCENCE

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Scorpions fluoresce when exposed to ultraviolet light. However, since most scorpions are nocturnal, the idea that this fluorescence has an ecological function has not been explored. A first step in determining the plausibility of any hypothesis having to do with an ecological function of scorpion fluorescence is to determine whether other organisms respond to scorpion fluorescence under natural conditions. To determine whether or not some potential prey, specifically flying insects, respond to scorpion fluorescence under natural conditions, I compared the number of flying insects captured on sticky traps containing fluorescent scorpions to the number captured on traps containing non-fluorescent scorpions during both full and new moons. The results show that aerial insects avoid fluorescing scorpions during the full moon, when nocturnal UV light is at its peak, but not during the new moon when it is weakest.

38 CHEMICAL AND NON-CHEMICAL METHODS FOR REMOVING INVASIVE PLANTS: TWO CASE STUDIES

Nat Cox, Environmental Scientist, California State Parks, Angeles District

Invasive non-native vegetation poses a real threat to the integrity of indigenous plant and animal communities. The most damaging invasive species can fundamentally alter the composition of species in a community through direct or indirect competition for resources such as nutrients, water, sunlight, and space. The end product is a change to the functionality of the ecosystem as a whole at the expense of the native biota and quite often the physical features of the landscape itself.

Natural resource managers in the state parks system have been given the daunting task of assessing the extent of weed infestations in their parks. In doing so they must also prioritize which weed species and which individual weed populations pose the greatest threat to park resources. Projects are then designed to curtail the spread of the highest priority infestations into surrounding unaffected areas as well as to eliminate infestations altogether when economically feasible. The methodologies most frequently employed involve vegetation removal via mechanical means, chemical means, or some combination of the two.

At Pt. Dume State Preserve, ice plant (*Carpobrotus edulis*) was effectively removed by a combination of mechanical and chemical treatments. Solid mats of ice plant were sprayed in late summer/fall with a low concentration herbicide mixture of glyphosate and triclopyr. The edges of the ice plant mats were pulled free from the surrounding native vegetation and placed in the middle of the chemically treated area. The ice plant was left in place where it died. Natural recruitment of native species rapidly filled in the voids left from the dead ice plant

In Malibu Creek State Park, an ongoing effort is under way to remove non-native vegetation from riparian corridors primarily through mechanical means. Species such as

periwinkle (*vinca major*) and poison hemlock (*Conium maculatum*) are removed with hand tools, and cleared areas are subsequently planted with native riparian species such as California blackberry (*Rubus ursinus*), California rose (*Rosa californica*), bay laurel (*Umbellularia californicum*), and mugwort (*Artemisia douglasiana*).

39 THE BRADLEY METHOD OF "BUSH" REGENERATION

Jo Kitz, Program Director, Mountains Restoration Trust

Abstract not received

40 USING INTEGRATED VEGETATION MANAGEMENT TO CONTROL NON-NATIVE INVASIVE SPECIES AND RESTORE NATIVE ECOSYSTEMS IN THE SANTA MONICA MOUNTAINS"

Marti Whitter, Fire Ecologist, National Parks Service.

Abstract not received

41 title and abstract not received.

Ellen Mackey, Field Ecologist/Biologist, Los Angeles & San Gabriel Rivers Watershed Council

42 ROLE OF WATERSHED-SCALE PHYSICAL PROCESSES IN SHAPING HABITAT REQUIREMENTS OF RIPARIAN DEPENDENT FAUNA

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Watershed planning is becoming an increasingly common approach to management of aquatic resources and their sensitive fauna. Although watershed plans often address physical processes that affect the integrity of wetland habitats, they often fail to draw a direct connection between these processes and the habitat requirements for various life stages of sensitive wetland fauna. In this study, we evaluated the requisite physical habitat components for five Federally-endangered wetland and riparian dependent species and related them to the key hydrologic and geomorphic processes that influence the habitat viability for various life-stages. The species analyzed represented several taxa: tidewater goby (*Eucyclogobius newberryi*; an estuarine fish), southern steelhead (*Oncorhynchus mykiss*; an anadromous fish), the arroyo toad (*Bufo californicus*; an amphibian), and two migratory bird species, least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*). The physical habitat components necessary to provide key life functions of all the species analyzed were controlled by four geomorphic processes - hillslope sediment yield, mass movements and debris flows, in-channel sediment transport, and sediment storage, and three hydrologic processes - infiltration and interflow, runoff, and discharges from springs, seeps, and shallow aquifers. These processes operate at broad spatial and temporal scales and ultimately control the distribution of species within the watershed. Understanding the link between physical processes and habitat components is critical to the long-term protection and appropriate habitat restoration for these species.

43 STATUS AND DISTRIBUTION OF THE INLAND FISHES OF COASTAL SOUTHERN CALIFORNIA

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The approximately nine species of inland fishes of coastal southern California include two elements: (1) the southern extreme of a temperate coastal fauna (steelhead, anadromous lampreys, sticklebacks, sculpins) and, (2) relict, cool water, endemic freshwater species of the Los Angeles Basin (freshwater lamprey and the South Coast Minnow Sucker community [SCMSC] of Santa Ana sucker, arroyo chub, and Santa Ana speckled dace), dating from ancient hydrological connections with the Colorado River (to the east) and the Central Valley (to the north). The coastal forms often range as far south as northern Baja California. Most of the species were originally widespread on the well-watered Los Angeles basin and environs. Today the three SCMSC species occur together in only two places, lower Big Tujunga Wash (Haines Creek, Los Angeles River drainage) and the upper San Gabriel system (East, West, and North Forks, San Gabriel River). Santa Ana sucker and arroyo chub also occur in the middle Santa Ana River; farther upstream speckled dace occur in eight to ten scattered localities at the base of the San Bernardino, San Gabriel, Santa Ana, and San Jacinto mountains. Arroyo chubs also occur in a few drainages adjacent to the Los Angeles Basin and have been widely introduced elsewhere in coastal drainages. Ironically introductions have created extralimital fish communities more diverse than currently exist within their original ranges. In the thirteen years since the last summary, most of the local species have acquired special conservation status by being listed at the State or Federal level.

44 STATUS, DISTRIBUTION, HABITAT AND POPULATION SIZE-STRUCTURE ESTIMATES FOR THE THREATENED SANTA ANA SUCKER (*CATOSTOMUS SANTAANAE*)

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The federally Threatened Santa Ana sucker occurs presently in the lowland floodplain of the Santa Ana River, and mainly in the upland, mountain tributaries of the San Gabriel and Los Angeles rivers. An unlisted population is in the Santa Clara River, where it is thought to be introduced. An overview of the habitat of various life history stages (egg, larval, juvenile and adult) is given. A comparison of the results of population estimates by multiple pass depletion studies in the San Gabriel and Santa Ana Rivers are presented.

Population estimates in the summer months in the Santa Ana River by the multiple pass depletion method at three 100 meter sites showed no significant change over 5 years. For 3 of these years populations were also examined by snorkeling in the same river reach. Both methods yielded a rough estimate of one fish per meter over the approximately 7.6 kilometer study area. Populations are described in various important habitats, and recommendations for habitat protection and enhancement, and species recovery are suggested.

45 STATUS OF THE SANTA ANA SUCKER (*CATOSTOMUS SANTAANAE*) IN SOUTHERN CALIFORNIA: PATTERNS AND TRENDS IN CONDITION INDEX AND HABITAT PREFERENCE THROUGHOUT ITS RANGE.

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Five years of standardized samples of *Catostomus santaanae* (Santa Ana sucker) in the Santa Ana River (SAR) were compared among years, and with other lowland (Los Angeles and Santa Clara Rivers basins) and mountain (East Fork, San Gabriel River) populations. Using all fish collected each year, there appear to be significant differences in condition (two measures: mass divided by standard length [gmm condition] and observed divided by predicted mass [oe condition]) among years for the SAR samples (Kruskal-Wallis; $p=0$). However, there appear to be two size classes among the SAR samples, and after separating these data into the two size classes, there appears to be no difference among the small size class fish for oe condition (Kruskal-Wallis $p=0.14$). For the large size class for both condition measures, and for the small size class for gmm condition, there were significant differences among years (Kruskal-Wallis $p=0$ for all three of these). There appears to be a small and non-monotonic decline in gmm condition over the sampling years, and very little of this decline is accounted for by year. Comparing all fish from various sites, it appears that fish from the East Fork of the San Gabriel River have higher gmm condition than lowland fish.

Attempting to explain these findings, we document and compare habitat conditions. Based on separate habitat selectivity studies of suckers in lowland and mountain sites we find much more of the favored habitat present in the mountain sites, e.g. boulder-cobble-gravel substrate, greater depth and velocity.

46 RARE OCCURRENCES OF A COMMON SPECIES: SPECKLED DACE AND THEIR STRUGGLE FOR SURVIVAL IN SOUTHERN CALIFORNIA.

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Speckled dace (*Rhinichthys osculus*) are possibly the most widely distributed fish in western North America, occurring in nearly every major drainage from British Columbia, Canada to Sonora, Mexico. Until recently, descriptions of different forms of speckled dace have been difficult due to the wide range of habitats it occupies and high variability in body form. Of seven unofficially recognized subspecies statewide, only one is found south of Point Conception. Santa Ana speckled dace historically inhabited the upper portions of the Los Angeles, San Gabriel, and Santa Ana River systems. It currently occupies only remnants of its historic range, with a limited distribution restricted almost entirely to the headwaters of the Santa Ana and San Gabriel Rivers. It was petitioned for listing as endangered in 1994, but was denied because the subspecies was not formally described. A review of speckled dace natural history, regional taxonomy, and known local distributions are presented along with information from ongoing work to better define its taxonomic designation, present status and conservation needs.

47 TIDEWATER GOBY SEASONAL HABITAT PREFERENCES IN A NORTHERN CALIFORNIA LAGOON, WITH REFERENCE TO ARTIFICIAL BREACHING.

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Environmental factors contributing to seasonal tidewater goby (*Eucyclogobius newberryi*) habitat selection were investigated in the Lake Earl and Tolowa Lagoon system in Del Norte County. Lagoon morphology provides for a wide variety of water quality and habitat types available to tidewater goby during most of the year. Substrate type, vegetative cover, depth, water quality variables, artificial breaching of the sandbar, and other seasonal factors were analyzed in relation to all goby life-stages. Seasonal habitat preferences for spawning tidewater goby and sub-adult foraging, planktonic larval refugia locations, and stranding pools were identified. Initial results provide information on life history requirements characterization and habitat preferences for tidewater goby. A 25-square meter *Block-Net* drop trap sampling protocol provided a landscape-scale sampling tool for a more accurate measurement of species richness and diversity in shallower open water conditions. This study demonstrates the importance of a properly designed and implemented sampling program to assess species population densities with minimum disturbance and fish escapement. Four hundred and eighty sites were sampled during twelve months, providing a robust database on the seasonal ecology of invertebrate and fish assemblages in the lagoon system. Artificial breaching consequences on tidewater goby, such as stranding, were assessed seasonally.

48 IMPACTS OF EXOTIC SPECIES ON NATIVE AQUATIC SPECIES DISTRIBUTION IN TWO SOUTHERN CALIFORNIA RIVER SYSTEMS

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ECORP Consulting, Inc. (ECORP) conducted two years of exotic aquatic species assessment and removal technique evaluation in two river systems in southern California; San Mateo Creek and Santa Margarita River and San Mateo Creek. In 2004 and 2005, ECORP conducted habitat assessments and removal of exotic aquatic species in the lower Santa Margarita River and Estuary from March through September, 2004 and 2005. This effort was conducted to 1) reduce the potential for predation of tidewater goby, and 2) improve conditions for re-establishment of tidewater goby.

The Santa Margarita River historically supported four native freshwater fish species, including the partially armored threespine stickleback (*Gasterosteus aculeatus*), Pacific lamprey (*Lampetra tridentata*), steelhead (*Oncorhynchus mykiss*), and the Arroyo chub (*Gila orcutti*). The river is currently dominated by exotic species, such as common carp (*Cyprinus carpio*), black bullhead (*Ameiurus melas*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), redeye bass (*M. coosae*), mosquitofish (*Gambusia affinis*), bullfrog (*Rana catesbeiana*), and red swamp crayfish (*Procambarus clarkia*).

In contrast, the Santa Margarita estuary historically contained many native fish species, including the federally endangered tidewater goby (*Eucyclogobius newberryi*). The estuary also contains several non-native estuarine species, such as the yellowfin goby (*Acanthogobius flavimanus*) and several non-native freshwater fish species, mostly ictalurids and centrarchids that enter the estuary seasonally from upstream sources.

In August 2003, ECORP conducted habitat assessment surveys along 10 miles of San Mateo Creek in the Cleveland National Forest, followed by exotic species removal efforts in the upper 2.2 miles of the surveyed stream in November and December, 2003, and again in September and October, 2004. The study area included 46 pools that were treated using a variety of techniques. Five introduced aquatic species were encountered both in 2003 and 2004, including: bullfrog, black bullhead, bluegill, mosquitofish, and red swamp crayfish. Four native amphibian and aquatic reptile species were also observed, including Pacific treefrog (*Hyla regilla*), California treefrog (*H. cadaverina*), California newt (*Taricha torosa*), and western pond turtle (*Clemmys marmorata*).

The current populations of exotic and native species from the two stream systems are compared and contrasting impacts on the native species are examined.

49 EXTENT OF FISHING AND FISH CONSUMPTION IN VENTURA AND LOS ANGELES COUNTY WATERSHEDS IN 2005

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Although fishing is an important recreational activity in southern California, there is no recent description of its distribution in the watersheds. With increased focus on pollution control, there is a need for understanding the extent of fishing and fish consumption as a beneficial use in these watersheds. This study describes the extent of fishing and fish consumption in six watersheds of Ventura and Los Angeles County: Ventura River, Santa Clara River, Calleguas Creek, Malibu Creek, Los Angeles River, and San Gabriel River. Of about 46 freshwater fish species in these watersheds, 85% are introduced species. We conducted a field survey during January-December 2005 to census fishers by fishing areas (estuary/river mouth, coastal terrace streams, urban lakes, mountain reservoirs, and mountain streams) in the watersheds. Fishers were interviewed to obtain fish consumption information. Teams of two interviewers conducted surveys on four week days and five weekend days per month during this period. Sites were selected from a stratified random sampling design. In all, 273 site visits were conducted at 85 sites. We observed 1,244 fishers and 496 were interviewed; of these, 238 consumed fish they caught. Most fishers and consumers were at urban lakes and mountain reservoirs, fewer at mountain streams and estuary/river mouths, and least at coastal terrace streams. Stocked rainbow trout (*Oncorhynchus mykiss*), channel catfish (*Ictalurus punctatus*), and largemouth bass (*Micropterus salmoides*) were the most frequently consumed species. Information, including consumption rates, from this study will be used in Total Maximum Daily Load (TMDL) assessments of these watersheds.

50 THE CALIFORNIA NEWT: NATURAL HISTORY AND CHEMICALLY-MEDIATED INTERACTIONS

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The California newt (*Taricha torosa*) is a chemically-defended amphibian that spends several months out of the year on land, but returns to freshwater ponds and streams for several months to breed. During this annual aquatic stage, adult newts feed on a diverse diet including both invertebrates and conspecific embryos and larvae. Although much attention has been given to the conservation of this animal due to its listing as a Species of Special Concern, recent investigations have focused on the role of the newt's chemical defense, tetrodotoxin (TTX) in ecological

interactions. It appears that the toxin serves multiple functions, facilitating predator deterrence, cannibal detection, and mating attraction. Furthermore, larval and adult newt olfaction provides an intriguing physiological mechanism for context-sensitive behaviors such as predator avoidance and food search.

51 USING STREAM CHEMISTRY TO UNDERSTAND WATERSHED DYNAMICS

Helen Jung, Terri Hogue, University of California at Los Angeles; Laura Rademacher, University of Pacific; Sheila Morrissey, University of California at Santa Barbara; Tom Meixner, University of Arizona

Urban-wildland areas are periodically affected by wildfires. Post-fire changes in land cover (e.g. vegetation and soils) affect water quality as well as alter watershed flowpaths. The study of two burned watersheds located in the San Bernardino Mountains (City Creek and Devils Canyon) will further understanding of watershed response and long-term recovery in the wake of wildfires. The two watersheds are very close in proximity (~10km) and precipitation data, discharge patterns, geochemistry, and elevation are similar. Increased hydrophobicity alters hydrologic flowpaths by increasing overland flow and decreasing infiltration to the subsurface. Watershed chemistry can be utilized to understand the subsequent changes in hydrologic processes and explore the mixture of representative streamwater components. Geochemical data collected from streamwater, springs, soilwater and precipitation are used to determine the distribution of water and solutes in the contributing flowpaths within the watersheds. A chemistry analysis shows increases in cations (Ca, Mg, K, and Na), and decreases in Chloride in the stream after the fire. An End Member Mixing Analysis (EMMA) was used to predict the contribution of three components (soil water, groundwater and overland flow) in Devils Canyon from both pre- and post-burn periods during the rainy season (December to April). Stream water samples from immediate post-burn indicate components more similar to the precipitation end member, whereas samples from the pre-burn period are more similar to the groundwater member. Gradual recovery of the watershed is being evidenced by a return to soil and groundwater compositions.

52 INNOVATIVE MONITORING TECHNIQUES TO ASSESS WATER QUALITY LOADINGS FROM NATURAL LANDSCAPES

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One of the challenges in developing TMDLs and estimating pollutant loads in dry and wet weather discharges from coastal watersheds is accounting for the natural contribution of certain constituents from undeveloped catchments. The underlying geology in a watershed can directly affect constituent concentrations. Because of limited data on the contributions of pollutants from undeveloped lands, many TMDLs are written with load allocations based on data from other parts of the country, or anecdotal data from previous time periods. This can result in TMDLs with overly stringent load allocations. To meet the challenges associated with remote watershed monitoring, MACTEC Engineering and Consulting, Inc. has been working closely with the Southern California Coastal Water Research Project (SCCWRP) for the past 5 years developing innovative flow monitoring and automated sampling techniques to sample in remote watersheds to obtain natural, background concentrations of constituents. This presentation discusses some of the innovative techniques developed to successfully sample previously un-sampled undeveloped catchments during wet weather conditions. In addition, two distinct watersheds, monitoring strategies, and associated sampling methodologies will be discussed. Multiple bottle pollutograph sampling is conducted if 10 or more grab samples are required and/or the site is safe

for field crews. Hybrid automated sampling is the preferred method if site safety or lower analytical costs are a concern.

53 WATERSHED-BASED SOURCES OF TOTAL COPPER, LEAD AND ZINC IN URBAN STORMWATER

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Emissions of trace metals as wash-off during rain events have been shown to produce large loads in urban stormwater runoff. Little is known, however, about the watershed-based sources and factors that influence temporal patterns of watershed-based metals loading in surface waters throughout the urban Los Angeles region. This knowledge is important for developing predictive models and management strategies to affect overall watershed loading. The goals of this study were (1) to examine trace metal event mean concentrations (EMC), fluxes, and mass loadings associated with stormwater runoff from urban (developed) and undeveloped watersheds, and specific land uses; (2) to evaluate how trace metal loadings compare to loadings from point sources, and (3) to assess how the concentrations of total metals in runoff compare to published water-quality criteria. To achieve these goals, trace metal concentrations (e.g. copper, lead and zinc) were measured from eight different land use types over 11 storm events in the Ballona Creek, Dominguez Channel, Los Angeles River and Santa Monica Bay watersheds during the 2000/01-2004/05 storm seasons. In addition, runoff samples were also collected from eight mass emission sites (in-river) during 15 different storm events. For all storms sampled, the highest metal concentrations occurred during the early phases of stormwater runoff. Stormwater runoff of trace metals from watersheds produced a similar range of annual loads based on comparisons to annual load estimates from point sources. Mean fluxes at land use sites ranged from 23.6 to 1238, 0.1 to 1272.2, 6.1 to 33,189.3 (g/km²) for total copper, total lead and total zinc respectively. Industrial land use sites, contributed higher storm event mean concentrations (EMC) and fluxes of all trace metals than other land use types and were significantly different ($p < 0.0001$) from all land use sites except recreational. Mean mass emissions (ME) of total copper, total lead and total zinc were highest at agricultural, industrial and commercial sites. Nearly all land use sites revealed greater than 50% of total copper and total zinc runoff samples exceeding the California Toxics Rules (CTR) for acute freshwater criteria. Seasonal differences in metals loading were observed at both mass emission and land use sites. Early season storms produced significantly higher ($p < 0.0001$) metal loads than late season storms. Storm size was also significant ($p < 0.0001$) but only at land use sites.

54 STORMWATER TOXICITY EVALUATION OF MAJOR RIVERS ENTERING THE SOUTHERN CALIFORNIA BIGHT.

John Rudolph¹, Chris Stransky¹, Howard Bailey¹, Steve Bay², and Darrin Greenstein². ¹Nautilus Environmental, San Diego, CA, 92121 and ²Southern California Coastal Water Research Project, Westminster, CA, 92683.

In an effort to assess the overall ecological condition of the Southern California Bight, this project was designed to address the magnitude and persistence of toxicity in nine river discharges and a stormwater plume in Southern California coastal waters using gametes of the purple urchin *Strongylocentrotus purpuratus*. Magnitude of runoff toxicity was determined by collecting and testing samples from each river near its ocean discharge point and its offshore stormwater plume.

Samples were collected during three storm events (≥ 0.25 in.), which occurred on February 23, 2004 (eight rivers), February 12, 2005 (two rivers), and March 24, 2005 (seven rivers). Persistence of toxicity following a storm event was evaluated by testing samples collected one, three, and five days following each storm. Sample holding time effects were evaluated by re-testing selected samples on multiple occasions after collection. Test results and data analyses (e.g., among rivers and between years) are presented. Toxicity was observed in several rivers, but the degree of toxicity, when present, often varied substantially between samples collected immediately following each storm, between storm events, and during sample holding.

55 **QUANTITATIVE MICROBIAL SOURCE TRACKING USING *BACTEROIDALES* AND HUMAN VIRUS MONITORING IN CALLEGUAS CREEK WATERSHED**

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A new probabilistic microbial source tracking (MST) approach based on *Bacteroidales* and human-specific viruses was applied to provide quantitative, host-specific fecal source information for the development of a bacteria total maximum daily load (TMDL) for the arid Calleguas Creek Watershed in Southern California. This field study was the first to utilize a suite of TaqMan quantitative polymerase chain reaction (PCR) systems for *Bacteroidales*; targeting genetic markers for a universal sequence, as well as specific markers for inputs from humans, cows/horses, and dogs. Hollow-fiber ultrafiltration was used to simultaneously concentrate these anaerobic bacteria, along with adenovirus and enterovirus, in 73 100-liter samples collected from the watershed over the course of eleven months. Field- and laboratory-based validation tests using fecal and aqueous samples demonstrated the efficacy of each *Bacteroidales* marker. The marker sequence for universal *Bacteroidales* was detected in 100% of samples, allowing for the calculation of host-specific to universal *Bacteroidales* ratios, which are indicative of the relative abundance of each marker over space and time. One of the most prominent features of the MST dataset was the distinct bifurcation between wet and dry weather; cow/horse and dog concentrations and ratios were significantly higher during wet weather, while human ratios were lower. Such patterns suggest that frequent indicator bacteria water quality objective exceedances during wet weather are due to loading from non-human sources. Our MST "toolkit" of quantitative MST with *Bacteroidales* and human-specific virus monitoring proved useful for development of watershed-scale conceptual models of the fate and transport of bacteria derived from wastewater, domestic animals and livestock.

56 **DRY WEATHER RIVER RUNOFF IN THE SOUTHERN CALIFORNIA BIGHT**

Burton Jones Marine Environmental Biology University of Southern California

Dry weather river flow in southern California is generally not considered a major environmental concern in contrast to the considerable concern for wet weather runoff. While our major sewage outfalls are a type of river inflow, southern California, and in particular the region of San Pedro has significant continuous surface river inflow from the Los Angeles and San Gabriel Rivers. Because of their proximity, these two sources often appear as a single river plume extending along the coast from Los Angeles and Long Beach harbors. While not readily obvious in ocean color observations, the plume is clearly defined by its lower salinity compared to the ambient surface water. The plume is significant because of its potential to impact the physical dynamics of

the nearshore region, phytoplankton blooms that may include harmful algal blooms, as a potential pathway for contaminants from the watersheds to the coastal ocean, and perhaps the beaches.

57 SATELLITE VIEW OF STORMWATER RUNOFF PLUMES IN SOUTHERN CALIFORNIA

Nikolay P. Nezlin Southern California Coastal Water Research Project 7171 Fenwick Lane, Westminster, CA 92683-5218 USA

Spatio-temporal dynamics of stormwater plumes is being studied in different coastal zones of the Southern California Bight using SeaWiFS and MODIS satellite imagery. The total volume of precipitated water is a primary factor regulating plume size. This relationship is quantitatively different in different regions, and can be explained by the differences in watershed size, terrain, and land-use. The direction of plume propagation results from the near-shore circulation. In particular, during spring transition typical to California Current System, equatorward currents associated with wind-driven upwelling can transport stormwater plumes downcoast. The most pronounced plumes, characterized by high concentration of suspended inorganic matter, were observed within two-three days after rainstorms; later color shifts in the plumes indicate the presence of phytoplankton biomass resulting from their response to the nutrient loading of the plumes.

58 THE EFFECTS OF STORMWATER RUNOFF IN SANTA MONICA BAY

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Urbanization within the Los Angeles region has resulted in increased stormwater inputs to the coast. Stormwater runoff creates distinct plumes that are easily detected by their low salinity and high turbidity signatures. Several aspects of these plumes have been studied, such as increases in contaminants and human pathogens, but few studies have attempted to directly test the links between stormwater plumes and changes in the phytoplankton community. Shifts in the phytoplankton community have great potential to alter the functioning of coastal foodwebs. In addition, it is unknown how long and far these stormwater plumes may travel once they are formed, thus their effects may extend well beyond their local discharge region. During recent storm events, we collected water samples of stormwater from Ballona Creek and from several sites within Santa Monica Bay. The samples were analyzed for their nutrient concentrations, bio-optical properties, and phytoplankton composition. Nitrate concentration, total suspended solids, and colored dissolved organic matter were high in stormwater samples (approximately 35 μm , 46 mg l^{-1} , and 3.9 relative fluorescence units, respectively). In addition, preliminary analysis of phytoplankton samples from several sites within the bay revealed the presence of several potentially toxic species including *Pseudonitzschia* sp., *Dinophysis* spp., *Amphidinium* sp., *Cochlodinium* sp., and *Lingulodinium polyedrum*

59 HARMFUL ALGAE IN THE SOUTHERN CALIFORNIA BIGHT: PRESENT THREATS AND FUTURE CONCERNS

David A. Caron, Astrid Schnetzer, Rebecca Schaffner, Steffi Moorthi, Peter Countway, Beth Stauffer, Adriane Jones, Diane Kim and Billy Pan. Department of Biological Sciences, University of Southern California, 3616 Trousdale Parkway, Los Angeles, CA 90089-0371.

The coastline of southern California has not been immune to the perceived increase in the occurrence of harmful algal blooms in coastal waters globally. Resident harmful algae in the Southern California Bight include species of the dinoflagellate genus *Alexandrium* (a source of PSP) and the diatom genus *Pseudo-nitzschia* (a source of domoic acid). Most notably, blooms of *Pseudo-nitzschia* spp. and outbreaks of domoic acid toxicity have occurred in the Bight during the last five years. These outbreaks have led to significant mortality events for marine mammals and coastal bird populations. In addition to these known problems, occasional blooms of a variety of potentially harmful algae occur in the Bight, including dinoflagellates in the genera *Lingulodinium*, *Cochlodinium*, *Dinophysis* and *Prorocentrum*. These algae have the potential for toxin production but as yet none has been attributed to these species in local waters. *Lingulodinium polyedrum*, in particular, has caused massive (but thus far innocuous), red tides along the coast of southern California, and 'nuisance blooms' of species within the prymnesiophyte genus *Phaeocystis* have begun to appear. This talk will provide a brief overview of the known and potential problems facing coastal waters of southern California, and outline potential causes and concerns raised by the presence and increased frequency of these events.

60 PSEUDO-NITZSCHIA AND DOMOIC ACID IN THE LOS ANGELES HARBOR AND ADJACENT COASTAL WATERS

Astrid Schnetzer, David A. Caron, Peter E. Miller, Rebecca Schaffner, Adriane Jones, Diane Kim and Billy Pan, Department of Biological Sciences, University of Southern California, 3616 Trousdale Parkway, Los Angeles, CA 90089-0371 and Stephen Weisberg, Southern California Coastal Water Research Project, Westminster, CA 92683.

The Los Angeles harbor and adjacent coastal ocean have proven as a 'hot zone' for *Pseudo-nitzschia* and domoic acid over recent years. Since 2003, the region has become the focal point of several research efforts to investigate these toxic blooms. The impact that episodic river discharge into the San Pedro Bay may have on *Pseudo-nitzschia* growth and toxin production is the focal point of an ECOHAB program that encompasses a 400 km² study area from the Palos Verdes peninsula to Newport Beach. This area is periodically influenced by runoff from the Los Angeles River, San Gabriel River and Santa Ana River. Multiple surveys have been conducted to investigate the temporal and spatial relationship between nutrient input via river discharge as well as coastal upwelling and *Pseudo-nitzschia* abundance and domoic acid concentrations. We will present some of the findings from this research and discuss the environmental factors that may play a key role in the development of toxic events within the coastal waters off Los Angeles and Orange Counties.

61 DOMOIC ACID TOXICITY IN CALIFORNIA SEA LIONS (*ZALOPHUS CALIFORNIANUS*) STRANDED IN ORANGE COUNTY, CA, 2002-2006

Richard Evans, Michele Hunter and Meg Jones, Pacific Marine Mammal Center, 20612 Laguna Canyon Road, Laguna Beach, CA 92651.

Domoic acid, a biotoxin most commonly produced by diatoms in the genus *Pseudo-nitzschia*, has sickened or killed more than 250 California sea lions at the Pacific Marine Mammal Center in Orange County, CA since 2002. Affected animals characteristically are in good body condition, exhibiting seizures, tremors, disorientation, ataxia, head-weaving and/or a combination of these symptoms. Common pathological lesions associated with domoic acid intoxication will be discussed and illustrated.

62 DOMOIC ACID POISONING IN SEABIRDS

Susan Kaveggia, International Bird Rescue Center, 3601 South Gaffey Street, San Pedro, CA 90731.

There was no confirmation or documentation that domoic acid affected birds until 1991. In September of that year large numbers of ill Brown Pelicans and cormorants were observed along the California coast. Shortly thereafter the etiology was connected to the recent algae bloom of *Pseudo-nitzschia australis*. Since then there has been an alarming increase in domoic acid poisoning among the avian species. Little is still understood about the pathology between domoic acid and seabirds. A brief discussion of this subject will cover symptoms, treatments, and post-mortem findings that have been elucidated in the past few years.

63 RED TIDE BLOOMS (*LINGULODINIUM POLYEDRA*) IN SAN PEDRO BAY

Ivona Cetinic, Astrid Schnetzer, David A. Caron and Burt Jones. Department of Biological Sciences, University of Southern California, Los Angeles, CA 90089 USA.

During the period from March to September 2005, phytoplankton abundance, and physical and chemical parameters were measured at 5 stations in surface and subsurface chlorophyll maximum in San Pedro basin as a part of the ECOHAB study. During that time, large red tide blooms were observed, dominated by HAB dinoflagellate *Lingulodinium polyedra*. Evolution of the phytoplankton community in the water column of the coastal ocean may be driven by a combination of natural and anthropogenic processes. Some of the measured environmental variables driven by the mentioned processes, when coupled to observed blooms, point out possible triggers of red tide bloom initiation in San Pedro Bay.

64 THE WATER QUALITY TASK FORCE IN REDONDO BEACH; HOW A SMALL COASTAL CITY IS DEALING WITH RED TIDES AND FISH KILLS

Chris Cagle, Councilman, City of Redondo Beach, 415 Diamond Street, Redondo Beach, CA 90277.

Clean water is one of the keys to maintaining the health, safety and the economic well-being of residents, businesses and visitors. As a coastal community with a harbor, beaches and regional storm water facilities, Redondo Beach has unique challenges to protecting surface waters and ocean quality. Redondo Beach Councilman Chris Cagle will share his City's experience with Red Tides and the effect it has had on their harbor. He will explain what his community is doing about it and the work in progress of their Water Quality Task Force. He will also describe a community volunteer program being set up to deal with fish kills resulting from reoccurring Red Tides in King Harbor.

65 SOME ASPECTS OF MONITORING FOR TOXIC AND NONTOXIC BLOOMS (THE HABS AND THE HAB-NOTS) IN CALIFORNIA

Gregg W. Langlois, California Department of Health Services, 850 Marina Bay Parkway, Richmond, CA. 94804.

California has the distinction of having the longest established monitoring program for paralytic shellfish poisoning (PSP) in the U.S., dating back to 1927. The traditional monitoring method

employed by all states has relied on the analysis of bivalve shellfish samples for the presence of one or more known toxins. In the fall of 1991 domoic acid was identified in Monterey Bay. In response, the California Department of Health Services began analyzing samples for this toxin and concurrently developed a volunteer-based phytoplankton monitoring program as a potential early warning tool. Establishment of the phytoplankton monitoring program has resulted in the early detection of both toxic and non-toxic blooms as well as the quick determination of the causative organisms. This information has proven valuable for health officials responsible for managing toxic events and for informing the public about visible blooms. A review of the shellfish PSP toxicity data reveals a seasonal pattern with distinct periods of elevated toxicity. Analysis of this data in conjunction with remote sensing information and phytoplankton distribution and abundance data provides interesting new insight into potential environmental cues for toxigenic blooms. There is also tremendous variability in PSP toxin levels and spatial distribution from year to year. Analysis of domoic acid data also reveals a seasonal pattern of peak toxicity. Domoic acid concentrations in shellfish from nearshore monitoring sites have increased dramatically since 2000. The majority of *Pseudo-nitzschia* blooms, with the resultant increase of domoic acid levels in shellfish, have occurred between Santa Cruz and Los Angeles.

66 GOALS AND OBJECTIVES OF CALIFORNIA'S SEDIMENT QUALITY OBJECTIVES PROGRAM

Beegan, Chris. State Water Resources Control Board, Sacramento, California

The State Water Resources Control Board is developing sediment quality objectives and implementation policy for enclosed bays and estuaries. The two greatest hurdles associated with the development of sediment quality objectives are the limited ability to link sediment chemistry concentrations to biological impairment and the uncertainty associated with currently available tools and indicators. As a result sediments cannot be assessed, managed or regulated using the single line of evidence approach traditionally used in water quality programs. Instead this program will rely on a multiple line of evidence approach to make station level and station network assessment decisions. The goals of this program are to 1) establish a condition that is considered protective, and then develop, refine and validate the tools so that the condition of each station can be measured relative to the protected condition and 2) use multiple lines of evidence to assess the condition of sediment and 3) promote consistency and minimize the reliance on best professional judgment.

67 COMPARISON AND SELECTION OF SUBLETHAL SEDIMENT TOXICITY TESTS FOR USE IN EVALUATING SEDIMENT QUALITY

Young, D.* Bay, S.M., and D. Greenstein. Southern California Coastal Water Research Project, Westminster CA

The use of aquatic invertebrates for acute sediment toxicity testing to assess sediment quality is widespread and well standardized. Sublethal tests have the potential to detect effects at lower levels of contamination than acute tests. Sublethal toxicity tests have been developed for many different aquatic species, yet little is known about their comparability and reliability. The objective of this study was to identify a suite of sublethal toxicity tests that are reliable, ecological relevant, with diverse endpoints and exposure conditions. Several tests were investigated for their the sensitivities, comparability and applicability in a variety of situations. Six of the sublethal tests; (amphipod, *Leptocheirus plumulosus* 28-day survival, growth and reproduction;

polychaete, *Neanthes arenaceodentata* 28-day survival and growth; benthic copepod, *Amphiascus tenuiremis*, 14-day life-cycle; seed clam, *Mercenaria mercenaria* 7-day growth; lysosomal destabilization using the oyster, *Crassostrea virginica*; and sediment-water interface testing with embryos of the mussel *Mytilus galloprovincialis*) were compared. The sublethal tests varied in their relative sensitivity and they were not always more sensitive to the sediments than the acute tests. More information regarding the presence of sediment toxicity was usually gained by using the acute and sublethal tests in concert, compared to using either type of test alone. The *Neanthes arenaceodentata* 28-day survival and growth or sediment-water interface testing with embryos of the mussel *Mytilus galloprovincialis* were recommended as sublethal tests for assessing sediment quality.

68 A MEASURE OF BENTHIC INVERTEBRATE COMMUNITY CONDITION FOR CALIFORNIA BAYS AND ESTUARIES

J.A. Ranasinghe¹, S.B. Weisberg¹, R.W. Smith², D.E. Montagne³, B. Thompson⁴, J.M. Oakden⁵, D.D. Huff⁶, and C. Beegan⁷. ¹SCCWRP, Westminster, CA; ²Deceased; ³County Sanitation Districts of Los Angeles County, Whittier, CA; ⁴San Francisco Estuary Institute, Oakland, CA; ⁵Moss Landing Marine Laboratory, Moss Landing, CA; ⁶Oregon Dept. of Environmental Quality, Portland, OR; ⁷State Water Resources Control Board, Sacramento, CA.

An indicator of benthic community condition that combines four existing benthic index approaches was developed for California bays and estuaries. Habitat-specific versions of five benthic indices were developed for two soft-bottom benthic habitats. In each habitat, performance of the indices was evaluated individually and in combination using independent data rated by nine benthic ecologists. The five index approaches were based on (a) community measures, (b) presence, abundance and pollution tolerance of several species, or (c) mixtures of (a) and (b). A four-index combination (Benthic Response Index (BRI), Index of Biotic Integrity (IBI), Relative Benthic Index (RBI) and River Invertebrate Prediction and Classification System (RIVPACS)) had the highest accuracy and was selected as the indicator of benthic condition. This combination correctly classified as affected or unaffected 91.7% of the evaluation samples from the southern California euhaline bays habitat and 100% from the polyhaline San Francisco Bay habitat. The indicator was developed only in these two habitats because sufficient data for indicator development were available only here. Future indicator development in other habitats is anticipated once additional data are collected.

69 DEVELOPMENT AND EVALUATION OF CHEMICAL SQGS BASED ON BENTHIC MACROFAUNA RESPONSES TO SEDIMENT CHEMISTRY.

Kerry J. Ritter*, Steven M. Bay, and Robert W. Smith. Southern California Coastal Water Research Project, Westminster, CA.

Resource managers often rely on chemical indicators referred to as sediment quality guidelines (SQGs) to assist them in assessing the level of sediment contamination in our coastal waters. SQGs are typically derived from large data sets containing paired chemistry and toxicity data. However, calibrating SQGs to toxicity data, such as the survival of amphipods, to various contaminant concentrations in the sediment may not accurately reflect how benthic macrofauna, indigenous to the specific region or area, respond to the same chemical profiles. For example, some studies have shown that benthos may be more sensitive to anthropogenic impact than toxicity. In our presentation we consider the effectiveness of current SQGs for predicting the state of benthos and quantify some of the differences in responses between benthos and amphipod

survival with regard to different chemical concentrations. Finally we present an alternative chemical SQG specific to predicting the state of benthos in marine sediments.

70 DEVELOPMENT AND VALIDATION OF A MULTIPLE LINE OF EVIDENCE FRAMEWORK FOR INTEGRATING SEDIMENT QUALITY DATA.

Steven M. Bay*, Stephen B. Weisberg, and Jeff Brown. Southern California Coastal Water Research Project, Westminster, CA.

Many assessment frameworks have been developed for the characterization of sediment quality, most of which are based on the sediment quality triad of sediment contamination, toxicity, and impacts on resident biota. These multiple line of evidence approaches have been used extensively in site-specific assessments, but they are typically based on best professional judgment. This is difficult to replicate and is therefore problematic for applications such as sediment quality objectives that must be standardized across a wide variety of sites. A framework for integrating multiple lines of evidence (LOE) in a standardized manner was developed for use in California's sediment quality objectives program. The framework is composed of three steps: classification of each LOE into one of several categories based on response magnitude and certainty, integration of the LOE categories to evaluate the potential for chemically-mediated impacts and the severity of biological effects, and a final step of assigning an impact category to the data. The framework was validated by comparing the results for a subset of stations to the assessment obtained based on the best professional judgment of individuals with extensive sediment quality assessment experience. There was a high level of agreement between the impact category for a station obtained using the framework and the consensus category obtained using best professional judgment. The error rate in classification using the framework was similar to that present among professionals and there was no evidence of bias.

71 CITIZEN MONITORING STATUS AND TRENDS

Erick Burres, State Water Resources Control Board

Surface water quality continues to be major issue across the state and the nation. The great threat is non-point pollution. Citizen monitoring can and has addressed both data and pollution reduction. The Clean Water Team is the State Water Resources Control Board's citizen monitoring program. This presentation will give an introduction to citizen monitoring, its history within California, an update on current activities and its future roles.

72 CITIZEN VOLUNTEER BASED BENTHIC MACROINVERTEBRATE WATER QUALITY SAMPLING.

Rob Roy*, Coordinator, San Diego Stream Team, San Diego, CA.

The San Diego Stream Team (SDST) is a citizen volunteer based non-profit organization that conducts benthic macroinvertebrate sampling for water quality analysis using the Southern California Index of Biotic Integrity. The SDST identifies valued characteristics, the status and trends of biological resources in and around the aquatic environment, and evaluates the effects of various land uses on water quality. This presentation will give an overview of the history of the SDST and examples of the challenges and achievements of citizen monitoring.

**73 RECOVERY OF THE WESTERN SNOWY PLOVER AT SAND'S BEACH,
COAL OIL POINT RESERVE, SANTA BARBARA, CALIFORNIA.**

Jennifer Stroh. Santa Barbara Audubon Society & University of California's Natural Reserve System, Santa Barbara, California.

The Western Snowy Plover (SnPI) is a small, threatened shorebird. The coastal population roosts and breeds on sandy beaches throughout the west coast from southern Washington to Baja California, Mexico. Habitat destruction and increased human recreation on these beaches have caused their dramatic decline over the past few decades, leading to their protection under the Endangered Species Act in 1993.

Throughout its range, the SnPI depends on particular sites such as wide, flat beaches around river mouths or estuaries, and beaches that are backed by sand dunes and supplied with kelp. Sand's Beach, part of Coal Oil Point Reserve (COPR), is one of these sites. Due to habitat degradation and disturbance, SnPIs had abandoned Sand's Beach as a breeding site in the late 1970's, but would return every year during the winter. Active management was implemented for SnPI conservation in 2001. Five years later, over 400 SnPIs winter at Sand's Beach, double the number found when the program began. During spring and summer, one can observe up to 25 nesting pairs. COPR is first to demonstrate that breeding SnPIs may recover when appropriate management is applied. COPR SnPI management includes restoration, fencing, signage, and a docent program. Disturbance research indicates that the recovery would not have occurred without volunteer docents. SnPI Docents are crucial for the protection of SnPIs through friendly contact and education of beach users. By promoting public awareness, docents increase the effectiveness of other management efforts, such as signs and barriers. These combined management tools have made it possible to maintain beach access and recreation for the public while preserving habitat for the SnPIs.

**74 RAPID ACQUISITION OF CITIZEN SCIENTIST DATA ACROSS LARGE
DISTANCES: GRUNION GREETERS AND THE INTERNET ALONG THE
CALIFORNIA COAST.**

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Now in its fifth year, the Grunion Greeter Project involves citizen scientists monitoring sandy beaches throughout California for the elusive grunion, *Leuresthes tenuis*. Hundreds of volunteers attend workshops each year to learn how to observe this beach spawning fish during the peak season. We coordinate the project with our web site, www.Grunion.Org, in several ways. First, the site provides basic information about grunion and our citizen scientists, with links to news articles, photographs, and other media. Second, we recruit volunteers and show dates of training workshops, community partnerships, and detailed flyers. Third, after training, volunteers sign up for observations at specific times on designated beaches by using a password-protected pull-down menu. For each date, county and beach site, numbers of volunteers are displayed live, permitting individuals to determine where they are needed up to the time of monitoring. Fourth, the site contains an interactive questionnaire that Grunion Greeters complete after each observation, prompting input on the numbers of fish seen, any predators, weather and wave descriptions, and other comments, stored in an electronic database. Fifth, we post bi-weekly web updates throughout the grunion season with photographs and quotes from the Grunion Greeters, beach workers, and others, providing rapid feedback and a common experience between the different areas of the state. Finally, questions, comments, and results are rapidly exchanged via e-mail.

This use of high-tech web-based communication allows centralized rapid, consistent data acquisition from many observers over a large geographic area. Funded by California Sea Grant College, NFWF, and NOAA.

75 A THREE YEAR STUDY OF SEASONAL BACTERIAL CONCENTRATIONS USING VOLUNTEER ASSISTANCE.

L. Gilbane, K.A Snow, S.Aizawa, K.E. Flaherty, Y.J. Ralph, C.V. Wolfe, K. Kull and R.E. Pieper, Southern California Marine Institute, Terminal Island, CA, 90731.

Freshwater outlets in southern California, such as channelized rivers and storm drains, often have bacterial concentrations that exceed health standards, particularly after rain events. The goal of this study was to organize volunteer help in order to determine how bacterial concentrations of freshwater outlets influenced coastal waters. Sampling focused mainly on the Los Angeles River, its receiving waters of Long Beach Harbor, and adjacent recreational beaches. From 2003 to 2005, samples were collected seasonally and after the first flush (> 0.5 inches rainfall) for total coliforms, *E. coli*, and enterococcus. Results revealed that coastal waters were subject to high levels of bacteria, with the extent of contamination varying among years. Distinct wet and dry patterns in bacterial concentrations were seen with the largest number of stations in exceedance of health standards occurring during the first flush. Health exceedances occurred during all wet weather sampling at 25 to 100 % of the sites. Exceedances were also detected during three dry weather sampling events. Freshwater outlets into coastal waters showed plume-like effects over all three years, with high bacteria concentrations that abated as increased salinity and mixing occurred. Bacterial concentrations 1.5 miles offshore from the Los Angeles River were detected in exceedance concentrations during the every first flush. Volunteers made an important contribution to this study by collecting samples and reduced the total project cost. This study demonstrates the successful integration of volunteers in a multi-year study to collect needed data on seasonal and yearly variation of bacterial concentrations effecting coastal recreational waters.

76 FIRE-FLOOD-FISH: LOSS AND PERSISTENCE OF UPPER SANTA ANA RIVER SPECKLED DACE (*RHINICHTHYS OSCULUS*) IN SOUTHERN CALIFORNIA AND THE VALUE OF TIMELY HUMAN INTERVENTION.

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The advent of unusually extensive fires (10/21-11/4, 2003) followed by excessively damaging floods in 2003-04 in the upper Santa Ana River watershed stimulated discussions in resource agencies and the Southern California Native Freshwater Fauna Working Group about the advisability of fish rescue. In October 2004 Santa Ana speckled dace were taken from 3 streams

(Plunge, Lytle, Cajon) and placed in the care of Kerwin Russell of the Riverside-Corona Resource Conservation District. By this time significant flooding had already occurred in two other streams (City and Strawberry/Twin) where dace seemed to have been extirpated. Dace have persisted in the first three streams from which reserve populations were taken, but recent efforts to locate them in the other two heavily flooded streams have failed. Evidence of dace presence in all of these streams immediately prior to floods is presented. Debate continues on the advisability of reintroducing dace where extirpated. Historical and recent data is presented on patterns of fire, precipitation, flood and sedimentation intensity, and the nature of the habitat, geomorphology and anthropogenic events in the five stream basins to determine possible reasons for loss or retention of populations. Less, or non-fire/flood impacted streams were also examined. Fishes were only eliminated at sites with record peak flows, not rainfall, following 95% watershed burn.

The Working Group, which meets quarterly at Cal Poly University Pomona, provides an informal forum for individuals from agencies and academia to reach consensus on conservation and other issues.

77 TOOTH FRACTURE AND WEAR COMPARED IN A RANCHO LA BREA SABERTOOTHED CAT AND THE DIRE WOLF.

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Several extinct carnivores preserved in the Pleistocene Rancho La Brea deposits display a high incidence of teeth broken during life as compared with modern species. This might reflect greater prey consumption in the Pleistocene relative to the present. This possibility was considered in a previous study on *Canis dirus* which explored tooth fracture and wear between two localities at Rancho La Brea, in which significant differences were found. In this study, we compared tooth fracture frequencies and tooth wear in a different carnivore, *Smilodon fatalis*. Unlike many species of canids, felids tend to feed entirely on meat. We were interested in how a hypercarnivore would compare to a canid in terms of tooth wear and breakage, as canids may eat harder diets including items such as bone. Our results indicated that while *S. fatalis* fractured their teeth about a third more often than in a comparison locality, the difference was not significant. They did not exhibit heavier tooth wear either. This was a departure from the *C. dirus* data, and supports the likelihood of a difference in diet between the two species. In order to be sure that the age distributions of the two species are similar, and to eliminate the possibility of an age effect, we estimated individual age *S. fatalis* from pulp cavity dimensions of lower canine teeth. Like the *C. dirus* sample, pulp cavity analysis indicated no significant difference between pits in the age structure of the preserved populations.

78 EFFECTS OF OFF-HIGHWAY VEHICLE ACTIVITY ON THE MOJAVE DESERT BIOTA

Amy J. Arispe and Stephanie H. Diaz. Southern California Ecosystems Research Program, Department of Biological Sciences, California State University, Fullerton.

The frequent use of off-highway vehicles (OHV) within the eastern Mojave Desert may lead to the destruction of plant and animal habitats. The effects of OHV activity on the eastern Mojave Desert community were investigated by measuring the percent coverage of perennial plants and vehicle tracks, and the abundance of lizards and ant nests. OHV active areas were compared with protected National Park Services (NPS) land, which is closed to OHV activity. Measurements were taken over two days at two separate sites along an access road that divides protected land

from land open to OHV activity. Community composition on both sides of the road was similar, validating a comparison between the sites. Six line transects (100 m in length) at each site were used to measure the percent coverage of vehicle tracks and perennial plants. The abundance of lizards and ant nests was measured with belt transects (10 m wide and 100 m long). All two tailed t-tests between open and closed sites showed no significant differences for the measurements taken. The NPS land is recovering from past OHV use; the land has been protected since 1994, making the measured NPS and OHV sites both disturbed communities. The data were in the predicted direction yet no significance could be determined. However, future studies of broader regions may show an effect of OHV activity on the desert biota.

79 LATE CENOZOIC VOLCANISM NEAR BAKER, CA.

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Late Cenozoic volcanism in the eastern Mojave Desert, near Baker California, spans 13 million years. The earliest event from 12.8 to 13.0 Ma resulted in the emplacement of a hypabyssal sill of rhyolitic to trachydacitic composition. This was followed at 12.1 Ma by multiple flows of trachyandesite (pyroxene andesite), approximately 15 km to the west in the Halloran Hills. The most recent activity began about 7.5 Ma and has continued to the Holocene. The result has been trachybasalts (hawaiites) and basaltic trachyandesites (mugearites) of the Cima volcanic field. This study analyzed over 100 rock samples from three areas for 21 major, minor and trace elements. The data define a trend of high K_2O+Na_2O rocks that show minimal decrease in alkalis with decreasing silica content over time. Trace elements analyses for some of the pyroxene andesites and many of the basalts reveal that crustal contamination has played a role in their current geochemistry.

It is suggested that Cenozoic volcanism began during initial stages of late Miocene detachment and has continued to Recent time as upwelling asthenosphere has occupied the void created by the thinning lithosphere. The compositional variations reflect progressively deeper melting, from shallow crustal rhyolite and trachydacite to lower crustal pyroxene andesite, to lithospheric and asthenospheric mantle basalts. While past researchers have stressed the role of MORB-like partial melts generated from an underplated East Pacific Rise (EPR), this research suggests the volcanism is most likely a manifestation of crustal thinning and not directly related to subduction of the EPR.

80 THE EFFECT OF FEMALE CRICKET CHEMICAL CUES ON THE AGGRESSIVE BEHAVIOR OF MALE CRICKETS, *ACHETA DOMESTICUS*.

Leslie J. Buena and Sean E. Walker, California State University, Fullerton

Male house crickets, *Acheta domesticus*, show aggressive behavior to gain opportunities for mating events over other males. Female cricket chemical cues along with residency status should influence male aggression. I predicted that aggression would increase with higher levels of female chemical cues. Resident males should be more likely to exhibit aggression in the presence of female cues than in their absence. I observed male behavior in 14 cm x 26 cm containers with a sand substrate. These containers had previously housed zero females, one virgin female, two virgin females, or three virgin females for 48 h prior to trials. More encounters occurred when there were chemical cues from three females than from zero, one, or two females. Resident males showed more aggression and had more wins as female chemical cues increased. I also found that the intensity of aggression could be predicted

based on the age of resident and intruder males. Older residents and younger intruders were more likely to be aggressive. These data suggest that perceived resource value is an important factor influencing a male's decision to fight. I believe that male crickets are more active when they perceive high resource value and are more willing to take the risks that come with engaging in aggressive encounters when benefits outweigh the cost. The data also suggest that age and residency status may be important, influencing factors. This pattern may be a product of younger intruders having nothing to lose and the cost of territory loss for older residents.

81 WATER AND SEDIMENT QUALITY EVALUATION OF THE SANTA CLARA RIVER ESTUARY - ANALYSIS OF IMPACTS ASSOCIATED WITH THE DISCHARGE OF TREATED WASTEWATER.

Colvin, Molly; Bailey, Howard C.; and Stransky, Chris. Nautilus Environmental, San Diego, CA.

The City of San Buenaventura currently discharges a monthly average of approximately 7 mgd of tertiary treated effluent into Santa Clara River estuary. The discharge has been ongoing for approximately 45 years. The objective of this study was to evaluate whether chemicals in the effluent may be affecting water and sediment quality within the estuary. Extensive testing with a variety of both marine and freshwater species showed a low incidence and degree of toxicity, and limited exceedences of water quality criteria. The discharge generally did not appear to be associated with toxicity; causes of toxicity appeared to be localized, variable, and related to upstream sources or groundwater influence. The sediment quality evaluation indicated that contaminants of concern were generally below sediment quality guidelines, and most of the responses in the sediment toxicity tests were related to coarse substrate. Copper is a primary constituent of concern for the treatment plant based on frequent exceedence of current marine water quality criteria. However, relationships between copper and toxicity, in addition to a series of water-effect ratio (WER) studies suggest that concentrations of copper in both the WWTP discharge and estuary are below those of potential biological concern.

82 COMPARATIVE ANALYSES OF THE ENTIRE MITOCHONDRIAL *cox-I* GENE SEQUENCE ACROSS VARIOUS GENERA OF CHITONS

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Chitons (Polyplacophora) are very ancient and morphologically conservative members of Mollusca, characterized by having eight shell plates, a creeping foot, and radular teeth coated with magnetite. Sequence comparisons of partial mitochondrial cytochrome *c* oxidase subunit I (*cox-I*) gene sequence are extremely popular and thousands have already been obtained for chitons, but there are few studies where the entire gene has been sequenced for a selection of closely related genera. In ongoing studies, we are attempting this for a broad selection of the 90 genera of living chitons with the goal of investigating how this protein subunit is free to vary within chitons. We expect that a comparative analysis of the inferred COX-I amino acid sequences will reveal where natural modifications have survived the continuous process of natural selection, presumably without altering any critical COX-I function. Humans and other animals also have this gene and it is well known that amino acid mutations within a conserved region can result in developing genetic disorders within the human body. Variation within COX can lead to human disorders specifically mitochondrial disorders (providing energy for organelles) such as myoglobinuria, thus, we expect that chiton *cox-I* could serve as an appropriate model for understanding the protein in general. By designing new PCR primers that amplify

between the sequenced *cox-I* portion and adjacent mitochondrial genes we have already obtained complete *cox-I* sequences for selected chitons and are presently expanding this sampling of genera.

83 SEX DIFFERENCES AND GEOGRAPHIC VARIATION IN BODY SIZE IN THE WOLF SPIDERS *RABIDOSA RABIDA* AND *RABIDOSA PUNCTULATA* (ARANEAE: LYCOSIDAE)

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Spiders are a classic example of sexual dimorphism and numerous hypotheses have been put forward to explain the extreme sexual size dimorphism seen in some species. However, little work has evaluated geographic variation in sex differences in spiders. Utilizing specimens from museum collections and from our own collections in Texas and Ohio, we examined variation in carapace width, chelicerae length, and the length of leg I and IV in two different species of wolf spider, *Rabidosa rabida* and *Rabidosa punctulata*. *Rabidosa rabida* and *R. punctulata* are two closely related species that occur in old-field habitats and both forage from vegetation. We found significant differences in body-size between sexes, locations in both species. Females were generally larger than males, and spiders collected in Texas were larger than those from Ohio. In addition, there was a significant difference in sexual dimorphism across locations in *R. punctulata*. Females of the species are much larger than males in Texas and females are not significantly larger than males in Ohio. We also examined chelicerae size, a characteristic associated with prey capture, in both species. After controlling for size differences, females generally had larger chelicerae than males and in *R. rabida* there is a larger sex difference in chelicerae size in Texas when compared to Ohio. In *R. punctulata*, females have larger chelicerae than males but there are no differences among locations. Our results indicate that different populations of the same species can be different in their degree of sexual dimorphism.

84 DIFFERENTIAL EFFECTS TO DOPAMINE OXIDATION IN PC12 CELLS AND PRIMARY ASTROCYTES: A MODEL FOR NEURODEGENERATION?

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Among the various neurodegenerative diseases that affect many people, one that is gaining more recognition is Parkinson's disease. It is the destruction of the substantia nigra that leads to the progression and development of this disease. What is killing the neurons in the substantia nigra? The main culprits are reactive oxygen and nitrogen species (ROS and RNS). Looking at Parkinson's disease from a biochemical standpoint, observations support the generation of ROS and RNS by a marked increase in the presence of superoxide dismutase and a decrease in glutathione (GSH). The oxidative state of the substantia nigra leads to the accumulation of free radical generators, like iron, low antioxidants, and damage and/or inhibition of complex I, through the production of ROS and RNS.

While exposing PC12 cells and primary astrocytes to varying concentrations of dopamine, results from MTT viability assay established the physiological concentration used in future experiments. There was no change in astrocyte viability, but an inverse relationship between PC12 cell viability and dopamine concentration. Data support the notion that in a co-culture system, astrocytes not only cope with the stress associated with dopamine but also protect

the PC12 cells either through uptake and/or breakdown of dopamine, or through the release of GSH to prevent oxidation. This is evident by an increase in PC12 cell viability when placed in a co-culture system. As a consequence of protecting the PC12 cells, the astrocytes up-regulate iNOS. Despite the occurrence of NO toxicity, this is incomparable to the harmful effects of dopamine oxidation.

85 PLEISTOCENE STRATIGRAPHY AND PALEOENVIRONMENT OF BAHIA SAN QUINTIN, BAJA CALIFORNIA, MEXICO

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A previously undescribed Pleistocene marine sedimentary deposit around Bahia San Quintin (Baja California, Mexico) was described and mapped to begin to reconstruct the paleoenvironment and the nature and the sequence of the depositional events.. This unit is unique in that it is extraordinarily rich in fossils and has sedimentary structures that indicate dynamic coastal processes related to changing sea level and the volcanic origin of the bay over the past 180,000 years. Using stratigraphic data and preliminary maps of the area an interpretation of the paleoenvironment has been constructed. The purpose of this study is to test the hypothesis that these sediments may be a record of the Sangamon Interglacial high stand of sea level.

86 EVALUATION OF ECOLOGICAL AND HYDROLOGICAL CONDITIONS IN THE SANTA CLARA RIVER ESTUARY WITH RESPECT TO DISCHARGE OF TREATED EFFLUENT.

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The purpose of this study was to identify areas in which the discharge of treated wastewater to the Santa Clara River Estuary may enhance beneficial uses. Key components of this study included evaluation of changes in habitat type and community assemblages over time, as well as changes in hydrological function. The estuary supports a number of species of regulatory interest, including the federally listed tidewater goby (*Eucyclogobius newberryi*). Moreover, it is located in a semi-arid region of California that has been subjected to intensive habitat and water development over time, making it problematic to establish baseline conditions. The ecological investigation relied on extensive historical information including USGS maps, aerial photographs, and anecdotal accounts from a variety of sources. Analysis of aerial photographs demonstrated that there were minimal changes in the relative composition of habitat types between 1929 and 2002. Most changes in flora and fauna could be attributed to development of the floodplain that has resulted in a decrease in estuary size of approximately 90%. The hydrological analysis used historical data, anecdotal evidence, and modeling to develop estimates for monthly flows under natural conditions. This analysis showed that the discharge accounts for a portion of the river flows that would historically have reached the estuary, but which have been diverted for other uses upstream. Overall, the analysis indicated that the discharge supports beneficial uses of the estuary, particularly by maintaining water quality and habitat.

87 TIERED AQUATIC LIFE USES FOR SOUTHERN CALIFORNIA COASTAL STREAMS

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The Los Angeles Regional Water Quality Control Plan identifies beneficial aquatic life uses and sets water quality standards to protect them based on the type of organisms present in a water body, i.e. cold water fish, estuarine species, etc. Tiered Aquatic Life Uses (TALU) is another approach to assigning habitat beneficial uses. The TALU framework tailors aquatic uses for a particular ecosystem by identifying tiers of use based on an analysis of (1) what aquatic life *is* present and (2) what *could be* there, i.e. what is the highest attainable use. The highest attainable use is set based on examination of historical conditions and healthy reference sites. Science, public input, and the regulatory agencies' priorities combine to determine goals for each water body. There are many potential benefits of TALU. By assigning beneficial uses more precisely, regulatory agencies can protect high quality waters and flag vulnerable waters where the biological condition is good but where significant stressors are present. Identification of these stressors may lead to prescriptions for improvement. TALU allows regulators to set more realistic goals for degraded waters and encourage incremental improvements. A TALU framework for southern California is being developed by USEPA, the LA Regional Water Quality Control Board, and an advisory group of aquatic ecologists. This project links to two USEPA initiatives: (1) *Use of Biological Information to Better Define Designated Aquatic Life Uses in State and Tribal Water Quality Standards: Tiered Aquatic Life Uses*, and (2) *Designated Use Plan*, demonstrating how a region can tailor the national model to local conditions.

88 DETAILED COMPOSITIONAL COMPARISON OF ACIDIC NSO COMPOUNDS IN BIODEGRADED VERSUS NON-BIODEGRADED ENVIRONMENTAL SAMPLES USING NEGATIVE ION ELECTROSPRAY FOURIER TRANSFORM ION CYCLOTRON RESONANCE MASS SPECTROMETRY.

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Knowledge of compositional changes due to crude oil biodegradation currently comes from geochemical research of oil reservoirs—not from surface contamination. Acidic NSO compounds, such as phenols and acids, have been used as indicators of microbial alteration. If these compounds provide evidence of biodegradation in the oil reservoir, one can infer that they may also provide clues to biodegradation in surface environments. Here we compare the compositional changes of acidic NSO compounds in a crude oil before and after biodegradation in the environment using ESI FT-ICR MS. Negative ion ESI allows for the selective ionization of acidic compounds while FT-ICR MS affords high enough resolution for a detailed analysis of a complex environmental sample. Crude oil contaminated soil samples were collected from an active biozone. In the non-degraded crude oil, nitrogen-containing compounds (e.g. N, N₂, NS, NO) comprised ~70% of the total relative ion abundance. Among these, carbazole-like compounds (N-containing compounds) accounted for ~50% of the relative abundance. In the more degraded crude oil samples, oxygen-containing compounds dominated the mass spectra.

These surface samples are likely the most biodegraded as the bacteria have ample supplies of oxygen and nutrients added to facilitate bioremediation. For the most shallow samples, O₂-containing compounds accounted for 55-60% of the total relative ion abundance—a ~50% increase from the non-degraded oil. As the degree of oxygenation increased, the relative abundance of nitrogen-containing compounds decreased by a factor of 5 (to ~10%). Consequently, the relative abundance of NO-containing compounds increased by a factor of 2.

89 EFFECTS OF SALINITY CONCENTRATION ON RATES OF POLYP CLONING, GROWTH, AND STROBILATION IN THE *AURELIA LABIATA* (CNIDARIA, SCYPHOZOA)

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The purpose of this study was to determine how increased and decreased salinity concentrations affect the developmental asexual stage in the life cycle of the *Aurelia labiata*. This species of jellyfish is known to be adaptable in the changing marine environments of coastal and harbor ecosystems, but environmental factors could influence their reproduction rates. After culturing from fertilized eggs, 10 similarly developed polyps on settlement plates were suspended in closed system tanks having salinity concentrations of 2.5%, 3.5% (control), and 4.5%. Four overlapping trials of 9-12 weeks were conducted, two using a freshwater base and two with a seawater base. Observations were made weekly and recorded onto templates of each plate. Results in the trials with a freshwater base were inconclusive due to unexpected distress and detachment losses of the control polyps, resulting in the decision to conduct two other trials with a seawater base and RO water. In the seawater based trials, all polyps in the 2.5% and 3.5% salinities survived and formed colonies. The rate of cloning, colonizing, strobilation and release of ephyrae was faster in the 2.5% salinity than in the control group, proving my hypothesis wrong that rates would be slower. No polyps in the 4.5% salinity level survived the lengths of the trials, as was expected. Results indicate that a lower salinity induces polyp cloning and strobilation. Investigating salinity ranges in the field where *Aurelia* are found, and salinity effects in combination with other environmental variations such as effects of increased ocean absorption of CO₂ (higher acidity) would be subjects of further research.

90 ASSESSMENT OF THE SELF-PURIFICATION OF A CONSTRUCTED WETLANDS AND THE EFFECTS OF POLLUTION ON THE BIOLOGICAL COMMUNITY.

I.R. Hajjali, S.A. Cardenas, T.A. Voung, R.B. Shah, J.Z. Liu, W.S. Liang, M.R. Robles, J.E. Krayer, L.A. Del Valle, and A. Lam, Ecology and Paleoecology Research Group, Pasadena City College, Natural Science Division, Pasadena, CA. 91106

In a world where life thrives on water, it is important to have methods that will secure the quality of water and provide the nourishment that the environment requires. In this study we observed the effects of pollution on a constructed wetland to determine the wetland's ability to reduce pollution levels. Through chemical tests and biological surveys, we were able to determine our wetland's efficiency in pollution reduction. Through chemical testing we found pollution reduction levels of up to twenty percent for phosphate, six percent for nitrate, one hundred percent for iron and ninety-two percent for copper. From the biological surveys taken, the bacterial counts and average diversity showed a substantial increase after the introduction of pollution. The protist population initially showed a substantial drop in numbers followed by a

notable increase. Our research has proven that the constructed wetland has the ability for self-purification.

91 A PRELIMINARY STUDY OF PLASTICS POLLUTION IN THE COASTAL WATERS AND BEACHES OF BAJA CALIFORNIA PENINSULA

ESTUDIOS PRELIMINARES DE CONTAMINACIÓN POR PLÁSTICOS EN AGUAS COSTERAS Y PLAYAS DE LA PENÍNSULA DE BAJA CALIFORNIA MÉXICO

Oce. **A. Raúl Herrera-Gutiérrez**, Cap. Charles Moore, M. C. Gustavo Riaño-Sánchez. Algalita Research Foundation and Asesores en Biología Pesquera, S.A. de C.V, BIOPESCA

A study was conducted of the coastal waters and beaches from Ensenada Baja California to La Paz Baja California Sur, during the months of November and December 2005. The goal of the study was to assess the concentrations of plastics in Mexican waters and on Mexican beaches. Beach sediment samples were taken by hand, and zooplankton samples by manta trawl on board the ORV Alguita. Plastics were found all along the Baja California Peninsula including some beach areas that are considered as natural reserves, where minimal human activity is supposed to take place. The point origin of most of these plastics is most likely nearby populated areas, but point of origin of some of these plastics is much farther away

Se realizó un estudio por las costas de la península de Baja California desde las costas de Ensenada, hasta La Paz Baja California Sur, durante los meses de Noviembre y Diciembre del 2005. El objetivo de esta investigación fue obtener una idea de las concentraciones de plásticos presentes en aguas y playas mexicanas. Se llevo a cabo diversos muestreos a lo largo de las aguas y playas de la Península de Baja California, a través de muestreos de zooplankton y de sedimentos de playas a bordo de la embarcación ORV Alguita. Se encontraron rastros de plásticos en todas las estaciones a lo largo de la península de Baja California, inclusive en algunas zonas asignadas como reservas ecológicas, en las cuales la actividad humana es mínima.

92 ANGLING-INDUCED BAROTRAUMA AND INITIAL CATCH SURVIVAL OF SOUTHERN CALIFORNIA NEARSHORE AND SHELF ROCKFISHES (SCORPAENIDAE, *SEBASTES* SPP.)

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Minimum size limits have not been considered a practical management tool for rockfishes because most rockfish suffer decompression injury (barotrauma) and positive buoyancy upon capture. However, little documentation exists regarding whether barotrauma in rockfishes is fatal. We collected nearshore and shelf rockfishes by hook-and-line in southern California between 18 – 177 m depth to characterize external and internal signs of barotrauma by species and depth, and to quantify initial survival 10 min after capture. The most common signs of barotrauma occurring in 166 rockfish (21 species) were subcutaneous gas (70%), hemorrhage (64%), and stomach eversion (63%). The incidence and extent of barotrauma was species-specific with species caught in deeper water (>58 m) generally showing a higher incidence of 4 or more traumas than species caught shallow (<58 m). Overall capture survival (n = 145) was 68%; however, species-specific survival generally did not decrease with depth. Of species with a sample size greater than 10, halfbanded rockfish (*Sebastes semicinctus*), flag rockfish (*Sebastes rubrivinctus*), and vermilion rockfish (*Sebastes miniatus*) showed the highest survival (>87%),

while rosy rockfish (*Sebastes rosaceus*) and olive rockfish (*Sebastes serranoides*) showed the lowest (<10%). The majority of rockfish showing signs of barotrauma survived, suggesting that evidence of barotrauma upon capture is not necessarily an indication of rockfish mortality. Assuming rockfish can be rapidly released back to the depth of capture, the potential for post-release survival may be greater than previously thought.

93 CAN MEDICAL STUDENTS LEARN AND RETAIN BEDSIDE ULTRASOUND? THE EVALUATION OF A FOURTH YEAR MEDICAL STUDENT ELECTIVE IN EMERGENCY ULTRASOUND.

Jarrold Larson, Graciela Barajas and John C. Fox, University of California, Irvine Medical Center, Department of Emergency Medicine, Orange, CA, 92868

While bedside ultrasound (BUS) has been incorporated into residency training in Emergency Medicine and has become an asset to emergency departments (ED) across the country, current U.S. medical school curriculum offers limited ultrasound training. In 2002, UC Irvine established the first medical student rotation in BUS in the ED. Through this rotation we tested whether or not medical students were able to learn and retain ultrasound skills. To complete this study, each student was given a thirty-five question test with an interactive DVD prior to and at the end of their rotation, as well as six months after the completion of their rotation. The test was also administered to a control group of students at the same time intervals without prior training. Over a nineteen-month period we enrolled 25 two-week rotation students and 20 four-week rotation students. When data analysis was complete, the mean pre-test score (PreTS) for all rotators was 46.9%, the mean Post-Test Score (PostTS) for all rotators was 75.7% ($p < 0.005$). The mean PostTS for the two-week students was 71.7%, while the four-week students scored 80.9% ($p = 0.003$). The mean scores on the 6-month follow-up exam were 69.1% for the two-week rotators, while the four-week rotators scored 76.9% ($p = 0.008$). The control group PreTS and PostTS were similar to the PreTS of the rotators ($p = 0.42$). The difference between the pre and post-test for the control group was not significant ($p = 0.116$). This study indicates that medical students can learn and retain BUS techniques through a structured rotation.

94 ECTOPARASITES OF THE CALIFORNIA SCORPIONFISH, *SCORPAENA GUTTATA*, IN THE SOUTHERN CALIFORNIA BIGHT.

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It is unclear to what degree parasites cause stress to their host and what long term damage occurs to host physiological responses. Chronic stress can inhibit an organism's normal physiological response to the environment. The California scorpionfish, *Scorpaena guttata*, is common in the Southern California Bight (SCB) and is frequently infested with ectoparasites. Of the 216 individuals sampled throughout the SCB, 210 were parasitized for an overall prevalence of 97.2% with an overall mean intensity of 48.2. This host harbored as many as eight species of parasites ranging in prevalence from 0.5%, *Elthusa californica* (Isopoda: Cymothoidae) to 88.4%, *Lepeophtheirus rotundipes* (Copepoda: Caligidae). The mean intensity of individual parasite species on *S. guttata* ranged from 1.0, *Holobomolochus spinulus*, *E. californica*, and *Elthusa vulgaris* (Copepoda: Bomolochidae, Isopoda: Cymothoidae, respectively) to 54.3, *Naobranchia scorpaenae* (Copepoda: Lernaepodidae). The range of intensity of the parasitic copepod *N.*

scorpaenae was from 0 to 321 individuals on a single fish. It was not uncommon to find fish with more than 100 individuals of this copepod parasitizing the gill filaments. The prevalence of *N. scorpaenae* at 78.2% was equally prominent. *Naobranchia scorpaenae* is a lernaeopodid copepod that is highly adapted to attach to the host's gill filaments using its modified maxilla. Most of the individuals recovered in this study had visible blood in the gut, presumably from the host's gill tissue. Infestation levels of ectoparasites were compared from scorpionfish collected at various predetermined stations in southern California, including those collected near wastewater outfalls.

95 MICROSATELLITE DNA ASSESSMENT OF MULTIPLE PATERNITY IN THE VIVIPAROUS ROCKFISH *SEBASTES MELANOPS*

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Three polymorphic microsatellite loci are being optimized and employed in a natural population of the viviparous Pacific rockfish *Sebastes melanops* to determine if multiple paternity occurs in brooded females, and to infer female mating strategies. Brooded females of *S. melanops* (n=14) were collected from nearshore reefs off Oregon to genotype mothers and samples of their brooded offspring (zygotes, embryos or larvae). DNA was extracted from three females and their progeny (n=90 per female), amplified by PCR, and assayed by polyacrylamide gel electrophoresis using a Li-COR DNA sequencing system. A one-sire null hypothesis (female monogamy and full-sibling relationships among brooded progeny) is being tested by conducting paternal allele counts and examining Mendelian segregation patterns in observed versus expected genotypic offspring ratios for the one-sire model. Early results of genotyped progeny from the first fully assayed female revealed four paternal alleles at one tetranucleotide-repeat locus, evidence of at least two fathers and polyandry in *S. melanops*. Brooded females of brown rockfish, *S. auriculatus*, from Washington and rosy rockfish, *S. rosaceus*, starry rockfish, *S. constellatus*, and greenspotted rockfish, *S. chlorostictus* from southern Californian have also been collected for future tests of multiple paternity across the species-rich genus *Sebastes*.

96 THE INFLUENCE OF ARTICHOKE THISTLE ON HUMMINGBIRD POPULATIONS

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Artichoke thistle (*Cynara cardunculus* L.), an invasive plant species disrupting coastal southern California, has been competing with rare, native plants in recent years. Hummingbirds feed on the artichoke thistle's large purple inflorescences, however preliminary observations suggested that hummingbird nests built on these plants often fail. It was hypothesized that hummingbird nesting success on live artichoke thistles would be lower than on native vegetation, mainly due to plant tensile strength. Nest searches and data collection were carried out from April to June, 2004 and May to July, 2005. A total of 59 active nests were found, all on artichoke thistle. Species using the nests were Costa's hummingbirds (*Calypte costae*), Anna's hummingbirds (*Calypte anna*), and Black-chinned hummingbirds (*Archilochus alexandri*). Thirty-eight nests were built on the dead stalks or inflorescences of artichoke thistle, and 21 nests were built on live artichoke thistle leaves. Approximately 24% of all nests were successful, which was within normal values presented in previous publications. Leaf and stem strength tests revealed that all nest locations were strong enough to hold a nest with two young, plus the mother. Failure of nests built on dead thistle was largely due to predation, but not to plant strength alone. In contrast, failure of nests

built on live thistle was hypothesized to be mainly due to plant strength and structure combined with nest placement, predation, and extreme temperature. Although artichoke thistle disturbs native plant species, it may ultimately provide a benefit for hummingbirds as both a nectar source and a nesting source.

97 A RETROSPECTIVE ANALYSIS OF GALLBLADDER PATHOLOGY USING BEDSIDE ULTRASOUND

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The objective of this research was to determine if emergency department (ED) sonographers could use bedside ultrasound scans (BUS) to determine gallbladder pathology. Pigmented and cholesterol based gallstones are thought to be the cause of most gallbladder conditions resulting in right upper quadrant pain. Both cholelithiasis, indicating gallstones within the gallbladder, and choledocholithiasis, indicating the presence of gallstones within the common bile duct were visualized using BUS. This study retrospectively reviewed 37 consecutive months of ED gallbladder BUS at a Level I trauma center. The ED Ultrasound Process Improvement Committee (EDUPIC) reviews all BUS to ensure proper BUS diagnoses. BUS results were compared to the EDUPIC and radiology results, and the EDUPIC results were compared to radiology as well. Of the 1690 gallbladder BUS that met the study's inclusion criteria, 575 received radiological imaging. When compared to the EDUPIC, sonographers were 88% sensitive (95% Confidence Interval [CI], 85-90) and 97% specific (95% CI, 95-98). When compared to radiology, sonographers were 88% sensitive (95% CI, 84-91) and 87% specific (95% CI, 82-91). The EDUPIC interpretation was 90% sensitive (95% CI, 87-93) and 90% specific (95% CI, 85-93) when compared to radiology. The results indicate ED sonographers are both sensitive and specific in the diagnosis of gallstones. These results also suggest that patients do not need to be subjected to the biological hazards resulting from CT scan radiation. Additionally, patients can benefit from a quicker and less expensive alternative when compared to radiological imaging, the most common modality for determining gallbladder pathology.

98 EUPHAUSIID SWARMS IN THE MONTEREY SUBMARINE CANYON AS SAMPLED WITH A REMOTELY OPERATED VEHICLE

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Euphausiids in the Monterey Submarine Canyon routinely form aggregations often exploited by numerous predator species. Our study examined influences of advection and variability in the species composition of euphausiid swarms at the shelf-break. In situ observations made in June, July and November, 2001 and August, 2002 with a Remotely Operated Vehicle permitted precise location of sampled swarms. Dominant euphausiid species were *Euphausia pacifica* and *Thysanoessa spinifera*. We observed significant overlap of their populations near the shelf-break, including dramatic variations in swarm species composition over small spatial scales (hundreds of meters), and over short time scales at the same location (daily). These observations, as well as moored acoustic data from a 12-day deployment at the shelf-break suggest the importance of advective mixing of krill populations at this location. Influence of advection on the fine-scale

distributions of krill was also indicated by acoustic scattering layers 1-5 m thick along the periphery of tidal flow maxima. These unique observations emphasize the importance of resolving plankton ecology at fine scales in dynamic shelf-break environments, where multiple species of this critical trophic level overlap.

99 EFFECTS OF ALTERED SALINITY DURING INCUBATION ON CALIFORNIA GRUNION, *LEURESTHES TENUIS*

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From early spring to late summer, California grunion (*Leuresthes tenuis*) ride with the high tides onto the shores of Southern California to spawn. The female fish dig into the sand and deposit their eggs, while the males deposit their milt around the females to fertilize the clutches. The clutches of eggs remain out of water incubating in the sand until the next high tide, synchronized with the lunar cycle. Although there are considerable advantages to non-aqueous egg incubation, there are also potential disadvantages, one of which is possible changes in osmolarity in the surrounding medium. The effects of different salinity levels on grunion eggs during incubation were experimentally tested, by comparing the embryo survival and hatching competence of eggs incubated in sand moistened with artificial seawater of five different salinities, including normal seawater at 34 ppt, and water of 15, 24, 41, and 49 ppt. Each set of grunion eggs were tested for hatching competence in two different hatching media: normal sea water and the salinity of incubation. Grunion embryos tolerated decreased salinity better than increased salinity during incubation, and hatched at significantly lower rates when the salinity was above normal. The hatching medium did not alter hatching competence of eggs within each treatment. This study has potential implications for possible effects on grunion for implementation of desalination plants on the coast, because after desalinization, concentrated seawater is released into the ocean. Funded by California Sea Grant College and Pepperdine University.

100 RELATIONSHIPS BETWEEN BODY SIZE AND SOUND PRODUCING STRUCTURES IN CRICKETS: DO BIG MALES HAVE BIG HARPS?

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The conspicuous acoustic signals of crickets are used to attract mates and to deter potential rivals. As such, there may be correlations between indicators of male quality or fighting ability (e.g. body size) and male signals. These are created when a male cricket closes his wings rapidly and a file and scraper mechanism cause an area of the wing called the harp to vibrate. Since the harp acts as a mechanical resonator, increases in harp area will result in decreases in the frequency of sound produced. If there is a positive relationship between harp area and body size, this would provide a mechanism which explains the often found correlation between body size and carrier frequency. We examined this in four different species of cricket, *Acheta domesticus*; *Gryllus bimaculatus*; *Gryllus rubens*; and *Teleogryllus oceanicus*. For each species we measured pronotum width as an index of body size, tibia length, and the area of the whole forewing and of the harp. There were significant differences among species in their morphological characteristics. In all but one species, tibia length, wing area, and the area of the harp were significantly correlated with body size. However, as body size increased harp area did not increase proportionally. This was expected because, in most species, females exhibit strong stabilizing selection on the carrier frequency produced by males and might constrain the evolution of

structures involved in male signaling. In conclusion, our data provide a potential mechanism linking decreases in song frequency with body size in male crickets.

101 LINKING THE STATOLITH CHEMISTRY OF *APLYSIA CALIFORNICA* TO WATERSHED DISCHARGE PLUMES ALONG THE OPEN COAST

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Biologists must identify the larval dispersal trajectories of marine organisms inhabiting marine protected areas (MPAs) in order to understand recruitment variability and population connectivity. Currently larval trajectories from populations inhabiting southern Californian MPAs, typically 2 – 3 km in length, remain unknown. However, the use of calcified structures such as fish otoliths and invertebrate statoliths as natural tags has enabled tracking of some marine larvae. Prior research indicates that along the open coast tags might exist at spatial scales of 10s of kilometers. We propose to validate whether or not watershed discharge plumes generate detectable watershed-specific tags at a spatial scale (<10 km) relevant for tracking larvae from MPA populations in southern California. In October 2005, we out-planted egg-masses of a model invertebrate species, *Aplysia californica*, at three MPA sites influenced by watershed discharge plumes along the open coast of southern California. Concurrently at each site, seawater chemistry, temperature and salinity were sampled to correlate statolith chemistry to seawater characteristics. Statoliths and seawater samples will be analyzed for elemental concentrations by inductively coupled plasma-mass spectrometry (ICP-MS) at the University of California Santa Barbara in July 2006. We predict that the out-planted *A. californica* statoliths will have watershed-specific tags. If detectable tags are validated, *A. californica* could be used in future studies as a model species to track larval dispersal among MPAs along the open coast of Southern California. Further, environmentally induced natural tags may be useful to track larval trajectories in other spatially close (<5 km) areas influenced by watershed discharge.

102 PHYLOGENETIC STUDY OF THE FLATFISH GENUS *PLEURONICHTHYS*

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The genus *Pleuronichthys* consists of seven species of right-eyed flatfishes found in the Pacific Ocean, five found of the coast of southern California. Although these fishes have been included in several family and order level phylogenetic studies, the relationships of the species within the genus are often incomplete and unresolved. I have attempted to gain better phylogenetic resolution by focusing specifically on the genus as the ingroup. I have collected seventy-four measurements and ten counts for all seven species in the genus as well as for seven pleuronectid outgroup taxa. I used gap coding to obtain discrete characters and a multiple outgroup approach to polarize the data. Using parsimony analysis, I generated trees using ordered and unordered characters. Ordering the characters yielded a tree with a monophyletic ingroup, a consistency index (CI) of 0.558 and a retention index (RI) of 0.6571. The unordered characters resulted in a similar tree (CI = 0.740, RI = 0.561) with two main differences: the placement of *Pleuronichthys cornutus* and the rooting of the tree. The resolved trees and implications of the differences between them will be discussed.

103 AN *IN VITRO* RISK ASSESSMENT MODEL FOR THE IMPACT OF PESTICIDES ON THE DEVELOPMENT OF T CELLS IN C57BL/6 MICE.

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Environmental toxicants, such as pesticides, have had severe consequences on the environment and the organisms that live in it. Although the effects of many pesticides on the reproductive system have been thoroughly studied, few scientists have tackled the study of their effects on the immune system. These studies are important because statistics have shown that today children are more prone to develop asthma and allergies compared to 10 years ago. The consensus among immunologists is that this is due in part to environmental influences on their developing immune systems, including during gestation. Previous studies of pesticides on the development of the immune system utilized gross assays of immune function, like cell counts and static immunophenotyping. We have undertaken the development of an accurate, sensitive *in vitro* risk assessment model for the effects of environmental toxicants on the development of the immune system. Our risk assessment model assays the consequences of prenatal pesticide exposure on the development of T cells. Our methodology uses day 16 or 17 embryos from C57BL/6 pregnant mice. Harvested thymocytes are exposed *in vitro* to combinations of antibodies that have been shown to induce the differentiation of thymocytes into mature T cells. Different concentrations of pesticide are added to the cells in the presence or absence of antibodies. Flow cytometric analysis is used to determine the phenotype of the resulting T cells. We have selected the pesticide methoxychlor as the first pesticide for analysis based on its established role as an endocrine mimic and known immune-endocrine interactions.

104 DETECTION OF QUORUM-SENSING COMPOUNDS IN PLANT-ASSOCIATED MICROORGANISMS.

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The mechanism known as quorum sensing (QS) is an environmental sensing system that allows bacteria to monitor their own population density and to couple cell population density with gene expression. Genes transcribed in response to QS mechanisms are diverse and involved in bioluminescence production, antibiotic biosynthesis, plant nodulation, biofilm formation, exopolysaccharide biosynthesis, and production of virulence factors, among others. In Gram-negative bacteria, most but not all, of the autoinducers belong to the family of N-acylhomoserine lactones (AHLs). In the last decade, a considerable amount of QS compounds (or autoinducers) has been detected in plant-associated bacteria. Most of these studies have been carried out with bacteria isolated from roots of temperate legumes. As far as we know, there are no screenings regarding the production of QS compounds on microsymbionts isolated from tropical plants. AHLs compounds are signal molecules and produced in very low concentrations. Therefore, they cannot be detected by chemical methods. The general aim of this work was to detect QS compounds in plant-associated bacteria from the tropics. We will show results about the use of different types of biosensors to detect AHL activity in supernatants of the bacterial strains.

105 THE USE OF MICROSATELLITE MARKERS TO EVALUATE THE GENETIC POPULATION STRUCTURE OF THE ROUND STINGRAY AT SEAL BEACH, CA

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Round stingrays (*Urobatis halleri*) are small, benthic elasmobranches with a range from Eureka, CA to Panama with high abundance in southern California. Most of the 500 stingray related injuries that occur annually during summer months are attributed to this particular species and the venomous barb located at the base of the tail. As part of an ongoing project to increase our knowledge about these animals, round stingrays were sampled monthly by beach seines from Seal Beach, CA from August of 2004 to December of 2005. Microsatellite markers were used to determine if the population at this location was the same year round, or if there were population shifts as previous tagging data have suggested. Out of 2,183 tagged stingrays, only 13 were recaptured within 1 km of Seal Beach. Thus far, one polymorphic microsatellite marker has been developed (Uha 170), and 28 different alleles have been recovered from the Seal Beach population over the sampling period of about 1.5 years. The allele frequencies for this locus show no major changes during the sampling period ($F=0.72$, $p=0.65$). We are in the process of developing new markers to strengthen our data set which suggests that the *Urobatis halleri* population is stable over time. We are also continuing our sampling during 2006, and we will present these data as well.

106 GSNO FORMATION IN ASTROCYTES AND NEURONS-IMPLICATION FOR NEUROTOXICITY

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S-nitrosoglutathione (GSNO) has been proposed to function as a modulator of the action of NO. GSNO has potentially significant roles in cell signaling and biological process through S-nitrosylation of proteins and modulation of redox status of cells by altering the GSH pool. To investigate GSNO formation under conditions that mimic NO production by iNOS during inflammation, we exposed primary astrocytes and cortical neurons to a long acting nitric oxide donor (DETA-NO), and measured GSH, GSNO and GSSG by HPLC. Exposure of both astrocytes and neurons to DETA-NO showed formation of GSNO and GSSG. Comparison of GSH/GSNO and GSH/GSSG ratios in both astrocytes and neurons showed both ratios decreased with increasing concentrations of DETA-NO. However, decreases in GSH/GSNO and GSH/GSSG ratios were more dramatic in neurons than in astrocytes, thus indicating a difference in rates of GSNO metabolism and GSSG reduction. Subsequently, the activities of GSNO and GSSG reductase were measured and compared. The activity of both the GSNO reductase and GSSG reductase in astrocytes were significantly higher than in neurons. Analysis of GSNO consumption in neurons and astrocytes by HPLC also showed a subsequent increase in the formation of GSSG. Taken together, the data suggest that the glutathione defense system in astrocytes is an efficient defense against nitrosative stress. This is especially important in the context of neurodegenerative disease associated with neuroinflammation where there is selective loss of neurons concomitant with a long lasting activation of iNOS.

107 GLUTATHIONE TRANSFERASE ACTIVITY IN 3 SPECIES OF SEA TURTLES, *CHELONIA MYDAS AGASSIZII*, *LEPIDOCHELYS OLIVACEA*, AND *CARETTA CARETTA*, FROM THE BAJA CALIFORNIA PENINSULA

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Sea turtles, all species of which are critically threatened or endangered, exhibit different dietary preferences based on life stage and species. Exposure to various toxicants may vary and require different detoxification strategies. Glutathione conjugation is an important detoxification mechanism for halogenated organic compounds which may be anthropogenic or natural. We examined the kinetics of basal glutathione transferase (GST) activity in liver tissue from 3 species of sea turtles – the herbivorous Eastern Pacific green, known locally as black (*Chelonia mydas agassizii*) and the carnivorous olive ridley (*Lepidochelys olivacea*) and loggerhead (*Caretta caretta*). Preliminary data suggest higher basal GST activity in *C. caretta* relative to the other species. Additionally, enzyme kinetic parameters (K_m and V_{max}) for glutathione, as well as the relative affinity (V_{max}/K_m) of GST for this substrate seem higher in *L. olivacea* than in *C. mydas*. These results suggest a possible difference in GST activity among species and may indicate a potential relationship between detoxification mechanisms and trophic level. Future research will include further examination of GST kinetics in sea turtles species, quantification of body burden of halogenated toxicants, and investigation of the biotransformation of natural halogenated products of dietary origin.

108 FIREBREAKS AND INVASIVE PLANT SPECIES

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Firebreaks are used by fuels management programs to stop, suppress or control fire behavior by manipulating plant in order to prevent costly damage. Previous studies have linked firebreaks to the establishment of nonnative invasive plants as a result of changing light levels, hydrology, and nutrient levels. Invasive species increase in abundance when an area is mowed or ploughed as a result of rapid growth rates and increased seed production which create persistent seed banks. The establishment of nonnative invasive plants within fuel treatments is a serious concern within the Whittier Hill-Puente Hill corridor because treated areas abut intact coastal sage scrub stands. We established belt transects across fire break/coastal sage scrub interfaces in order to examine the effect of fire breaks on cover, growth, seed production and seed banks of non-native species. We predict that non-native species will show increased growth rates and increased seed production in the firebreaks, and that seedbanks will be greater in firebreaks as a result. We also predict that the penetration of non-natives into coastal sage scrub will be related to the seed production and seedbanks present in adjacent fire breaks. Increased seed sources in a firebreak adjacent to coastal sage scrub may make coastal sage scrub more susceptible to invasion following large scale disturbance such as natural or prescribed fires. This is of particular concern because prescribed fires have been proposed as an alternative method of fuel control in the Whittier-Puente Hill Corridor.

109 AN OBSERVATION OF OYSTER SETTLEMENT OVER SEASONS FOR THE WEST COAST OYSTER, *OSTREA CONCHAPHILA*.

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Declines in populations of the native oyster, *Ostrea conchaphila*, have piqued recent interest in restoring its populations. Local population dynamics and persistence are influenced by the magnitude and timing of larval settlement. Thus, we examined factors such as temperature and salinity, which may influence larval settlement and examined settlement as a function of season. *O. conchaphila* settlement is thought to peak in the spring and fall months in California and Baja. Salinity and temperature vary in estuaries due to rainfall, freshwater input, distance from open ocean, oyster exposure to air temperature and water depth of oyster settlement. Salinity and water temperature ranges are crucial for adult survival and cue synchronized male spawning during reproduction. To observe variation in larval settlement density over seasons, artificial substrate tiles were placed in two separate estuarine locations in Newport Bay, CA and Carlsbad, CA. Temperature was monitored at each site every 15 minutes and salinity was measured by hand with a salinity probe at each tile collection. Tiles were collected and oyster settlers counted every two weeks during spring tides to pinpoint pulses in settlement. Preliminary results indicate that settlement is significantly higher at Newport Bay than at Aqua Hedionda only when pulses in settlement occur, and larval settlement is variable among months.

110 AN APPLICATION OF ISLAND BIOGEOGRAPHY THEORY TO RIPARIAN RESTORATION

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The theory of island biogeography says that species diversity on an island is controlled by its size and distance from the mainland. If a degraded landscape can be thought of as an "ocean" inhospitable to many species, restored and natural areas provide "islands" of habitat. There should then be a relationship between species diversity at a restored site and its distance from an established site. At three riparian restoration sites in northern Los Angeles and southern Ventura counties, transects were used to measure species richness and abundance. The Shannon-Weiner diversity (H') for each transect was then calculated and averaged for each site. The closest upstream established site to the restoration was located using a combination of fieldwork and aerial photographs. Distance between this site and the restoration ("site distance") was measured and regression analyses of distance vs. diversity and species richness were performed. The species richness per unit transect length vs. site distance regression yielded a strong negative relationship ($r^2=99\%$, $p=0.065$). There also appears to be an inverse relationship between H' and distance ($r^2=82.7\%$, $p=0.273$) and H' per unit transect length and distance ($r^2=67.1\%$, $p=0.389$), although results were not statistically significant. These findings are highly tentative due to small sample size but, if confirmed, will have implications for restoration planning.

**111 PETROLOGY AND GEOCHEMISTRY OF THE BIG PINE VOLCANIC FIELD,
INYO COUNTY, CALIFORNIA**

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The Big Pine volcanic field encompasses 1000 square kilometers of the northern Owens Valley. It is comprised of 30 basaltic cones and flows emplaced over the past 1.2 million years.

In thin section, Big Pine (BP) basalts display marked differences. Some samples contain phenocrysts of plagioclase, resorbed olivine and orthopyroxene and minor nepheline. Others have abundant plagioclase and pyroxene phenocrysts, but sparse olivine and no nepheline. There is also a noticeable difference in phenocryst size. Some basalts are comprised of phenocrysts that exceed 1mm in diameter, while others have much smaller (<0.1mm) phenocrysts. There is no apparent relationship between phenocryst size and mineralogy.

Major element analyses support thin section observations. Two distinct groupings are present. One is generally quartz normative (silica-rich), while the second is nepheline normative (silica-poor). Temporal relationships are difficult to establish, but field observations suggest the older flows were more silica undersaturated. Trace element data is enigmatic. There is a subtle trend for the more incompatible elements to favor silica-rich rocks; however, strontium is clearly anomalous.

The bimodal distribution of silica has been well documented for the Cima basalts. There, it is attributed to systematic variation in melting depth over time. A similar explanation for the BP field is difficult to rationalize. BP basalts were emplaced over a shorter time span and display an inverse relationship, characterized by more recent silica-rich basalts. We conclude BP mineralogy and geochemistry are best explained by partial assimilation of Mesozoic granite as basaltic magma rose upward from the underlying mantle.

**112 REAL-TIME OCEANOGRAPHIC MONITORING NEAR POINT FERMIN AND
THE LOS ANGELES RIVER MOUTH.**

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The ocean is a constantly changing environment that impacts both local and global communities. Currently, a majority of the ocean measurements are made as a snapshot (one time and location) that potentially leaves out vital changes. High-resolution monitoring is used to gather data on small temporal scales (i.e. minutes) over a long period and is essential for tracking short-term impacts from both natural and man-made causes, such as a pollution spill or storm. The Center for Integrative Coastal Observation, Research and Education (CICORE) program's goal is to monitor California coastal waters and shores and they have recently added two moorings that are operated through the California State University Long Beach. One mooring is in cleaner ocean water at the edge of the continental shelf and the second mooring is near the terminus of the Los Angeles River. The purpose of the project is to measure oceanographic data, sampling at high data rates (minutes), and make it available in real-time on the web. The two moorings will permit us to observe and measure variable conditions in the River and compare them to a more natural site. A third mooring in the San Gabriel River is planned for later this year. Standard measurements are collected at six-minute intervals at a depth of around 1.5 m from the surface. This data is available to scientists, managers, and students of all ages to better understand the both short-term and long-term trends of these coastal waters.

113 THE EFFECTS OF SELECTIVE FISHING PRESSURE ON THE POPULATION DYNAMICS AND LIFE HISTORY PARAMETERS OF THE CALIFORNIA SHEEPHEAD, *SEMICOSSYPHUS PULCHER*

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The California sheephead *Semicossyphus pulcher* is a hermaphroditic wrasse which presents an interesting challenge in environmental management due to its harem mating system and protogynous life history pattern. The fishery for California sheephead is size-selective, and while the recreational fishery has historically targeted larger males, the more recent live-fin fishery specifically targets small immature females for the restaurant trade. It is uncertain whether these practices affect the timing of sexual changeover or alter the natural harem mating system. California sheephead populations were surveyed at five sites with varying degrees of fishing pressure, and fish were collected for age and growth analysis. Three mainland sites (Rocky Point, the Ridges and the Los Angeles Federal Breakwater) and two Santa Catalina Island sites (Italian Gardens and West Quarry) were sampled in 2005-2006. There were significant differences in density, sex distribution, sex ratio and mean fish size of California sheephead populations among the five sites. However, while mean density was significantly higher at the two island sites, mean fish size was significantly lower at those two sites, as well as at the Ridges, the Palos Verdes site falling outside of the restricted commercial fishing area. In addition, sex distribution at the two island sites and the Ridges was significantly different from the two other mainland sites, showing a greater concentration of small male fish and a lower female-to-male ratio. While further sampling is needed, this suggests that fishing pressure as well as biogeography may have an effect on California sheephead population structure.

114 CHANGES IN DENSITIES OF FECAL INDICATOR BACTERIA (FIB) OVER DIFFERING TIDAL FLOWS IN THE BALLONA WETLANDS, LOS ANGELES

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There are two main objectives of this experiment: 1) to create a mathematical model showing the relationship between turbidity, dissolved oxygen, pH, salinity, time from high tide, and levels of indicator bacteria for fecal contamination, and 2) to see if fecal indicator bacteria (FIB) densities differ with tidal flows from flood to ebb.

In the field samples were tested at a single location every half hour during 12-hour periods on 3 occasions for temperature, dissolved oxygen, and pH levels using the YSI 600R Sonde Electronic Probe. In the laboratory, turbidity was measured using a HACH 2100N turbidity meter, and densities of FIB (total coliforms, *E. coli*, enterococci) were determined using IDEXX Quantitray 2000 test kits and reagents based on enzyme substrate methods. A mathematical model was created showing the relationship between dissolved oxygen, turbidity, pH, salinity, time from high tide, and bacterial growth.

Results indicated that bacterial levels were higher with decreased dissolved oxygen, decreased salinity, and increased turbidity in a neutral pH. As bacterial levels rose, the dissolved oxygen and salinity reserves were depleted. Turbidity levels appear to increase as sediments are drawn off of the banks of the water column and resuspended from the bed of the creek. FIB appear to attach to the sediment particles, thus are drawn into the water as turbidity increases. FIB levels were also

higher at and around high tide. This study suggests that sophisticated mathematical models can be constructed to integrate testing parameters. As more variation around these parameters is explained through modeling, then fewer key parameters could be measured in the future, thus reducing the costs for monitoring programs.

115 USING SOLID-PHASE MICROEXTRACTION TO DETERMINE THE BIOAVAILABILITY OF PYRETHROID INSECTICIDES IN SEDIMENT.

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Pyrethroid insecticides are widely used in both agricultural and urban regions, and their use will become even more widespread as organophosphate compounds are being phased out. Pyrethroid insecticides have broad-spectrum aquatic toxicity, including acute toxicity to benthic organisms. Recent detections of pyrethroid residues in sediments in many California surface streams and estuaries underline pyrethroids as an important class of emerging contaminants. However, because pyrethroids are highly hydrophobic, it may be argued that the total concentration of pyrethroids in the sediment does not reflect actual biological exposure, as a significant fraction of the pyrethroid may be adsorbed to the solid phase and is thus unavailable. In this study, solid phase microextraction (SPME) was used to determine the bioavailability of sediment-bound ^{14}C -Cyfluthrin to benthic invertebrates. Disposable polydimethylsiloxane (PDMS) fibers were inserted directly into the sediment phase where they acted as "biomimetic" devices for *C. tentans*. PDMS fiber measurements correlated well with ^{14}C -Cyfluthrin body residue in *C. tentans*, indicating that these fibers may be good surrogates for this species ($R^2=0.92$, $p=0.0002$). The contribution of sediment consumption to the bioavailability of cyfluthrin to *C. tentans* was also investigated. Results were variable ($\alpha=0.69-3.50$), most likely due to the low radioactivity used in this study. Current experiments are underway that include higher levels of radioactivity which should decrease variability. In the future, PDMS fiber measurements will also be correlated with LC_{50} values to further establish the use of PDMS fibers as a robust method to predict the bioavailability and toxicity of sediment-bound pyrethroids to benthic invertebrates. This method will be useful in risk assessment and monitoring studies.

116 ENANTIOSELECTIVE INHIBITION OF ACETYLCHOLINESTERASE BY CHIRAL ORGANOPHOSPHORUS INSECTICIDES

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A majority of chiral pesticides are introduced into the environment as racemates even though pesticidal activity often results from preferential reactivity of only one enantiomer, with the other becoming an added chemical burden to the environment and potentially toxic to non-target organisms. Chirality often enters in the reaction mechanisms of these compounds. Organophosphorus (OP) insecticides are a popular class of pesticides. Its major mode of action is the inhibition of Acetylcholinesterase (AChE) leading to disruption of nervous function. Several OPs contain a chiral center, either in the pentavalent phosphorus, or a carbon or sulfur substituent of the phosphorus atom. Studies on the differences in bioactivity between enantiomers of a chiral pesticide are still limited. This study investigates the enantioselectivity in AChE inhibition of chiral OPs. Separation and isolation of enantiomers were carried out on HPLC using a chiral column. Preliminary results from *in vitro* inhibition tests using Eel AChE suggest differences in toxicity between the (+) and (-) enantiomers of profenofos, fonofos and crotoxyphos. AChE inhibition assays following 24-hour exposure of *Daphnia magna* to racemates and enantiomers indicated differences in AChE inhibition between the (-) and (+) enantiomers that is consistent

with acute toxicity results. Reduction in AChE activity was higher in (-) enantiomer with IC50 values of 0.006, 0.115, 0.029 μ mole/L for profenofos, fonofos and crotoxyphos, respectively. IC50 values for the (+) enantiomers of the same OPs are at concentrations higher than the IC50 of the racemates.

117 AN ANOLE LIZARD (SQUAMATA: POLYCHROTIDAE) PRESERVED IN COLOMBIAN COPAL.

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The remains of an anole lizard, preserved in Colombian copal, were investigated using conventional X-ray techniques, computed tomography (CT) scanning, radiocarbon dating, and digital photomicrography. The X-rays revealed transverse processes on the autotomic caudal vertebrae, identifying the specimen as a β -anole. The results of the CT scan proved inconclusive, and radiocarbon dating yielded an approximate age of < 50 years. Digital photomicrographs indicate that the specimen probably represents the extant species *Norops tropidogaster*.

118 SYNTHETIC POLYMERS IN THE MARINE ENVIRONMENT; WHAT WE KNOW-WHAT WE NEED TO KNOW

Charles Moore, Algalita Marine Research Foundation, 148 N. Marina Drive, Long Beach, CA 90803

Synthetic Polymers, commonly known as plastics have been entering the marine environment in quantities paralleling their level of production over the last half century. (Thompson) Thirty years ago the prevailing attitude of the industry was that "plastic litter is a very small proportion of all litter and causes no harm to the environment except as an eyesore."(Derraik) Since that time, US consumption of thermoplastics has sextupled (Center for Environmental Education), and litter is now 60-80% plastic, whether on land or in the marine environment (Plastic Debris Rivers to Sea Project). While undoubtedly still an eyesore, plastic debris is now having significant harmful effects on marine biota. Albatross, fulmars and petrels mistake floating plastics for food and few, if any, individuals of these species remain unaffected; in fact, 44% of all seabird species ingest plastic. Sea turtles ingest plastic bags, fishing line and other plastics, as do 26 species of cetaceans. (Derraik) The numbers of fish, birds mammals, and other marine organisms that succumb each year to derelict fishing nets and lines in which they become entangled is not reliably known, but estimates in the millions have been made (Moore)

Ready ingestion of degraded plastic pellets and fragments (EPA) raises toxicity concerns since they are known to sorb hydrophobic pollutants (Moore, Takada). At least four common plastic additives are known estrogen mimics, however no studies have yet determined if any of these toxics desorb when ingested and become bioavailable (Andrady). Ingestion of small plastics by filter feeders at the base of the food pyramid is known to occur (Moore), but has not been quantified. "There is also potential danger to marine ecosystems from the accumulation of plastic debris on the sea floor...The accumulation of such debris can inhibit the gas exchange between the overlying waters and the pore waters of the sediments..."(Derraik). The extent of this problem and its effects, have yet to be investigated.

119 CHARACTERIZING AND SURVEYING OCEANIC SOURCES AND SINKS OF MARINE DEBRIS

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As problems caused by the increased presence of anthropogenic marine debris in the North Pacific Ocean continue to manifest across the basin, the focus of studies is steadily evolving from attempts at basic identification of debris hot-spots to strategies for at-sea removal. Having recently completed oceanographic analyses and aerial surveys in the North Pacific subtropical convergence zone, members of the Ghostnet Project Team are now looking at the area of the North Pacific known as the "Eastern Garbage Patch" (EGP). This area can be characterized by sustained high atmospheric pressure resulting in convergent surface flow and low ocean productivity. During August of 2005, we used real-time information from environmental satellites and atmospheric models to guide CAPT Charles Moore and the *SRV Algalita* for a survey of the EGP. The vessel was equipped with four Oceantrek drifters to be deployed on debris masses as part of a larger study to ascertain the movement of such debris with respect to the atmospheric and oceanic forcing. Having successfully brought the ship to the EGP using the NAVY NOGAPS model and satellite-based measurements of sea surface height and chlorophyll a concentration, these drifters were deployed on nets and bundles of debris. The drifters were tracked using on-board global positioning system (GPS) and data telemetry via low-Earth orbit satellites. The observed movements were tested against results from several transport models with the intent of identifying the best model for planning future survey and interdiction activities in the EGP.

120 LONG-TERM TRAJECTORIES OF PLASTIC FLOTSAM IN THE NORTH PACIFIC OCEAN CALCULATED BY THE "OCEAN SURFACE CURRENT SIMULATOR"— OSCURS.

W. James Ingraham, Jr. (NOAA Fisheries, retired) DriftBusters Co., 720 Camano View Road, Camano Island, WA 98282.

Oceanic drifters can only measure ocean currents for a few years. OSCURS can simulate drift for 35 years by using empirical formulae to compute wind then surface ocean currents daily (0000Z) from a 90km grid of sea level pressure from 1/1/1967 to present. Originally calibrated with satellite-tracked drifters with parachute drogues, OSCURS trajectories have also shown good agreement with World Ocean Circulation Experiment (WOCE) drifter trajectories. New evidence is shown that the North Pacific's cyclonic Subarctic Gyre north of 40 N has a three year orbital period while estimates for the North Pacific's anticyclonic Subtropical Gyre south of 40 N are an orbital period of about 6 years. Within the slow moving center of the Subtropical Gyre is a convergence zone where flotsam of all kinds can have residence times of greater than 20 years, sometimes called the Eastern and Western Garbage Patches. Computer simulations of long-term trajectories show the features of North Pacific Ocean surface currents and the critical areas of bifurcation where flotsam can move between gyres or leave the North Pacific. These areas also change with season and year-to-year climate variations.

121 QUANTITATIVE ANALYSIS OF POPS IN PLASTIC DEBRIS IN THE OCEAN.

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The growth in plastic production in the last sixty years has made plastic materials one of the main pollutants of oceanic waters and of beaches. Low production costs, high physical resistance to aging and minimal biological degradation has meant that plastic objects, fragments and residues accumulate and persist. Persistent Organic Pollutants (POPs) are synthetic organic compounds with the following properties: highly toxic; wide range of chronic effects (endocrine disrupters, carcinogenicity, mutagenicity); stable chemically; and, not easily degraded in the environment or in organisms. They are lipophilic and accumulate in the food chain. The objective of this research is to assess plastic fragments and pellets found in the marine environment to determine the concentrations of selected Persistent Organic Pollutants (POPs) including PCBs, PAHs, aliphatic hydrocarbons, and chlorinated organic pesticides. The plastic samples were fragments and pellets with a wide range of sizes and shapes. They were found to be primarily polypropylene and polyethylene, which is consistent with the buoyancy of these polymers. The plastic was identified using a Shimadzu 8300 FT-IR Spectrophotometer. Virgin pellets from different industrial sources were also analyzed to look for target compounds in the pellets not exposed to seawater. The plastic debris samples collected in the North Pacific Gyre, contained PAHs, some PCBs and Pesticides. These compounds were identified and quantified using a JEOL GCmate GC/MS. The mass spectrometer was operated in SIM mode. This finding confirms the hypothesis that plastic debris can accumulate hydrophobic compounds (POPs) from the marine environment.

122 INTERNATIONAL PELLET WATCH : GLOBAL MONITORING OF PERSISTENT ORGANIC POLLUTANTS (POPs) BY USING BEACHED PLASTIC RESIN PELLETS.

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Plastic resin pellets are industrial raw material and are unintentionally released to the environment, both during manufacturing and transport. The released resin pellets are carried eventually to the ocean. Because of their environmental persistence, they are distributed widely in the ocean and found on beaches all over the world. Because of the hydrophobic nature of the plastic pellets, hydrophobic organic pollutants such as PCBs, DDTs, and PAHs are enriched in the pellets with concentration factor of $\sim 10^6$. In our preliminary study covering whole Japanese beaches correlation was observed between concentrations of PCBs in beached resin pellets and those in mussels, although concentrations of PCBs in the pellets are largely influenced by residence time and pathways of resin pellets from the sources to the stranding points. Based on the finding, we've proposed "International Pellet Watch (IPW)" project to monitor persistent organic pollutants (POPs) in world ocean. In the project, we call world citizens to collect beached resin pellets on their nearby beaches and send them via airmail to our laboratory where the resin pellets will be analyzed for POPs by using our instruments including FOCUS-Polaris Q GC/MS which is kindly provided by Thermoelectron KK, Japan. Based on the analytical results, global distribution of POPs will be mapped and released on web. The advantage of IPW is extremely low cost for sampling and shipment of the samples and non-scientists participate to the monitoring as a part of environmental education. Details of the project is available on website (<http://www.tuat.ac.jp/~gaia/ipw/index.html>).

123 SHIPS FOR SCRAP AT ALANG-SOSIYA: LOOMING OF SMALL PLASTICS IN MARINE SEDIMENTS

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Accumulation of plastics and their tidbits in beach, estuarine and sub-tidal sediments pose a big challenge to the environment as they do not degrade easily, drift for years, cover vast areas and persist for a long period of time. These plastic articles eventually, breakdown into smaller fragments, staying in suspension in the water column or settling in the sediments, and therefore inhibiting the vertical transfer of oxygen and percolation of water across it. Additionally, the plastic pellets and fragments not only support the growth of hydroids, diatoms, and bacteria but also transfer chemical pollutants including polychlorinated biphenyls, (PCBs); 1,1-dichloro-2,2-chlorophenylethylene (DDE) and nonyl phenols (NP) to organisms. Attempts have been made earlier to quantify the plastic debris of various marine environments. However, the extent of accumulation and classification of small plastics in marine sediments at ship scrapping yards, where large-scale accumulation is possible besides huge employment and financial benefits, have not been studied as yet. The present paper discusses the extent of accumulation of small-plastics in the intertidal sediments of a world's largest ship-breaking yard at Alang-Sosiya, established in 1982 on the NW of Gulf of Cambay, India. The small plastics and their associates have been collected, separated under microscope and identified by FT-IR spectroscopy as polyurethane, nylon, polystyrene, polyester and glasswool. The morphology of the identified plastics has also been studied by Scanning Electron Microscope. Overall, the small plastics weighed around 81 ± 4 mg per kg of sediment, of which the transparent plastics and nylon together contributed 37%.

124 WHAT THE PLASTIC INDUSTRY MUST DO IF WE ARE TO KEEP PLASTIC OUT OF MARINE DEBRIS AND GET TO ZERO WASTE

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The reuse and recycling/composting of fiber and organic material and the recycling of textiles, ceramics, metal, glass, can be found as an industry in all cultures in the world. The use of plastic for durable goods and packaging is increasingly taking the place of other materials. The result has been an increasing amount of plastic materials being sent to landfill and incinerators that are subsidized by the general public. The Plastic Industry needs to develop a closed loop recovery system and include recovery in the product design. RAA recommends that the industry perform a cradle to cradle analysis of its products and plan for recovery and reuse. The industry must design packages and product for dismantling and recycling and include post consumer content. Products must be tested as a precautionary principal for human impacts before allowed to be distributed. The manufacturing systems must be clean without residual runoff. All plastic types must be labeled or signaled in such a way as they may be recognized for recovery. The industry must create the plastic equivalent of the scrap yard or paper yard to receive clean products from self hauled and private businesses. If the plastic industry creates recovery loops for their products, businesses will be the first to take advantage of the savings, and once established the government programs will follow. As cities across the world endorse zero waste goals, industry could be proactive or they can wait until government makes them do it.

125 LAMPREYS SOUTH OF POINT CONCEPTION AND PERSPECTIVES FROM THE NORTH

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Two species of lamprey are native to California south of Point Conception, the Pacific Lamprey, *Entosphenus tridentatus*, and an unresolved brook lamprey, *Lampetra* cf. *pacifica*, which is apparently extirpated from its known range in southern California. The North American range of the Pacific Lamprey extends from Alaska south to the Río Santo Domingo in northern Baja California, including records from many principal streams in southern California. However, a recent coast-wide survey of streams from Canada south to Baja California suggests that there is a major change in population dynamics south of Point Conception. While Pacific Lamprey ammocoetes (a freshwater-resident larval stage lasting about five years) are nearly ubiquitous from San Luis Obispo northwards, they are extremely rare or absent southwards, even at sites of recent collections and known populations. The mechanisms causing this pattern remain to be resolved, but may include different life-history strategies related to oceanographic and hydrologic environments, natural habitat constraints, or anthropogenic changes in the environment. Historically, there was also a freshwater-resident brook lamprey in the Los Angeles Basin, including the San Gabriel, Santa Ana, and Los Angeles drainages. However, the species has not been collected from its known range in the basin since 1955. One goal of this project is to increase awareness of lampreys in southern California streams and provide information on extant northern brook lampreys that may aid field biologists in their search for possible relict populations of this elusive lamprey.

126 THERMAL ECOLOGY OF STEELHEAD IN A WARM-WATER ENVIRONMENT

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How salmonids adjust to the cost of chronic exposure to warm water in nature, particularly in habitats where areas of cold water are unavailable, is largely unknown. In the hot dry climate of southern California, overwintering juvenile steelhead, *Oncorhynchus mykiss*, can experience an unceasing warm-water environment. A study performed in Topanga Creek, Los Angeles County, during July and August 2004 assessed how steelhead (10 to 28 cm TL) exploited the thermal environment. Analyses of achievable body temperatures, an index of observed body temperatures, and behavioral time budgets, indicate steelhead did not behaviorally thermoregulate. Juvenile steelhead accepted an elevated body temperature (18.7 to 24.5°C) and remained active and foraged throughout the day at the extreme southern extent of their geographic distribution. The high body temperature that steelhead accept appears to represent a compromise in exchange for an expanded range of thermal habitats.

127 SOUTHERN CALIFORNIA STEELHEAD: WHERE AND WHAT ARE THEY?

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The distribution and character of southern populations of Southern steelhead (*Oncorhynchus mykiss*) has become the focused attention of biologists, resource managers, political decision makers, and the general public since listing as an endangered species under the Endangered Species Act in 1997 (and southern extension in 2002). Increased attention has resulted in new

information on distribution and occurrence of both juveniles and sea run-adults, as well as on their physiological characteristics and ecological role. The perceived distinction between the freshwater resident life-history forms and the anadromous life-history forms of *O. mykiss* differs with the perspective of the viewer's vantage point: taxonomists, ecologists/evolutionists, regulators, and resource managers may have different ways of looking at the same fish. The diversity of the habitat conditions occupied *O. mykiss* is mirrored in the diversity of life-history patterns which they exhibit, but the geography of these differences is unclear, as well as the specific mechanisms which account for expression of this diversity. While the run-size of southern California steelhead populations have decline dramatically over the past 100 years, research activities and opportunities on *O. mykiss* in its fresh and marine water habitats have increased. Recovery planning currently underway by NOAA Fisheries will guide and stimulate both research and conservation measures over the next several decades.

128 HABITAT EVALUATION FOR SOUTHERN POPULATIONS OF STEELHEAD TROUT, *ONCORHYNCHUS MYKISS*

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Southern California populations of steelhead trout (*Oncorhynchus mykiss*) live in flashy, warm, sometimes intermittent, highly variable streams. How do we evaluate habitat quality for these unique fish? Many of the protocols and parameters established to evaluate habitat for *Oncorhynchus mykiss* were developed based upon research conducted on steelhead from the Pacific Northwest and Northern California, or on rainbow trout from other parts of the country. Several field surveys to evaluate habitat quality for steelhead have been conducted in recent years in the Santa Ynez, Ventura, and Santa Clara systems, as well as streams along the Conception Coast and the Santa Monica Mountains. Researchers in Southern California modified these existing protocols to more adequately reflect local conditions. Modified parameters include those dealing with habitat type, flow, temperature, instream cover, riparian vegetation, and substrate. At the 2005 Salmonid Restoration Federation meeting, a session on this topic included presentations of the field work described above and a group discussion about how we might modify assessment protocols. Some of the issues discussed include: Do southern steelhead have different temperature and dissolved oxygen tolerances than more northern populations? How does this related to food availability, and nutrient levels? Are spawning substrates used differently? Should instream cover provided by boulders be weighed more heavily? What is the role of large woody debris? What is a "pool" in the context of a southern California stream? Should bank vegetation assessments include a category for invasive plants? This presentation will review the results of that meeting, and examine future directions in the evaluation of habitat for southern populations.

129 SURVIVAL ON THE EDGE: THE PLIGHT OF THE SAN MATEO CREEK SOUTHERN STEELHEAD

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The discovery of a small population (<70 individuals) of southern steelhead trout, *Oncorhynchus mykiss* in San Mateo Creek (SMC) and Devil Canyon Creek (DCC), a small tributary to SMC in San Diego County, California in the spring 1999 represents the first multiple record account of trout in the creek in over 50 years. From August 1999 to April 2006 the California Department of Fish and Game (CDFG) has been involved in an extensive monitoring program along both creeks to monitor the status and health of the newly found steelhead population. Data on trout abundance, age analysis, genetics, otolith micro-chemistry, temperature profiles and spawning behavior have been routinely collected. Utilizing the data collected, CDFG biologists were able to construct a conclusive chronological graph of trout presence and of lineage relationships for the trout on SMC and DCC from their discovery in 1999 to the last sighting of trout on the drainage in December 2003. While trout presence in SMC and DCC has not been observed since 2003, Salmonid observations in adjacent streams in 2002, 2003 and 2004 are promising. The ephemeral presence of southern steelhead within San Mateo Creek is to be expected when the population of anadromous adults in the southern portion of their range is considered low. Additionally, a number of events need to align (water availability, creek access and adult steelhead presence) in order for anadromous immigration into the creek to occur.

130 STATUS OF THE THREESPINE STICKLEBACK IN SOUTHERN CALIFORNIA

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The circumboreal threespine stickleback, *Gasterosteus aculeatus*, once inhabited all the major, and many minor, drainages in Southern California. Development and water harvest has restricted their current distribution, eliminating some populations and threatening or restricting the distribution of others. Southern California has populations of three forms of stickleback: the widespread low-plated form of *Gasterosteus aculeatus*, including those found in San Antonio Creek; an unplated form endemic(?) to the Santa Clara River in Los Angeles County, *G. a. williamsoni*, which is listed as federally endangered; and a possible undescribed species, the Shay Creek stickleback, endemic to the endorheic Baldwin basin. Introductions of *G. a. williamsoni* have been tried in Malibu Creek and in San Felipe Creek. The Shay Creek stickleback has been introduced into artificial ponds, Sugarloaf Meadow and Juniper Springs, in the San Bernardino Mountains. Low-plated populations in San Jacinto Creek, Strawberry Creek, Mohave River and Holcomb Creek are believed to be trout related introductions.

131 UPDATE ON *RANA MUSCOSA* IN SOUTHERN CALIFORNIA

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The mountain yellow-legged frog (*Rana muscosa*) has suffered precipitous declines over the past 35 years in southern California. The remaining populations are unstable and continue to be impacted by disease, fires, floods, debris flows, and invasive species. We will review the status of this species based on our field data from 2000 - 2005 and make some recommendations about

future prospects of these populations. Adaptive management is immediately needed at most populations if they are to stabilize and increase. Additionally, extirpated populations need to be re-established if these species are going to persist in the region.

132 AN UPDATE: ECOLOGY, STATUS, AND CONSERVATION OF THE WESTERN SPADEFOOT TOAD, *SPEA HAMMONDII*

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The western spadefoot toad, *Spea hammondi*, is a fossorial amphibian with secretive habits. Observations of adults are infrequent and highly correlated with periods of rainfall while observations of eggs, larvae, and metamorphic individuals are limited to a period of weeks and only in those years that breeding occurs. Given its secretive habits and limited opportunities to detect, this amphibian can be difficult to study. However, based the observational data I have collected over the last ten years, I will discuss several important issues that typically have *not* been associated with the western spadefoot.

This species is often characterized as requiring ephemeral pools located in the upland for breeding. I will describe the importance of zero and first order headwater drainages as breeding habitat for populations occupying landscapes lacking relatively flat valley bottoms or mesa tops. In addition, I will discuss the relationship between ecological and life history aspects of the toad as it relates to landscape changes and how that interaction has changed the geographic and local distribution of the western spadefoot. Finally, despite its precipitous decline, I will discuss why this species should not be considered for listing as a federal threatened or endangered species at this time.

133 STATUS OF THE CALIFORNIA RED-LEGGED FROG (*RANA DRAYTONII*) IN SOUTHERN CALIFORNIA

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According to the fine map compiled by Jennings and Hayes (1994), the California red-legged frog once occurred at more than 100 localities in southern California, from Santa Barbara, Ventura, Los Angeles, and San Bernardino counties southward. Now, approximately 75% of these populations is extinct. Urbanization has clearly been the most important cause of the extinctions, although introductions of exotic, predaceous fishes and other factors contributed in some areas.

Throughout the state, the California red-legged frog extinction pattern has been characterized by a gradual severing of metapopulation ties, and the disappearance of isolated peripheral populations, leaving several scattered core areas. In southern California, the only core persists in the mountains of Ventura and Santa Barbara counties, and along the Santa Barbara coast. An isolated population still exists in San Francisquito Canyon, Los Angeles County, but other isolates in Los Angeles and Riverside County have recently gone extinct, and further extinctions are predicted.

134 CONSERVATION IMPLICATIONS OF INTRODUCED AMPHIBIAN SPECIES IN SOUTHERN CALIFORNIA: INSATIABLE PREDATORS OR PLENTIFUL PREY

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The introduced bullfrog (*Rana catesbeiana*) and African-clawed frog (*Xenopus laevis*) are now permanent and ubiquitous components of our freshwater habitats in coastal southern California. These invasive and predatory species are known to compete with and prey on native fauna, including some sensitive and at-risk species. However, few studies in our region have been designed to quantify the effects these introduced species have on native species at the population level. A major challenge in demonstrating the direct and indirect effects of these introduced species is that, where they occur, other modifications to the habitat have also occurred (hydroperiod, geomorphology, community composition, vegetation structure, etc.). Consequently, it is difficult to single out specifically what effects these introduced amphibians have on native fauna (positive or negative) due to the confounding aspect of the multitude of other physical and biological habitat modifications.

Specific to the conservation of native amphibian species, it is critical to understand the effects these introduced amphibians have on the habitat quality prior to the development of reintroduction plans for species such as the endangered California Red-legged Frog (*Rana draytonii*). I will discuss the bullfrog and the African-clawed frog in the context of a food web, and discuss how the modified wetlands occupied by these introduced amphibians would not serve as suitable locations for future reintroductions of the California Red-legged Frog. I will conclude discussing the rationale for why the presence of the bullfrog can be considered an 'ecological synecdoche' and what its presence indicates in terms of overall habitat quality.

135 A PLACE-SPECIFIC EDUCATION PROGRAM TO INCREASE AWARENESS OF INTRODUCED STREAM PREDATORS AND THEIR ROLE IN NATIVE AMPHIBIAN DECLINE.

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In the Santa Monica Mountains near Los Angeles, CA, USA, stream breeding amphibian populations (namely the California treefrog *Hyla cadaverina* and the California newt *Taricha torosa*) have been in decline largely due to the introduced red swamp crayfish (*Procambarus clarkia*). Recent efforts to remove crayfish in a Malibu stream led to a marked increase in California newt reproduction, suggesting that management to reduce introduced predators can be an effective method of conserving threatened amphibian species. Of particular interest to area conservation agencies is the prospect of community-based management of invasive species. A public that is educated on the threats posed by invasive species is important for community-based management to be a possibility. We have produced an education program to be used in local schools and at public gatherings which combine age-appropriate PowerPoint® presentations with supplemental information sheets, school activities and evaluation instruments. The program emphasizes the dependence of native amphibians on mountain stream habitats and the disruption caused by introduced predators. The program has been presented in eleven classrooms and ten civic events by students from Pepperdine University. Before and after evaluations (N=150 for schools and N=70 for adults at civic events) indicate a 40% increase in the ability of students to recognize species and to discriminate natives and non-natives as a result of participating in the

program. Adults show an improvement of 20% in similar evaluations. Such locally adapted educational programs can be instrumental in laying the ground work for community-based conservation efforts.

136 GROWTH AND DEMOGRAPHY OF WESTERN POND TURTLES AT VANDENBERG AIR FORCE BASE, CALIFORNIA.

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Western pond turtles (*Emys marmorata*) occur throughout much of California. Vandenberg AFB is along the coast in southern San Luis Obispo County, and has a Mediterranean climate with wet winters and dry summers and year-round moderate (10-25° C) air temperatures. This is in contrast to inland sites in California where temperatures often drop to freezing in winter and exceed 35° C during summer. In April 1995 and June 1996 we trapped pond turtles at five natural and man-made ponds on the air force base and took mass, several shell measurements, sex, age, and growth histories. Combining all ponds, we captured 174 turtles; 66% were males, 15.5% females, and 18.5% juveniles. Turtles ≥ 120 mm carapace length (CL) accounted for 83% of turtles caught, although 49% of turtles were 5 years old or less. The average CL of the upper 10% of male and females were not significantly different (Male CL = 162.1 mm; Female CL = 160.7 mm). Turtles grew quickly and reached 120 mm CL by about 4 yr, although males reached 150 mm CL by 8 years but females were 11 years when CL was 150 mm. Female turtles were x-rayed in June 1996 and 68.4% were gravid. Mean clutch size was 5.2 eggs and ranged from 3 – 7 eggs. Despite the skewed sex ratio (4.3 M / 1 F), many young turtles were found at the base and growth rates of both sexes were almost as high as turtles living in the warmer Central Valley of California

137 THE GARTER SNAKES OF SOUTHERN CALIFORNIA.

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Despite the relatively arid climate, six species of garter snakes occur in southern California, defined here as that area south of the northern borders of San Luis Obispo, Kern and San Bernardino Counties. While all tend to be associated with riparian habitats, the degree to which they depend on permanent water varies. Two of the six species (Aquatic GS and Western Terrestrial GS) occur along the immediate coast inland to the Coast Ranges and south into Santa Barbara and Ventura Counties, respectively. An isolated population of the latter also occurs in the San Bernardino Mountains. The Common GS is confined to the immediate coast and adjacent drainages, ranging south into San Diego County. Populations south of Santa Barbara County are disjunct, probably endangered and possibly represent a new subspecies. The Sierra GS appears to have small, disjunct populations ranging from the southern Sierra Nevada through the Tehachapi Mountains to the vicinity of Frazier Park in Kern County. There, its range abuts that of the Two-striped GS. The Two-striped GS is the most wide-ranging of the southern California garter snakes, occurring from San Luis Obispo County south to the Mexican border and inland through the inner Coast, Transverse and Peninsular Ranges. One of the more highly aquatic species, urbanization has taken much of its lowland habitat and it is officially recognized as a state Species of Special Concern. The Checkered GS occurs along the Colorado River and adjacent irrigation canals in Imperial and Riverside Counties where its current status is unknown.

138 GENETIC STRUCTURE IN SOUTHERN CALIFORNIA COASTAL STREAM VERTEBRATES: SANTA ANA SPECKLED DACE, THREESPINE STICKLEBACK, AND CALIFORNIA TREE FROG

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We have evaluated genetic variation and population structure in both fish and amphibian taxa in the freshwater streams of southern California using mitochondrial cytochrome b sequence data. Patterns of genetic variation in the unarmored three spine stickleback (*Gasterosteus aculeatus ssp*) and the California tree frog (*Pseudacris cadaverina*) indicate that both historical processes over a wide range of time and space, and extant biogeographic variables shape the current geographic population structure. Such influencing factors are inferred, but rarely witnessed. We now have an opportunity to examine the combined effects of fire and flood on population structure in Santa Ana speckled dace (*Rhinichthys osculus ssp*). We sampled dace in five tributaries to the inland reach of the Santa Ana River in San Bernardino county immediately prior to the fire and flood regime of 2003-2004. The combine effects of these events resulted in severe impacts to these streams from debris flow and the extirpation of dace in two of the five streams. We are currently obtaining genetic data on the pre-cataclysmic populations, and plan to sample post-cataclysmic populations to estimate the impacts on genetic structure.

139 USE OF ULTRASOUND TO RISH-STRATIFY PREGNANCY OUTCOME IN EMERGENCY DEPARTMENT PATIENTS WITH FIRST TRIMESTER VAGINAL BLEEDING

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Vaginal bleeding during the first trimester of pregnancy can be a result of spontaneous abortion, gestational trophoblastic disease, implantation bleeding, cervical ectropion, cervicitis and ectopic pregnancy, which must not be misdiagnosed. It is essential to include all diagnoses due to potential life threat and threatened abortion. Pelvic ultrasonography will be the best procedure to evaluate every pregnant patient with vaginal bleeding in early pregnancy due to no evidence of risk to mother or fetus, and immediate test results while providing five potential diagnoses in such situations. For example, pelvic ultraonography can reveal *NDIUP* (no definitive intrauterine pregnancy), *IUP* (intrauterine pregnancy), *Live IUP* (live intrauterine pregnancy), *Abnormal IUP* (abnormal intrauterine pregnancy), and ectopic pregnancy. Finding *NDIUP*, *IUP* and *Live IUP* indicates potentially viable pregnancies. Finding *Abnormal IUP* and ectopic pregnancy displays non-viable pregnancies. If transabdominal technique fails to distinguish a gestational sac, a yolk sac and live intrauterine pregnancy, endovaginal technique will be performed under standards of care in order to obtain better images. The ultrasound performed provides very unusual information of a uterus such as a gestational sac, a yolk sac, fetal heart motion, and fetal pole. The goal of this research is to evaluate if and how finding *NDIUP*, *IUP*, and live *IUP* may result in a better and faster prediction of live birth from vaginal bleeding during the first trimester of pregnancy. We expect to dramatically accelerate a doctor's ability to diagnose a patient who is suffering from vaginal bleeding during the first trimester of her pregnancy with pelvic ultrasonography.

**140 RAPID RETURN OF OVARIAN FUNCTION IN SIBERIAN HAMSTERS
(*PHODOPUS SUNGORUS*) FOLLOWS LONG DAY STIMULATION**

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Return of ovarian function, or recrudescence, in seasonally breeding species such as Siberian hamsters (*Phodopus sungorus*), is characterized by a restoration of folliculogenesis and ovulation. However, the structural and functional changes that occur during recrudescence are not well understood. We hypothesized that photo-stimulation would induce a rapid recrudescence in regressed hamsters and that ovarian function would be fully restored by 8 weeks of exposure. Experimental groups were transferred to long day (LD; 16L:8D) conditions for 1, 2, 4, or 8 wks after exposure to inhibitory (8L:16D) photoperiods for 14 weeks (wk0). Control tissues were maintained in LD for the duration of the experiment and harvested at wks 0, 2, and 8. No changes were observed along any parameter in LD animals, and groups were pooled for analysis ($p>0.05$). Among SD hamsters, ovarian mass increased 1.3-fold by wk1, returning to LD values ($p<0.05$). No changes were noted in pre-antral follicle number as compared to LD ($p>0.05$), however early-antral follicles increased 1.3-fold from wk0 to wk1 ($p<0.05$). As compared to wk0, CL number increased 16-fold by wk8 ($p<0.05$). Advanced atretic follicles, absent in LD controls, showed no change ($p>0.05$). Terminal atretic follicles, also absent in controls, declined 5-fold from wk0 to wk2 ($p<0.05$), and did not appear after wk4. These data suggest that recrudescence is not complete after 8 weeks of stimulation, implied by the persistence in advanced atretic follicles. However, as evidenced by CL formation by wk2, folliculogenesis and ovarian function return rapidly with LD stimulation.

**141 HAS THE STATE BAN ON AQUARIUM *CAULERPA* SPECIES BEEN
EFFECTIVE IN SOUTHERN CALIFORNIA?**

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The *Caulerpa taxifolia* invasion of the Mediterranean Sea raised awareness of the potential for introduced seaweeds to impact coastal communities. Subsequent introductions of *C. taxifolia* in southern California in 2000, presumably from the release of aquarium specimens, led to the expenditure of more than \$4.5 million for eradication efforts. Besides *C. taxifolia*, other species of *Caulerpa* being sold for aquarium use also may have the potential to invade southern Californian and U.S. waters. To determine the availability of aquarium specimens of *Caulerpa* in southern California, 50 retail outlets were visited in 2000-01 and 52% were found to sell *Caulerpa*; 10% of these stores sold *C. taxifolia*. Surveys of aquarium stores in Florida produced similar results and also revealed the ability to purchase *Caulerpa* via e-commerce. In late 2001, California imposed a ban on importation, sale, or possession of 9 *Caulerpa* species; the City of San Diego expanded these regulations to include all species. To determine the effectiveness of the California ban on *Caulerpa*, in 2005-06 we visited 24 retail stores previously found to sell *Caulerpa*. Of 24 stores, 63% sold *Caulerpa* and 8% were selling *C. taxifolia*. These results together with recent work in Florida suggest that the retail aquarium industry, including e-commerce, continues to represent a potential vector for distributing *Caulerpa* specimens, including *C. taxifolia*. It also appears that outreach and enforcement programs in the City of San Diego have resulted in greater compliance with existing regulations underscoring the need to increase awareness among the aquarium retail industry.

142 MUSCULATURE OF THE MODIFIED RIB FOUND IN CYPRINIFORM FISHES

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The Weberian apparatus is a series of bones that interconnect the gas bladder with the inner ear of some fishes. Within the literature there are descriptions of the hard elements of the apparatus including the highly modified ribs but the soft elements like the extrinsic muscles have received little attention. The modified rib of the fourth vertebra (V4) and its musculature are the basis of this study. Twenty one species from five cypriniform families, Cyprinidae, Catostomidae, Cobitidae, Psilorhynchidae, and Gyrinocheilidae, and several out-group representatives of Characiformes and Siluriformes, were dissected to describe and attempt to understand the function of the musculature attaching to the gas bladder and the V4 rib. In the cypriniform species examined, a muscle, the cleithropleuralis, interconnects the medial cleithrum with the ventral tip of the V4 rib. The swimbladder protractor interconnects the ventral surfaces of the first three vertebrae with the cranial surface of the gas bladder. The cleithropleuralis is similar in cyprinids and catostomids but the swim bladder protractor was more robust in cyprinids. In silurids, the swim bladder protractor is a broad muscle covering the anterior end of the gas bladder and extending to the ventral surface. In cypriniforms it is a centralized muscle attaching to only the anterior face of the gas bladder. Based on the position of the cleithropleuralis, I pose that it could be used to fine-tune the tension in the gas bladder external covering for improved sound reception or possibly to provide a means of directional location of sounds.

143 STRESS AND CONSEQUENCES IN THE URBAN OCEAN –ENVIRONMENTAL ENDOCRINOLOGY OF MARINE FISHES OF THE SOUTHERN CALIFORNIA BIGHT

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The urban ocean environment presents a variety of stressors to marine wildlife, from disturbances such as direct contact with humans (e.g., catch & release) to environmental contamination (e.g., from stormwater or sanitation district outfalls). As in all vertebrates, fishes respond to environmental stressors via a highly integrated neuroendocrine system (hypothalamo-pituitary-interrenal (HPI) axis) that results in production of the steroid, cortisol. Depending on the nature of the stressor(s) presented to a fish, and the species under consideration, plasma cortisol levels may increase >200-fold (e.g., with capture and captivity) and remain elevated if the stressor(s) persists. Secondary physiological impacts of the cortisol response include impairment of the HPI axis itself, disruption of the growth endocrine system, and inhibited defense mechanisms, particularly under situations of chronic stress. The regulation and observed dysregulation of stress responses in urban ocean fish will be discussed in terms of underlying steroidogenic mechanisms and potential impacts on other physiological systems. [Support in part by Southern California Sea Grant & California Sea Grant College Programs]

144 EVALUATION OF RELATIONSHIPS BETWEEN REPRODUCTIVE METRICS, GENDER AND VITELLOGENIN EXPRESSION IN DEMERSAL FLATFISH COLLECTED NEAR THE MUNICIPAL WASTEWATER OUTFALL OF ORANGE COUNTY, CALIFORNIA, USA.

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Estrogenic activity in fish has primarily been evaluated using vitellogenin (vtg) expression in male and juvenile animals. Although the response has been widespread in field and laboratory studies, the relevance of the response to higher-level adverse effects, particularly in the field, is less than clear. Previous evaluations of vtg within flatfish species collected near the Orange County Sanitation District (OCSD) outfall and stations as far as 7.7 km down current indicated bioavailable estrogens within demersal flatfish populations. In order to evaluate the persistence of estrogenic activity and relationships to reproduction and development, fish were sampled in the winter and summer of 2003 and 2004 from the same locations and vtg, plasma estradiol (E2) concentrations, gonadosomatic indices (GSI), sperm DNA damage, development and gender ratios were measured in English Sole (*Pleuronectes vetulus*) and Hornyhead Turbot (*Pleuronichthys verticalis*). Variable levels of vtg were continually observed in plasma samples from fish collected in the locations analyzed. Vtg expression and plasma E2 levels were significantly correlated in females of both species. A positive relationship was demonstrated between plasma E2 levels and sperm DNA damage. Rather than an expected feminization of populations, a trend toward masculinization was observed particularly at the OCSD outfall, as indicated by gender ratios and significantly higher GSI in males versus males from the reference station. These results are consistent with previous studies showing vtg expression in male flatfish, but no alteration in overall flatfish abundance at the sampled sites.

145 SEASONAL EVALUATION OF REPRODUCTIVE STATUS AND EXPOSURE TO ENVIRONMENTAL ESTROGENS IN HORNYHEAD TURBOT AT THE MUNICIPAL WASTEWATER OUTFALL OF ORANGE COUNTY

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In the sediments near the outfall of Orange County Sanitation District (OCSD), detectable levels of 17 β -estradiol, alkylphenol ethoxylates and alkylphenols, raise concerns about the health of biota. Hornyhead turbot (*Pleuronichthys verticalis*), a flatfish dwelling in the sediment and feeding on benthos, may experience significant exposure via water, sediment and prey to environmental estrogens. As part of a multi-year monitoring project, fish collected in February, August and November 2005 at the outfall (T1) and a farfield site (T11) 7.7 km north of the outfall were analyzed for condition factor (CF), gonadosomatic index (GSI), plasma vitellogenin (Vtg) concentrations, and histopathology of gonads (August and November samples only). The above endpoints were evaluated to determine whether reproductive status changed seasonally and to identify the suitability of T11 as a reference site. The results indicated that site differences were not statistically detected for CF, GSI, developmental status, and Vtg concentrations of females but seasonal changes were well pronounced in most of the cases. Incidences of ovarian atresia were observed in 4 of 5 females collected at T11 in August but no incidence of ova-testis was observed. Vtg concentrations in males were significantly different between the two sites with

higher values in T11 in February and August but lower values in November. With the exception of male samples collected at T11 in November, the average male Vtg concentrations of all the sampling events exceeded the concentrations of purged control animals and male animals collected at Dana Point in February 2006. Over all, the results exhibited estrogenic responses and similar developmental status in male hornyhead turbot at T1 and T11. With undetectable Vtg concentrations similar to purged control animals, males collected at Dana Point in February suggest that this location has potential as a reference site for further evaluation.

146 REGION-ASSOCIATED DISRUPTION OF FLATFISH ENDOCRINE SYSTEMS – STUDIES IN THE SOUTHERN CALIFORNIA BIGHT

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Despite the enormous human population affecting southern California's marine environment, the issue of environmental endocrine disruption in marine wildlife has been poorly studied in this region. Our work and that of our collaborators has uncovered evidence of endocrine-disrupted states in flatfish living in locales affected by wastewater treatment plant (WWTP) outfalls, as compared with fish at more distal "reference" sites. Among these pieces of evidence are a blunted endocrine stress response (impaired hypothalamo-pituitary-interrenal axis) and significantly reduced levels of the important growth-regulatory peptide, insulin-like growth factor-I (IGF-I). Additionally, in a non-migratory flatfish species (hornyhead turbot, *Pleuronichthys verticalis*), levels of the sex steroids, 17 β -estradiol and testosterone are significantly altered in association with proximity to WWTP outfalls. These observed endocrine alterations will be discussed in terms of potential underlying causes and interactions between endocrine systems in these fishes. [Support by Southern California Sea Grant College Program].

147 IN VIVO BIOASSAY GUIDED FRACTIONATION OF MARINE SEDIMENT EXTRACTS FROM THE SOUTHERN CALIFORNIA BIGHT FOR ESTROGENIC ACTIVITY.

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The exposure and uptake of environmental estrogenic compounds have been reported in previous studies of demersal flatfish species in the central Southern California Bight (SCB). The objective of this study was to evaluate the feminizing activity of marine sediments from the SCB by using *in vivo* vitellogenin (Vtg) assays in male or juvenile fish. In 2003, sediments were collected near wastewater outfalls serving the counties of Los Angeles (LACSD) and Orange (OCSD), and the city of San Diego (SD). Cultured male California Halibut (CH) (*Paralichthys californicus*) were either directly exposed to sediments for 7 days or treated with two intraperitoneal injections of

sediment extract over seven days. 17 β -Estradiol (E2) equivalent values ranged from 1-90 μ g/kg with LACSD > SD > OCSD. Measurable concentrations of E2 were observed in all sediment extracts. Estrone (E1) was only observed in sediments near the LACSD outfall. Alkylphenols and alkylphenol ethoxylates were observed in all sediment samples but were highest near the OCSD outfall. Fractionation studies of the LACSD sediment extract failed to demonstrate relationships between Vtg expression and 62 analytes including E2, which was observed in whole extract (2.9 ng/g). Oxybenzone (1.6 ng/g) was identified in bioactive fractions as well as unknown compounds of relatively high polarity. These results indicate estrogenic compounds other than classic natural and xenoestrogens may contribute to estrogenic activity of sediments from the SCB.

148 PALOS VERDES SHELF REMEDIATION AND RESTORATION PLENARY - HISTORICAL AND LEGAL OVERVIEW

John Saurenman, Supervising Deputy Attorney General, California Department of Justice

A discussion of the history of DDT/PCB contamination on the shelf, the legal battles which were settled for 140 M dollars, and how that money was divided among the various remediation/restoration entities.

149 PALOS VERDES SHELF REMEDIATION AND RESTORATION PLENARY - INSTITUTIONAL CONTROLS

Sharon Lin, Remedial Project Manager, Public Outreach and Education, USEPA Region 9

The institutional control (IC) program is focused on the protection of human populations at risk to DDT and PCB exposure from eating contaminated fish. The ICs program consists of public outreach to at risk populations, fish contamination monitoring, and white croaker commercial catch ban and bag limit enforcement. The ICs program has been in full implementation phase since 2002. The stakeholders of the PV Shelf project completed a series of workshops to develop a revised strategic plan for the ICs components in Fall 2005. The presenter will show a video describing the ICs program with an emphasis on the public outreach component of the program, the Fish Contamination Education Collaborative. The presenter will give a status update on the program and discuss any related subjects that are of interest to the meeting attendees.

150 PALOS VERDES SHELF REMEDIATION AND RESTORATION PLENARY - RESOURCE RESTORATION

Dave Witting, Montrose Settlement Restoration Program

Provide an overview of the recently released final plan for restoring natural resource injuries caused by DDTs and PCBs discharged onto the Palos Verdes shelf. The plan details how they intend to restore fishing services, fish habitat, bald eagles, peregrine falcons, and seabirds to the Southern California Bight. The presentation will describe the status of a comprehensive fish contamination study for DDTs, PCBs and mercury and how results from this study will guide resource restoration projects.

**151 PALOS VERDES SHELF REMEDIATION AND RESTORATION PLENARY -
SITE REMEDIATION**

Carmen White, Remedial Project Manager, Superfund Division, USEPA Region 9

Provide an overview of the studies conducted regarding characterization of the site and a discussion of the options being considered for site remediation. EPA is getting ready to release its remedial investigation report, which will show why there are no easy answers to cleaning up Palos Verdes Shelf. Discussion of remedial options is encouraged.

**152 NITROGEN DEPOSITION IN SOUTHERN CALIFORNIA: IMPACTS ON
PLANT AND FOREST HEALTH, NUTRIENT CYCLING, WATER QUALITY,
AND ECOSYSTEM SUSTAINABILITY.**

Fenn, M.E.*, USDA Forest Service, Pacific Southwest Experiment Station, Riverside, CA

Atmospheric nitrogen (N) deposition to montane sites in the South Coast (Los Angeles) Air Basin is the highest reported in North America. Although NO_x emissions have declined dramatically in recent years, N deposition yet remains unusually high in montane areas directly exposed to incoming smog. Dry deposition is often the major input form because of long smoggy dry periods. However, in sites with regular fog occurrence, N deposition in fog is also a major N deposition input to forests. Nitrogenous emissions generally come from urban sources comprised of the transportation sector as well as industrial and domestic emissions. In some areas agricultural emissions are still an important but declining source as agricultural land is converted to suburban uses. Nitrogen oxide emissions are precursors to ozone formation; thus N deposition and ozone exposure co-occur in polluted areas. Ozone is phytotoxic while N is generally a plant growth promoter. The combined effects of these pollutant types on forests causes fundamental perturbations in nutrient cycling, tree physiology, fuel accumulation and forest sustainability. The other major environmental impact of chronic N deposition is increased nitrate levels in runoff and groundwater from montane watersheds, decreasing water quality. Accumulated N from atmospheric deposition is affecting low elevation coastal sage scrub ecosystems, chaparral catchments, forest health, and Class I Wilderness areas in southern California.

**153 DRY AND WET ATMOSPHERIC DEPOSITIONS OF SELECTED
INSECTICIDES IN THE SAN DIEGO CREEK-NEWPORT BAY
WATERSHED.**

Jay Gan,* Wenjian Lao, Svetlana Bondarenko, and Fredrick Ernst. Department of Environmental Science, University of California, Riverside.

A Total Maximum Daily Load (TMDL) for diazinon and chlorpyrifos in the Newport Bay watershed was promulgated by USEPA in June 2002 and adopted by the Regional Board in April 2003. Similarly, a TMDL for organochlorine compounds including DDT was promulgated by USEPA and is scheduled for adoption by the Regional Board in 2007. The TMDL implementation plan requires that a study be performed to characterize the significance of atmospheric deposition of selected insecticides in the Upper Newport Bay. In this study we measured levels of selected pesticides, including chlorpyrifos, diazinon, malathion, carbaryl, organochlorine pesticides, and synthetic pyrethroids in the near-surface atmosphere, in dust, and in precipitation at locations in the Newport Bay watershed. Air samples were taken using a high volume sampler with polyurethane foam plugs at four locations in the summer months of 2005. Dust samples were collected using a flat panel at three locations under dry weather conditions.

Rain samples were collected through the winter of 2005 and 2006 at three locations in the watershed. Samples were extracted and analyzed using standard methods. Preliminary results in concentrations will be presented and discussed at the meeting.

154 THE DRY DEPOSITION AND RESUSPENSION OF PARTICLE-ASSOCIATED TRACE METALS NEAR A FREEWAY IN LOS ANGELES.

Lisa D. Sabin* and Kenneth C. Schiff. Southern California Coastal Water Research Project, Westminster, CA. Jeong Hee Lim, Maria Teresa Venezia, Arthur M. Winer^c, and Keith D. Stolzenbach. University of California, Los Angeles, CA.

Dry atmospheric deposition represents a potentially large source of trace metal contamination in urban stormwater runoff, yet there is a limited amount of research on the relationship between atmospheric emissions and water quality problems in urban areas. In Los Angeles, which has among the worst air quality in the nation, significant quantities of toxic materials are released into the atmosphere every day, and paved road dust represents the largest source of particle-associated trace metal emissions to the atmosphere. In order to better understand the role of roadways as a source of localized trace metal deposition, we characterized the horizontal dry deposition patterns of chromium, copper, lead, nickel and zinc upwind and at increasing distances downwind of the I-405 Freeway in coastal Los Angeles. Dry deposition fluxes and atmospheric concentrations of these metals were highest at the site closest to the freeway, and reduced to approximately urban background concentrations within 150 m downwind of the freeway. Compared with urban background, atmospheric particle size distributions indicated the freeway was a significant source of trace metals on large particles > 6 μm in diameter, which deposit close to their source and account for the increased dry deposition flux rates observed near the freeway. The spatial pattern of measured deposition flux was well predicted by a relatively simple line-source Gaussian plume model modified to include particle deposition and resuspension. The model results indicated dilution by vertical dispersion of the plume was the most important mechanism regulating downwind concentrations and deposition.

155 DEPOSITION AND RESUSPENSION PROCESSES ON SURFACE CONTAMINATION AND AIR CONCENTRATION PROFILES.

Jeong Hee Lim*, Keith D. Stolzenbach. Civil and Environmental Engineering Department, University of California, Los Angeles, CA.

A formulated line-source Gaussian plume model was used to estimate vertical and horizontal air concentration profiles and horizontal fluxes of surface contamination. The model included both deposition and resuspension parameters. A rapid reduction of air concentration was observed below a height of 5 m and within a 200 m horizontal distance from the source. The ground level concentration was highest when there was no deposition and resuspension, but rapidly decreased with horizontal distance from the source. As deposition velocity increased, the time for surface contamination to reach steady state increased proportionally. The net accumulation of surface contamination increased as the dependence of the resuspension rate on wind speed decreased.

156 USE OF *IN SITU* HATCHBOX STUDIES TO EVALUATE WATER QUALITY EFFECTS

Howard Bailey^{1*}, Ben Chalmers², and James Elphick¹ ¹Nautilus Environmental, San Diego, CA.
²Myra Falls Mine, Campbell River, British Columbia

Laboratory toxicity tests have been criticized on the basis that their results may not reflect site-specific conditions. Conversely, interpreting the results of bioassessment studies may be problematic due to the inability to control for the movements of organisms in the receiving environment, as well as difficulties distinguishing between water quality and habitat effects. Thus, the use of *in situ* studies may provide an opportunity to quantitatively evaluate the potential effects of a discharge under the conditions found in the actual receiving environment. This presentation describes the approach used at the Myra Falls mine to evaluate the potential for discharge effects in the receiving environment. Eyed trout embryos were placed in hatchboxes at different locations to identify any potential for toxicity in Myra Creek. The reference site was located upstream of the discharge, and potential impact sites were located downstream of the discharge. Hatchboxes were also placed at selected locations to identify possible inputs of contaminated subsurface flows. Both lethal and sub-lethal endpoints were evaluated, including survival, hatching success, and growth. Last year's presentation focused on methods and perceived benefits associated with this approach; this year's presentation will focus on some of the practical issues and the results.

157 EVALUATION OF IMPACTS AND BENEFITS ASSOCIATED WITH DISCHARGE OF TREATED EFFLUENT TO THE SANTA CLARA RIVER ESTUARY.

Bailey, Howard C.¹; Stransky, Chris¹; Kamman, Greg²; and Pfeifer, Dan³. ¹Nautilus Environmental, San Diego, CA. ²Kamman Hydrology and Engineering, Inc., San Rafael, CA. ³City of San Buenaventura, Ventura, CA.

The objective of this study was to evaluate impacts and benefits associated with discharge of treated wastewater to the Santa Clara River Estuary. The estuary is located in a semi-arid region of California that has been subjected to intensive habitat and water development over time. The analysis included evaluation of effluent toxicity and sediment quality, as well as investigations of ecological and hydrological function. The frequency and magnitude of toxicity in samples from the estuary was minimal, and not related to the discharge. In addition, the sediment quality investigation indicated that contaminants of concern were not accumulating in estuary sediments, and that the intermittent adverse effects observed in sediment toxicity tests were largely due to grain size effects. The ecological investigation showed that changes in flora and fauna could be attributed to changes in land use that resulted in a decrease in estuary size of approximately 90% between the late 1800s and 2003. The hydrological analysis demonstrated that the discharge accounts for a portion of the river flows that would have historically reached the estuary, but which have been diverted for other uses upstream. Overall, the study demonstrated that the discharge has no demonstrable negative impacts on the estuary, and supports beneficial uses by maintaining water quality and habitat. In a broader perspective, this study is an example of a robust approach that integrates several environmental disciplines to evaluate the extent of impacts (both positive and negative) to a given receiving environment.

158 CHARACTERIZATION OF CHOLINESTERASES FROM TWO DEMERSAL FLATFISH COLLECTED NEAR A MUNICIPAL WASTEWATER OUTFALL IN SOUTHERN CALIFORNIA

Gabriela Rodriguez-Fuentes^{1*}, Daniel Schlenk¹ and Jeff Armstrong². ¹University of California Riverside, Riverside CA ; ²OCSD, Fountain Valley, CA.

Two cholinesterases (ChE) present in vertebrates, acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) are distributed in tissues in species-specific patterns. English sole and Horneyhead turbot muscle ChE activities were measured from in two locations off the coast of Southern California. Biochemical characterization in both species was done according to differences in size or gender. To characterize the ChEs two substrates were tested: acetylthiocholine iodide (ASChI) and butyrylthiocholine iodide (BSChI). Eserine, BW284c51, and iso-OMPA were used as selective inhibitors for ChE, acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE), respectively. Pesticide sensitivity was evaluated with Aldicarb and Paraoxon.

English sole muscle ChE correlated with total fish length ($r = -0.3271$). No significant differences were observed between genders and sampling sites. Substrate preference assay shown that both ChE are found in muscle, BChE represents about 36% of the total ChE activity. Data resulting from the use of selective inhibitors suggested the presence of an atypical BChE because its kinetic parameters had characteristics of both ChEs. Higher sensitivity to pesticide inhibition was observed in ChEs from smaller size fish.

Horneyhead turbot muscle ChE activities presented significant differences between males and females but no correlation was found with total length. No significant differences were observed between sampling sites. Both ChEs were also present with BChE activity constituting 88% of the total ChE activity. Selective inhibitor results indicated the presence of an atypical ChE. Male ChE were more sensitive to pesticide inhibition.

Species, size and gender dependent differences in ChE may contribute to differences in susceptibility to ChE-inhibiting toxicants encountered in the environment.

159 TOXICITY IDENTIFICATION EVALUATION (TIE) CASE STUDY OF A GEOTHERMAL ELECTRIC PLANT LOCATED IN SOUTHERN CALIFORNIA.

John Rudolph, Chris Stransky, and Howard Bailey. Nautilus Environmental, San Diego, CA 92121.

A geothermal electric plant located in Southern California has consistently exhibited toxicity in their monthly NPDES monitoring to the Cladoceran *Ceriodaphnia dubia*, whereas the fathead minnow, *Pimephales promelas*, has not generally shown toxicity. Upon performing acute testing with *C. dubia*, it was determined that samples collected within days of each other were extremely variable in their toxicity. Routine Phase I TIE treatments were generally ineffective at removing toxicity; however, it was determined that the toxicity of the samples was inversely related to pH. In addition, the presence of ammonia complicated interpretation of the TIE results because there was sufficient ammonia present in at least some of the samples to result in toxicity if the pH was increased to 9. TIE testing on several samples collected during a site visit to the plant demonstrated that sulfides and ammonia could be major contributors to the toxicity. However, further investigations into plant operations revealed that frequent chlorination events could be oxidizing ammonia to nitrite. Nitrite analysis of all archived samples indicated that, with few exceptions, a tight relationship existed between nitrite levels and toxicity. Phase II TIE investigations have identified nitrite as the primary toxicant of concern, with ammonia being a secondary toxicant (depending on the pH of the sample). Elevated TDS remains an issue with

respect to chronic toxicity to *C. dubia*, and hydrogen sulfide could become a concern depending on seasonal changes in influent streams. Routine monthly testing is continuing in order to confirm these relationships.

160 EXTENT AND MAGNITUDE OF COPPER CONTAMINATION IN MARINAS OF THE SAN DIEGO REGION

Kenneth Schiff*, Jeff Brown and Dario Diehl, Southern California Coastal Water Research Project, Westminster, CA

Marinas are areas of special water quality concern because of the potential for pollutant accumulation within their protected waters. Perhaps the largest contaminant source to marinas is antifouling paints that leach copper to prevent the growth of encrusting organisms on vessel bottoms. Despite the potential environmental risk in marinas, particularly in San Diego, California, where as many as 17,000 recreational vessels are berthed, very little monitoring of marinas has been conducted. The objective of this study was two-fold: 1) Determine the extent and magnitude of dissolved copper concentrations in marinas throughout the San Diego region, and 2) Determine if elevated copper concentrations in marinas of the San Diego region are resulting in adverse biological impacts. A probabilistic study design was used to sample water-column copper concentrations and toxicity (using *Mytilus galloprovincialis*) at 30 stations. Results indicated that exceedance of state water quality objectives was widespread (86% of marina area), but that toxicity was much less prevalent (21% of marina area). Toxicity identification evaluations (TIEs) conducted at the most toxic sites indicated that toxicity was largely due to trace metals, most likely copper. Toxicity was reduced using TIE treatments that chelated trace metals such as cation exchange column, ethylenediaminetetraacetic acid (EDTA), sodium thiosulfate (STS). Moreover, increasing dissolved copper concentrations correlated with increasing toxicity and these copper concentrations were high enough to account for virtually all of the observed toxicity.

161 PHYSICAL ASPECTS OF SOUTHERN CALIFORNIA BEACHES AND HOW PEOPLE PERCEIVE THEM: CONSIDERATIONS FOR BEACH NOURISHMENT PLANNING

Scott H. Grove, Sonora High School, La Habra, CA

Beaches are California's number one tourist and recreational destination. This study of Southern California beaches has two parts. Part 1 provides a snap shot of the beaches of Southern California, recording comparative physical properties at intervals along the 200-mile shoreline from Point Conception to the San Diego boarder. Results of the first part of this study show that beaches in Southern California have a dramatic variety of widths as well as sand types, colors, and textures. Part 2 of the study surveys people's opinions of Southern California beaches. To accomplish this, a "Beach Sand Survey" was given to 225 people who were divided into three groups: 1) the public – beach users; 2) coastal resource scientists, agency professionals, and educators; and 3) coastal engineers and geologists. The survey was designed to assess what physical beach factors are considered important. Survey results revealed that people have a wide variety of reasons why they enjoy going to the beach and a wide set of perceptions concerning our beaches. For example: While most prefer moderately wide beaches with fine texture sand, some favor very narrow and pebbly beaches, noting that these types of beaches may be adjacent to the best places for either surfing or tidepooling. The "Beach Sand Survey" also asks whether people are in favor of restoring Southern California beaches using beach nourishment if erosion has unfavorably narrowed them. People had mixed opinions regarding bringing new sand onto

the beaches, but with the majority favoring nourishment and the majority willing to pay an extra tax to have their beaches restored.

162 TRANSPLANTED XY SPERMATOGONIA STEM CELLS COLONIZE IN THE SEMINIFEROUS TUBULES OF XXY MICE

B. Chuck and Y. Lue, Department of Medicine, LABiomed at Harbor-UCLA Medical Center, Torrance, CA 90502

Klinefelter syndrome (XXY males) is the most common sex chromosome aneuploidy, occurring in about 1.2 per 1000 liveborn male births. An experimental XXY mouse model has been developed and characterized for the purpose of uncovering the molecular mechanism of KS. It has been demonstrated that adult XXY mice have absence of germ cells, decreased serum testosterone levels, elevated serum FSH levels and impaired learning and memory. Furthermore, it has been shown that massive germ cell loss occurs within 10 days after birth, indicating that testicular failure begins early in XXY mice. It was hypothesized that in addition to germ cell defect, Sertoli cell dysfunction may contribute to the spermatogenetic failure in XXY mice. To test this hypothesis, testicular cells from 4-6 wks old transgenic mice (XY) were harvested and engineered to express green fluorescent protein (GFP). These cells were then injected them directly into the seminiferous tubules of adult XXY mice and busulfan-treated recipient testes of wild-type (XY) mice. Ten weeks after transplantation, these recipient mice testes were removed. Decapsulated testes were examined under fluorescence microscopy to detect the GFP labelled cells. Immunohistochemistry was performed for detection of cells with GFP expression. Under fluorescent microscopy, green fluorescence (GFP positive cells) was present within seminiferous tubules of busulfan-treated XY mice, but not in XXY mice. Immunohistochemistry on serial testicular sections demonstrated that GFP positive spermatogonia present in some of the seminiferous tubules of XXY mice, but more abundant in busulfan-treated XY mice. In some recipients, GFP positive Leydig cells were found in the interstitium of both XY and XXY mice. This demonstrates that XY testicular cells transplanted into XXY testes are able to survive for 10 weeks. Donor XY spermatogonia could colonize in the seminiferous tubules and donor Leydig cells reside in the interstitium of XXY testis (presumably arriving through puncture or rupture of tubules). It has been concluded that 1) XXY testicular environment allows XY Leydig cells to seed in the interstitium and 2) XXY Sertoli cells are sufficiently functional for XY spermatogonia to reside in the XXY seminiferous tubules. (Supported in part by LABiomed Seed Grant to YLue).

163 COUNTING THE MICROINFARCT(S) IN SECTION R-19 OF A HUMAN BRAIN

Huynh, Tommy. Neuroscience Method Research Group, University of Southern California, Department of Neurology, Los Angeles, CA, 90242

Ischemic vascular dementia (IVD) is a relatively uncommon entity, in the course of which multiple ischemic brain lesions result in progressive memory impairment. Ischemic brain lesions may also aggravate the neuropsychologic deficit of Alzheimer disease (AD). The most commonly observed neuropathologic abnormalities were lacunar infarcts and microinfarcts (Vinters, 2000). Microinfarcts are by lesions not visible on gross inspection of the brain slices but are apparent on subsequent microscopic review of the case. Microinfarcts can be easily seen by routine hematoxylin and eosin-stained sections. A method was developed in processing entire sections of the human brain using an Aliquot Mixer, therefore allowing the staining of the tissue.

In the nineteenth section of this non-IVD brain, microinfarcts were not prevalent in the diagrammed regions in both the cortical and white matter, thus showing that microinfarcts are not in great numbers in patients without IVD.

164 MUTAGENIC ANALYSIS OF THE CYTOCHROME P450 14 α -DEMETHYLASE (CkCyp51p) TO AZOLE RESISTANCE IN *CANDIDA KRUSEI*.

Da Eun Im, Trang Phan, Hyunsook Park, and Scott G. Filler. Division of Infectious Diseases, Department of Medicine, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, CA 90502.

Candida krusei is an opportunistic pathogen that can cause serious infections in immunocompromised patients. Because *C. krusei* is intrinsically resistant to azole, this organism is a significant concern with the rise in the use of azole antifungal agents. Our previous study indicates that the main mechanism of fluconazole resistance in *C. krusei* is the alternation in the target enzyme, cytochrome P450 14 α -demethylase (*CkCYP51*, *CkERG16*), which is inhibited by azoles to cause an accumulation of C₁₄ methylated sterols that disrupts membrane structure. In this study, we have compared the amino acid sequence of *CkCyp51p*, which is resistant to azoles and *C. albicans* Erg16p, which is azole-susceptible. We hypothesized that the mutation of some amino acid in conserved region makes *C. krusei* become more resistant to azole drug during evolution. To prove this hypothesis, we introduced point mutations in *CkCYP51* by in vitro mutagenesis, potentially changing the active pockets for azole binding. We compared the susceptibility of *Saccharomyces cerevisiae* strains, which expressed these mutated proteins, to voriconazole and fluconazole and that of the strains expressing *CaERG16*. We identified that the protein possessing mutations in *ckCYP51*: Ile437 to Val, Val156 to Phe, and Ile404 to Val caused altered drug sensitivity to twofold more compared to wild type CkCYP51. This result indicates that this region is critically important in governing drug resistance; however, the point mutation may not be enough for diminishing azole-resistance. Further work will involve deletion of the functional domain of *CkCYP51*.

165 FACTORS AFFECTING BALANCE AND PCP DISORDERS: THE INFLUENCE OF NATURAL STIMULI IN MICE UTRICLES YEAR 2.

D. E. Lluncor Palos Verdes Peninsula High School and David Geffen School of Medicine at UCLA. Division of Neurobiology Head and Neck Surgery Laboratory of Vestibular/Sensory Neurobiology, Los Angeles, CA 90095.

One otolithic organ, the utricle, has otoconia which acts upon the hair cells distinct polarization of cilia, called the morphological polarization vector (MPV). This project examines the effect of otoconia as stimuli upon the MPV orientation. The het/het and tlt/tlt mutation inhibits otoconia formation. When compared to the wild type and het/plus mice, otoconia is the experimental variable. The tissue was prepared and imaged for confocal microscopy. A highly analytical methodology was created to assess precise MPV orientation. The data was collected from twelve mice utricles, totaling 5837 traced MPV angles. Using the independent variable two sample t-test, 78.5% of the 28 het/het and het/plus regions and 68.5% of the 35 tlt/tlt and wild type regions had equal MPVs. The majority of angle distributions were equal, suggesting MPV organization is stimuli independent. This experiment might have specified a class of factors contributing to MPV maintenance.

166 EFFECTS OF STRESS AND EXERCISE IN BRAIN-DERIVED NEUROTROPHIC FACTOR EXPRESSION

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It was previously shown that chronic restraint stress induces an upregulation of activated Bcl-2 Associated protein X (Bax), a molecule that promotes neuronal apoptosis. Exercise served to lower levels of Bax, the reason for which was hypothesized to be elevation in trophic factor expression, in particular brain-derived neurotrophic factor (BDNF). BDNF, markedly expressed in the hippocampus, the part of the brain responsible for spatial learning and memory, is a protein that serves as a neurotransmitter regulator and aids in long-term potentiation and learning. BDNF can also activate phosphatidylinositol 3-kinase, mitogen-associated protein kinase, and other cell survival pathways; it has the potential to protect against stress-induced harm in neurons. In the current study, rat models were subjected to acute stress by immobilization and/or allowed to exercise by a running wheel 14 days prior. Four treatment groups were compared: stress-only, exercise-only, exercise with stress, and control (with neither stress nor exercise). Hippocampal BDNF mRNA levels were analyzed via *in-situ* hybridization. In the CA3 region of the hippocampus, the exercise-only group showed higher BDNF mRNA levels than those of the stress-only group. This comparison is consistent with data from earlier studies in this lab. Also consistent with Bax levels, these data suggest that BDNF plays some role in countering the harmful effects of stress.

167 CAPILLARY ELECTROPHORESIS-BASED SELECTION OF APTAMERS WITH AFFINITY FOR PLATELET-DERIVED GROWTH FACTOR (PDGF)

Hilary Ruiz, Arwen Brown, and Christina D. Smolke. Smolke Research Group, California Institute of Technology, Department of Chemical Engineering, CA, 91125.

Aptamers are single-stranded nucleic acids that have great potential as tools for protein analysis in the fields of therapeutics and disease diagnosis. Aptamers can be selected *in vitro* by a process called the Systematic Evolution of Ligands by Exponential enrichment (SELEX). It is this mechanism that allows for the isolation of oligonucleotide sequences that can bind to molecular targets. Because of how aptamers recognize different classes of target molecules with high affinity and specificity, they can be thought of as nucleic acid antibodies. In this project, capillary electrophoresis was used as a separation technique in the development of a SELEX process for the isolation of aptamers for the platelet-derived growth factor (PDGF) protein.

168 MICRO PATHOLOGY LAB CHIP FOR DETECTING MOLECULAR LESIONS OF GLIOBLASTOMA

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Current methods for cancer diagnosis commonly utilize imaging (MRI, PET), needle biopsies, and microscopic examination of diseased tissue. These methods, however, are inadequate because they can detect distinguishing morphological patterns, but lack the capability to accurately identify molecular markers and intercellular interactions specific to a particular type of cancer. In glioblastoma, the most lethal form of brain cancer, the PI3K/Akt signaling pathways are activated by EGFRvIII and undergo a series of phosphorylations proteins such as PTEN,

mTOR, EGFR etc. Detecting and analyzing the interaction among these proteins using a systems biology approach will improve the pathological diagnosis of cancer. Through this project, a Micro Pathology Lab Chip (µPLC) that can detect and analyze cell-signaling pathways has been created by microfluidic technology. PTEN was detected in this system and showed to be 19.7 fold greater in fluorescence intensity than in lysates without the presence of PTEN. EGFRvIII was also identified in this system and showed detection efficiency two times greater than the controls. These results indicate the promising applications of the Micro Pathology Lab Chip (µPLC) in laboratory research and medicine. The detection and understanding of specific cell-signaling pathways and intercellular interactions can lead to the development of patient specific medications and treatment.

169 BIOARTIFICIAL HEART TISSUE: AN ELECTROACTIVE POLYMER FOR CARDIAC PATCHES

Karis R. Tang-Quan, Palos Verdes Peninsula High School, Rolling Hills Estates, CA 90274.
Mentor: Dr. Ben Wu, UCLA, Department of Bioengineering, Los Angeles, CA 90095.

Tissue engineering seeks to replace heart infarcts with functional engineered heart tissue. The project aimed to study the effects of mechanical and electrical stimulation for engineering cardiac patches. The project investigated further the effectiveness of a polymer and scaffold for cardiac tissue engineering.

Electrospinning of polyurethane (PU) created an elastic scaffold. An electroactive polymer was developed to provide stimulation. Eleven trials of 30 samples of human foreskin fibroblasts (HFF) and cardiomyocytes were cultured. Immunofluorescence and scanning electron microscopy (SEM) were used to collect images.

The design of the polymer is novel but unstable. Morphology and directional orientation of the layers of cells indicate proper cell signaling. The properties of PU are unique to the needs of cardiomyocytes because the fibers participate in contraction with the cells, instead of inhibiting it.

The effects of electrical and mechanical stimulation on cardiomyocytes using an electroactive polymer could not be studied. However, a greater discovery was made in the second part of the project objective—the application of PU as a scaffold. Electrospinning brought out novel advantages to using PU in engineering cardiac patches.

170 MYOSTATIN EFFECT ON BODY COMPOSITION IN GENETICALLY MODIFIED MICE

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Purpose: Myostatin (Mst), a member of the TGF- β superfamily, is a negative regulator of skeletal muscle mass. In animals and humans, inactivation of Mst is associated with an increase in skeletal muscle mass while increased levels of Mst result in significant muscle loss. Aging is associated with the increase of Mst levels and fat mass. We hypothesized that the regulation of skeletal muscle and fat mass is partially coordinated by Mst. The purpose of this study was to delineate the role of Mst, and its effect on body composition, using Mst overexpressing transgenic and knock out mice in the age-dependent process.

Methods: Transgenic animals were generated by pronuclei injection of muscle creatine kinase promoter driven Mst cDNA construct into C57/Bl6 inbred mouse strain. Mst knock out (KO) animals were generated at John Hopkins University. In each study group, we used 5 animals,

twelve months of age. Animals were positioned into a MicroCAT II CT scan. The three dimensional reconstructed animals were sliced for quantification and comparison.

Results: The Mst transgenic animals were 10 % heavier, had 27 % less hind limb muscle mass, and 3.2 time more abdominal fat, compared to controls. The Mst KO mice were 22 % heavier, had 67 % more hind limb muscle mass, and 70 % less abdominal fat mass. To our knowledge, this is the first quantitative demonstration of changes in muscle and fat mass caused by overexpression or inhibition of the Mst protein.

Conclusions: These data suggest that Mst has a remarkable effect on body composition during aging. The consequences of these data may be related with muscle dysfunction, arteriosclerosis, diabetes, and heart failure. With age advancement, individuals lose lean protein tissue and gain adipose tissue. Thus, skeletal muscle protein is particularly susceptible to aging. The animals used in this project may be an excellent model for studying the aging process.

171 HEAT SHOCK PROTEIN 70 (HSP70) EXPRESSION IN MULTIPLE SCLEROSIS

Young, Amy. Multiple Sclerosis Research Group. University of Southern California, Keck School of Medicine, McKibben Hall, 1333 San Pablo Street, Los Angeles, CA, 90033.

Multiple Sclerosis is an autoimmune disease of the central nervous system which results in significant areas of demyelination, caused by the immune system attacking the myelin, thinking it's a foreign antigen. There are three main neural lineage cell types in the brain; neurons, astrocytes, and oligodendrocytes. Heat shock proteins (Hsp) are essential to the everyday survival of cells but play a significant role in the protection of all cellular proteins following stress, by binding to and ensuring they retain their shape and activity. Hsp can also work as immune stimulators, taking these cellular proteins to the immune system and causing increased immune responses to these proteins.

The data describes the identification of a typical active MS lesion where the demyelination has occurred. In and around this lesion are many mononuclear cells, including macrophages and also a large number of cells expressing one of the major Hsp, namely Hsp70. Using immunofluorescence and immunohistochemistry, I was able to successfully identify the three different lineages of neural cells in the tissues, with differential expression of oligodendrocytes and astrocytes observed on and around the lesions. The ability to detect Hsp70 in and around MS lesions and the staining of different lineages of neural cells provide an important basis for the ongoing research to determining which neural cells overexpress Hsp70 in the MS lesion.

172 DETECTION OF METAL FATIGUE AND DEFECTS BY ELECTRON WORK FUNCTION TOPOGRAPHY AND GRADIENT

Geoffrey Woo. Palos Verdes Peninsula High School, Mentor Dr. Seth Putterman, UCLA, Department of Physics and Astronomy, Los Angeles, CA 90095.

This paper explores the relationship between electron work function (EWF) gradient and metal fatigue and defects. Although multiple techniques have been developed for non-destructive evaluation of a material, no effective *real-time* method to actively detect and monitor the effects of defects and fatigue on a material currently exists. This study observes novel phenomena with implications for an original non-destructive, non-contact, real-time metal monitoring method. This study also proposes a parallel dislocation mechanism for both exo-electron emission of metals and deformation luminescence of ionic crystals, which was studied previously, in material fatigue and defect analysis. Because low-energy exo-electrons dissipate quickly in the atmosphere, the Kelvin method, which measures the work function gradient, was utilized to

measure the increased surface electric potential resulting from exo-electron emission. Using compressive and three-point bending tests on hardened aluminum, the EWF gradient was found to be (1) a clear real-time indicator for metal fatigue, (2) a real-time monitor tracking a metal's progressive deterioration induced by cyclical load, and (3) useful for determining stress/strain levels through derived mathematical modeling. EWF topographies, taken from a Kelvin probe mounted on a three-dimensional stage, were found to be effective in (1) identifying and pinpointing the locations of both surface and internal flaws, and (2) visualizing the stress distributions of a metal under load. These findings may lead to safer use of vehicles, machines, and structures.

173 EXPOSURE TO HYPEROXIA DURING PERINATAL PERIOD DISRUPTS SPECIFIC PULMONARY ALVEOLAR EPITHELIAL-MESENCHYMAL SIGNALING PATHWAYS

Sanvi Kabre, Sharon Sugano, Dr. John S. Torday, Dr. Virender K. Rehan Dept. of Pediatrics and Obstetrics & Gynecology, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, CA.

Bronchopulmonary dysplasia (BPD) remains a major cause of morbidity and mortality in the premature infant. Although exposure to hyperoxia is commonly implicated in BPD pathogenesis, the underlying molecular mechanisms remain unclear. There is increasing evidence that lipid interstitial fibroblasts play a key role in injury-repair mechanisms in a variety of organ systems. In the lung, pulmonary interstitial fibroblasts are classified into lipid containing lipofibroblasts and non-lipid containing interstitial cells, myofibroblast, that are located more peripherally in the alveolar septum.

Lipofibroblasts are characterized by the expression of biomarkers, such as *PTHrPR*, *ADRP*, and *PPAR γ* . Myofibroblast phenotypes are characterized by the expression of α -SMA and the absence of lipid storage. Although the functional role of pulmonary fibroblasts remain incompletely understood, lipofibroblasts synthesize and secrete growth factors necessary for normal lung growth and development; provide substrate for surfactant phospholipid synthesis, and store neutral lipids that act as antioxidants. In contrast, myofibroblasts play a major role in chronic inflammation and pulmonary fibrosis.

Exposure to hyperoxia exacerbates change from lipofibroblasts to myofibroblasts. Specifically down-regulating Platelet Derived Growth Factor (PDGF) mediated alveolar signaling. With excessive mechanical stress to lipofibroblasts, expression of PTHrP-R and other lipogenic markers decreased and lipofibroblasts transdifferentiated to myofibroblast. However, the effect of oxygen exposure on this lipo-to- myofibroblast transdifferentiation is unknown.

Our objective was to examine the effect of O₂ on the transdifferentiation of pulmonary lipofibroblasts cultured from preterm and near term fetal lung. Gestational day 18 and 21 fetal rat lung fibroblasts were obtained from time-mated Sprague Dawley rats.

We speculate that this is a critical molecular event underlying the hyperoxic lung injury, and in the pathogenesis of BPD. Further, induction of adipogenic transcription factors may not only prevent but, in fact, reverse the myogenic fibroblast to an adipogenic phenotype.

174 INVESTIGATING PROTOCOLS FOR *HALIOTIS RUFESCENS* EGG CRYOPRESERVATION

Julie A. Guerin. Cabrillo Marine Aquarium, San Pedro, CA 90731; Palos Verdes Peninsula High School, Rolling Hills Estates, CA 90274

The purpose of this study was to investigate cryopreservation protocols which would yield results for normal red abalone (*Haliotis rufescens*) egg phenotype after thawing. The objectives were to determine whether eggs can be successfully cryopreserved using a stepwise cooling and thawing procedure, which cryoprotectant agent (CPA) is most effective, and whether a non-permeating cryoprotectant (sucrose) can aid in the thawing and rehydration process.

After induced spawning and egg collection, four freezing trials were conducted using CPA 'Freezing Medium' (FM) or dimethyl sulfoxide (DMSO) at 8 and 16 mins stepwise gradual cooling and non-stepwise 1 min cooling, before plunging into liquid nitrogen. A total of 45 stepwise and non-stepwise thawing protocols were tested with and without sucrose.

Best results were found in protocols using DMSO at 8 and 16 mins stepwise cooling, and stepwise thawing with sucrose amounts of 1.25g or 2.5g, yielding 25% to 50% (8mins) and 50% to 75% (16mins) normal egg phenotypes. Non-stepwise protocols resulted in 75% to 100% eggs bursting with the remainder abnormal. Thawing protocols without sucrose resulted in 100% eggs bursting. Protocols using FM resulted in 50% to 100% eggs bursting, with the remainder abnormal.

Stepwise cooling and thawing, DMSO as CPA, and the use of sucrose in acting as a non-permeating buffer in diminishing effects of rapid rehydration, contribute to maintain normal egg phenotype after cryopreservation, which supports my hypothesis. However, it is unknown whether eggs were still viable. The intention was to verify the survivability of eggs with live sperm, but male spawning was unsuccessful. Further research will include *in vitro* fertilization studies, and cryogenic studies on the endangered white and threatened black abalone.

175 MEASURING THE PERCEIVED PREDATION RISKS IN HOUSE FINCHES IN DIFFERENT HABITAT TYPES.

Singh, Deepak H., Fernandez-Juricic, Esteban, and Valcarcel, Anna. Department of Biological Sciences, California State University, Long Beach, Long Beach, CA 90840-3702

Animals use different strategies to minimize predation risk; such as foraging in tighter groups to benefit from dilution or select habitats with lower abundance of predators to reduce the number of predator-prey interactions. We tested whether two indicators of anti-predator behavior (scanning rate and scan bout duration) of house finch *Carpodacus Mexicanus* were influenced by neighbor distance (0 m, 3 m) and habitat type (less urban, highly urban with human disturbance, highly urban without human disturbance). We conducted this study using semi-natural experiments, which allowed us to manipulate environmental conditions while keeping animals foraging on natural grounds. Preliminary results suggest that house finches are indeed affected by the distance to flock mates, but not by habitat type. When animals forage farther from flock mates, they increase the allocation of time to scanning, probably to increase the chances of detecting potential predators.

176 EFFECTS OF TIDAL FLUCTUATIONS ON THE AVAILABILITY OF
NITROGEN COMPOUNDS IN THE LOS ANGELES HARBOR

Sanjit Datta. Cabrillo Marine Aquarium, 3720 Stephen White Drive, San Pedro, CA 90731

Due to high shipping volume in the Los Angeles Harbor and the subsequent pollution of this semi-enclosed environment, the density of life in the Harbor has been steadily decreasing due to a lack of available nutrients. To remedy the problem, active study is needed in order to discover patterns in nutrient concentration fluctuations and to determine what environmental characteristics within an enclosed coastal environment.

This study attempted to correlate changes in tide with concentrations of nitrites in two coastal environments of the Los Angeles Harbor: a boat launch area and a salt marsh. Water samples were collected from these two locations at alternate five-minute intervals and analyzed for nitrite concentrations. These data were compared to a graph of tide height at the time of collection to determine any correlation.

There was no apparent link found between tidal fluctuations and nitrite concentrations. The nitrite concentrations seemed to be relatively randomly distributed, changing by mere thousandths of ppm. However, the nutrient concentrations in the salt marsh fluctuated more than those in the boat launch, suggesting that the boat launch environment would provide a more stable environment for life to grow. However, the almost complete lack of human influence in the salt marsh (something that is not feasible for a busy harbor) has rendered it much more conducive to life. The tides, however, seem to have no effect on the nutrient concentrations.

177 A STUDY OF FECAL INDICATOR BACTERIA (FIB) IN THE BALLONA
WETLANDS AND DEL REY LAGOON, LOS ANGELES COUNTY,
CALIFORNIA.

S. Yanamadala¹ and John H. Dorsey². ¹Chadwick High School, 26800 S. Academy Drive, Palos Verdes Peninsula, CA, 90274, and ²Loyola Marymount University, Department of Natural Sciences, Los Angeles, CA, 90045.

Wetland areas and beaches adjacent to them are a great concern due to their interaction and the presence of sources of fecal contamination. The purpose of this study is to compare densities of fecal indicator bacteria (FIB) in tidal water flowing two adjacent aquatic ecosystems, the Ballona Wetlands and Del Rey Lagoon. During four surveys in 2005, each site was sampled during ebb tide flows of spring low tides. Samples were collected inside the Ballona Wetlands and in Del Rey Lagoon. At each site, water quality measurements (temperature, salinity, dissolved oxygen, pH) were made using a YSI 600R sonde, five replicate samples of water were collected for turbidity (HACH 2100N turbidimeter) and FIB determinations and counts of birds feeding or resting on nearby intertidal mudflats were made. FIB were tested for total coliforms and *E. coli* using the Idexx defined substrate test kits (Quantitray-2000 test trays, Colilert-18 media). Bacteria were further characterized using the API 20E Identification System for *Enterobacteriaceae*. *E. coli* densities were greater in water flowing from the lagoon compare to the wetlands on three occasions, two of which were significantly different ($p < 0.05$). The Del Rey Lagoon was observed to have higher concentrations of water fowl than seen in the main channel of the Ballona Wetlands, so the greater *E. coli* densities in the lagoon may be associated with greater bird densities. Based on the metabolic responses indicated by the API system, the *E. coli* measurements obtained using the IDEXX system may represent a variety of *Enterobacteriaceae* species.

178 ANALYSIS OF PHYSICAL PROPERTIES OF LINEAR ACCELERATORS USING MATHEMATICAL AND EXPERIMENTAL METHODS.

J. Luo and O. O. Bernal, California State University Los Angeles, Department of Physics, Los Angeles, California, 90032.

One of the most interesting applications of magnetism is accelerating objects at tremendous speeds. The two most prominent magnetic accelerators are Gauss Guns and Rail Guns. The research focus lies in analyzing the interaction between the physical dimensions of these accelerators and the projectiles and their influence on the velocity and efficiency to promote specific amplification. This is done both mathematically and experimentally. It was found that the Gauss Gun can be amplified not through an increase of length, but rather by an increase in width. Furthermore, increased resistance in the coils demonstrates higher projectile velocity due to a mathematic model created. The Rail Gun has infinite possible amplification in terms of length due to the ability to continually provide force and acceleration down the rails. Also, the use of different rail compositions alters performance. Carbon rails were found to be most efficient for larger-scale implementation due to sustainability, whereas aluminum and copper rails were best suited for small and medium-scale implementation. In addition, the shape of the launch opening is best designed towards the specific shape of the projectile to create better connectivity. In terms of the projectile, multiple connections made in conjunction with the rails provided more aerodynamic stability and decreased rail erosion.

179 THE NEW AND INNOVATIVE OPTIC ACCELEROMETER SENSOR

R. Purasinghe, Dr. Feng, and Dr. Kim, University of California Irvine, Department of Structural Engineering, Irvine, CA, 92697

The optic sensor being created is to replace the inaccurate electrical sensor being used today in many fields of engineering due to the fact that its internals cause an alteration in the movement and data it picks up. This alteration happens when the electrical sensor is used in a location with a high abundance of electricity. The two sensors are placed on a shake table that moves at a known acceleration sine value and show the difference in what the optic sensor picks up for the movement. Because the electrical sensor is not near any high current or electricity whilst on the shake table, the electrical sensor's movement read is said to be correct. Thus this will provide two acceleration sine graphs being: the optic sensor's reading of what the movement of the shake table is, and the electrical sensor's reading of what the movement of the shake table is. The graphs of each sine curve are analyzed together, showing where the optical sensor has a natural frequency. The tests show that at 21 hertz, the optic sensor picks up the most vibrations (this particular sensor's natural frequency) and at this movement is the most inaccurate/insufficient. For use of this sensor, more will need to be made but with different masses, so that the natural frequency changes. And a group of sensors with different masses can be used on one location for best results.

180 ATAXIA TELANGIECTASIA AND DOSAGES OF BLEOMYCIN

Sunghve Kim and Helen Chun California State University of Dominguez Hills, Department of Biology, Carson, CA 90747

Ataxia telangiectasia (A-T) is a recessive genetic disease caused by mutations in the gene, ATM (*ataxia telangiectasia*, mutated). Symptoms of this disease include the degeneration

of the brain, *telangiectasia* (enlarged blood vessels) around the eyes, lack of muscle coordination, higher chances of developing cancer, a weak immune system, and sensitivity to radiation.

ATM plays a crucial part of the repair process for double-stranded breaks in DNA by finding breaks in DNA strands. In unaffected people, ATM autophosphorylates after DNA breakage, starting a chain of reactions that lead to the phosphorylation of other proteins such as p53, a protein required for the G1 checkpoint. However, for AT patients, ATM does not autophosphorylate and thus p53 is not phosphorylated, meaning that the G1 checkpoint does not occur. DNA is not repaired and can cause damage to the affected patient.

Double-stranded breakage can be caused by radiation. Breakage can also be induced by doses of bleomycin, a drug used in chemotherapy. Bleomycin was used in the experiment to treat white blood cells from normal and A-T affected people. Dosages of bleomycin were changed in order to find the feasible amount of bleomycin should be used in order to prevent overdosage.

181 A SCREEN FOR MUTANTS IN *DROSOPHILA MELANOGASTER* WHICH AFFECTS TRIGLYCERIDE LEVELS.

Ryan Tam and Daniel Yeh. Benzer Laboratories, California Institute of Technology, Department of Biology, Pasadena, CA, 91125

The success of *Drosophila Melanogaster* as a model organism has largely been due to its ability to carry out large-scale genetic screens in identifying the genes involved in a biological process. Although most genes are based on a loss-of-function phenotype, our gene is based on a gain-of-function phenotype, or overexpressed genes. In our project, we overexpress the progeny of our Ryan-Daniel (aptly named after ourselves) fly line cross using a UAS-GAL4 system and test them for high or low triglyceride levels which deviate from the calculated average value. We will isolate the progeny with notable deviation because if the lines of the overexpressed gene show an increase in triglyceride level, it means that the genes regulate the triglyceride levels. We want to isolate new genes that change the triglyceride levels of the fly, and we predict that we will find lines causing both an increase and decrease of triglyceride levels in the fly. For our methods, we used various grinded flies, triglyceride reagents and a microplate reader to determine our results. We found that line 5 of our cross had the highest deviation and thus had the most reproducible phenotype. Through this project, we want to understand fat regulation and find out what role high triglyceride levels play in causing disease in humans.

182 PERCENT METHYLATION AND ITS RELATIONSHIP WITH AGING

Shelly Tat and Dr. Shibata. USC Norris Cancer Center, 1441 Eastlake Ave. Los Angeles, CA 90033, Topping Tower 6410

Aging, tissue deteriorating over time was evaluated using DNA methylation, a level of control, which regulates gene expression by adding a methyl group to cytosine, one of the bases of DNA. By measuring the DNA methylation patterns in buccal cells in the CpG islands of the CSX gene, it is hypothesized that as aging develops, there are numerous incorrect gene expressions causing an increase in DNA methylation patterns. Thus, the goal of this study is to determine an individual's age by calculating the percentage of methylation found in DNA in buccal cells. Using bisulfite treatment, which is necessary to determine the presence of DNA methylation, unmethylated cytosine is converted into uracil in the extracted DNA. DNA extracted buccal cells was amplified by PCR and cloned for reading. Further research and a significant amount of new trials must be performed before accurately concluding whether or not DNA methylation patterns using buccal cells, correlates with one's aging.

183 COMPUTATIONAL ANALYSIS OF GRAINYHEAD-LIKE EPITHELIAL TRANSACTIVATOR (GET1) REGULATED GENES

Madhvi Venkatesh, Ambica Bhandari, and Bogi Andersen, University of California, Department of Biological Chemistry, Irvine, CA, 92697.

Grainyhead-like epithelial transactivator (Get1/Grhl3) is a conserved mammalian homolog of Grainyhead, the protein which plays an important role in the cuticle development in *Drosophila*. It has been shown that Get-1 plays a critical role in the terminal differentiation of the skin epidermis and is essential for barrier function in mice. Microarray gene expression analysis of Get-1 knockout mice indicates that it regulates a broad array of epidermal differentiation genes encoding structural proteins, lipid metabolizing enzymes and cell adhesion molecules. In order to identify the direct target genes of Get-1, we looked for potential Get-1 sites conserved between upstream, downstream and intronic regions of mouse and human genes using the ConSite program. We considered only those sites that were also present in significantly conserved regions. We analyzed the top forty significantly differentially expressed genes from the microarray data. Get-1 binding sites were found in four upregulated and ten downregulated genes, indicating that Get-1 directly regulates some genes involved in epidermal differentiation. The fact that both up and downregulated genes contain Get-1 binding sites suggests that Get-1 can both activate and repress transcription.

184 MAKING CAMKII δ A BY THE ADENOVIRUS SYSTEM

Tea, Nicky-Chai, Yan Bai, University of Southern California, Institute for Genetic Medicine, Los Angeles, 90033

Breast cancer is the number two leading cause of death in women in the United States. Side effects of Doxorubicin (a chemotherapy used to treat breast cancer) has led to the research that better understands Doxorubicin and its role in the treatment of breast cancer. Using the Adenovirus system, a versatile system involving recombinant adenoviruses, replication of genes that may be involved is further analyzed. By studying *CamIIK δ A* it was found that *CamIIK δ B* had a completely different result when treated with Doxorubicin. *CamIIK δ A* stayed the same, no abnormal regulation while *CamIIK δ B* (from previous research), unlike *CamIIK δ A* showed to reduce innumerably.

185 PHOTOOXIDATION OF COBALT-BOUND THIOLATO LIGANDS

May Chow, Alhambra High School. Mentor:

Singlet oxygen is the first excited state of oxygen that is a strong electrophile that can react with amino acids, peptides and other biologically relevant molecules. Here we study the oxidation of cobalt-sulfur compounds with singlet oxygen, $^1\text{O}_2$, to give the corresponding sulfenato. The cobalt complexes used are (2-mercaptoaniline-*N,S*)(en) $_2$ Co(III)tetrafluoroborate and (cystamine-*N,S*)(en) $_2$ Co(III)tetrafluoroborate. Previous studies with organic thiolates have been shown to occur through a hydroperoxy intermediate. The quenching rates (K_T) were measured by time-resolved laser spectroscopy experiments. The quenching rate of these Co compounds is $\sim 10^{-8} \text{ M}^{-1} \text{ s}^{-1}$, while the organic compounds have a rate in the range of $10^{-4} - 10^{-6} \text{ M}^{-1} \text{ s}^{-1}$. However, it has been found that this intermediate can be stabilized by hydrogen bonding, which should affect the rate reaction. Therefore, we measured the rates of reaction with singlet oxygen in three solvents of decreasing polarity: methanol (CD_3OD), dimethyl formamide (DMF),

and water (D₂O). Results show that protic solvents significantly lower the rate of initial attack by singlet oxygen on the thiolato moiety, but conversely increase the rate of product formation from the peroxidic intermediate.

186 THE EFFECTS OF THE HSR-OMEGA GENE IN DROSOPHILA MELANOGASTER

William Martin, Benzer Lab, California Institute of Technology, Pasadena, CA, 91125

In my project, I use the fruit fly *Drosophila melanogaster* to study the creosote phenotype. The creosote phenotype is an inability to function due to a diet containing over nutrition. I study the genes that cause this creosote phenotype in the fruit fly and in my project the gene I am studying is HSR-Omega. The HSR-Omega gene is an unusual non-protein-coding gene with multiple transcription products dynamically expressed in most cell types of *Drosophila melanogaster* and it is a member of the heat shock gene family. This gene has vital functions during times of stress. In my project, I test the effects of this gene by doing crosses under flies with certain P-Elements. In doing this project, I discovered that the P-element EP3269 does cause an expression of the creosote phenotype, but is not associated with the HSR-Omega gene.

187 FUNCTIONAL ANALYSIS OF THE MBNL3 PROTEIN

Dan Qing Yan, University of Southern California, Institute of Genetic Medicine, Los Angeles, CA 90033

DM1 (muscular dystrophy) is a neuromuscular disease associated with myotonia, caused by expanded CTG repeats in the 3' untranslated region (UTR) of the DM protein kinase (DMPK) gene. The expanded repeats aggregate within the nucleus as foci where several proteins bind to that repeats. MBNL3 muscleblind protein is one of these proteins found in the nuclear foci. In this context, to better understand the mechanism of the DM disease, characterization of MBNL3 is necessary. The protein will be produced using Adenovirus system as it is the most efficient and versatile system for producing this type of protein. The harvested proteins will then be expressed in muscle tissues, *in vitro*; to test the effects it has on Myotonic Dystrophy. The produced cells expressed in muscle tissue cells showed that MBNL3 has substantial effect on the disease and plays a critical role in the maintenance of DM1 integrity.

ALPHABETICAL LIST OF ALL PRESENTERS

Name	Abstract No.	day	award	symposia
Dave Witting	150	sat		SETAC Plenary
Geoffrey Woo	172	sat		rtp
Daniel Wu	170	sat		rtp
Dan Qing Yan	187	sat		rtp
Swati Yanamadala	114,177	fri,sat		poster, rtp
Daniel Yeh	181	sat		rtp
Amy Young	171	sat		rtp
Diana Young	67	fr		sediment
Ann Zellers	1	fri		plastics

ALPHABETICAL LIST OF ALL PRESENTERS

Name	Abstract No.	day	award	symposia
Kristine L. Richardson	107	fri	mol	poster
Lorena M. Rios	121	fri		plastics
Kerry J. Ritter	69	fri		sed qual
Gabriela Rodriguez-Fuentes	158	sat		env poll
Rob Roy	72	fri		volunteer
John Rudolph	159, 54	sat		env poll, runoff
Hilary Ruiz	167	sat		cont
Rosa M. Runcie	31	fri	mol	cont
Moy McKayla Sab	108	fri	eco/evo	poster
Lisa D. Sabin	154	sat		atm
John Saurenman	148	sat		SETAC Plenary
Kenneth Schiff	160	sat		env poll
Daniel Schlenk	147	sat		endocrine
Astrid Schnetzer	60	fri		red tide
Norman J. Scott	133	sat		fw verts
Erin M. Seale	109	fri	eco/evo	poster
Jane Shevtsov	110	fri	eco/evo	poster
Craig Shuman	20	fri		reefs
Deepak Singh	175	sat		rtp
Jason Smith	141	fri		invasive
Anthony P. Spina	126	sat		fw verts
Eric Stein	42	fri		fw verts
Glenn R. Stewart	137	sat		fw verts
Jennifer Stroh	73	fri		monitor
Carol Y. Suh	168	sat		rtp
Camm Swift	43	fri		fw verts
Hideshige Takada	122	sat		plastics
Ryan Tam	181	sat		rtp
Karis Tang-Quan	169	sat		rtp
Shelly Tat	182	sat		rtp
Nicky-Chai M. Tea	184	sat		rtp
Christopher Thellen	5	fri		plastics
L.L. Tiefenthaler	53	fri		runoff
Kent Trego	11	sat		cont
Ashley E. Varnell	111	fri	physical	poster
Amy Vaux	112	fri	physical	poster
Madhvi Venkatesh	183	sat		rtp
Lynne Wetmore	113	fri	fish	poster
Carmen White	151	sat		SETAC Plenary
Mark Whitter	40	fri		invasive
Jonathan P. Williams	26	fri	eco	cont
Carl Wirsen	4	fri		plastics

ALPHABETICAL LIST OF ALL PRESENTERS

Name	Abstract No.	day	award	symposia
Sharon Lin	149	sat		SETAC Plenary
Diana Lloyd	33	fri		cont
David Lluncor	165	sat		rtp
Kerri Loke	23	fri	fish	cont
James Luo	178	sat		rtp
Henry Luu	166	sat		rtp
Ellen Mackey	41	fri		invasive
Karen Martin	74	fri		vol monit
William Martin	186	sat		rtp
Paul Matson	16	fri	eco/evo	cont
Juli Matsumoto	99	fri	fish	poster
Mike McCarthy	25	fri		cont
Greer McMichael	140	fri	mol	cont
Anthony Metcalf	138	sat		fw verts
Eric Miller	22	fri		rocky reefs
Charles Moore	118	sat		plastics
Shelly Moore	7	fri		plastics
Nima Moradian	100	fri	eco/evo	poster
A Kimo Morris	24	fri		cont
Sarah S. Mosko	9	fri		plastics
Christopher Mull	30	fri	mol	cont
Michael O. Navarro	101	fri	eco/evo	poster
Nicolay P. Nezlin	57	fri		plumes
Jennifer Nguyen	14	fri	phys	cont
Mae Grace Nillos	116	fri		poster
Christopher T. Oakes	21	fri	fisheries	cont
Joshua D. Olson	102	fri	fisheries	poster
Joan Marie Ordonez	103	fri	mol	poster
Melva R. Osequera	104	fri	mol	poster
Carl Page	47	sat		cont
Rick L. Perry	142	fri	eco/evo	cont
Susanne Plank	105	fri	fisheries	poster
Daniel Pondella II	19	sat		rocky reefs
Sean A. Porter	52	fri		Runoff
Taylor L. Pupka	106	fri	mol bio	poster
Ruwanka Purasinghe	179	sat	physical	cont
G. Ramachandraiah	123	sat		plastics
Ananda Ranasinghe	68	fri		sed qual
Stewart Reid	25	fri		fw verts
Kristen N. Reifel	58	fri	eco evo	river plumes
Mary Ann Rempel	144	sat		endocrine
Jesus Reyes	146	sat		endocrine

ALPHABETICAL LIST OF ALL PRESENTERS

Name	Abstract No.	day	award	symposia
Alyssa Floyd	29	fri	eco/evo	cont
David G. Foley	119	sat		plastics
Tom Ford	18	fr		reef
Amy Frame.	8	fri		plastics
Bridgette Froeschke	27	fri	eco/evo	cont
Samantha Galasso	88	fri	mol	poster
Jay Gan	153	sat		atm
David J. Germano	136	sat		fw verts
Lisa Gilbane	75	fri		vol mon
Scott H. Grove	161	sat		rtp
Julie A Guerin	89,174	fri, sat		poster
Thomas R. Haglund	130	f or s		fw verts
Ibrahim Hajjali	90	sat	eco/evo	poster
Lisa Haney	10	fri		cont
Oce. A. Raul H. Gutierrez	91	fri	eco/evo	poster
Cynthia Hitchcock	131	sat		fw verts
Tim E. Hovey	129	sat		cont
Wesley S. Hunter	115	fri		poster
Tommy Huynh	163	sat		rtp
Da Eun Im	164	sat		rtp
W. James Ingraham	120	sat		plastics
Andrew Jahn	12,13	fri		cont
Erica T. Jarvis	92	fri	fish	poster
Burton Jones	56	fri		plumes
Laura Jones	135	sat	eco/evo	cont
Helen YH Jung	51	fri		runoff
Sanyl Kabre	173	sat		rtp
Julianne E. Kalman	94, 34	fri	fish	poster, cont
Kurt Karageorge	95	fri	mol evo	poster
Susan Kaveggia	62	fri		red tide
Robin J. Keber	96	fri	eco/evo	poster
Thomas Keegan	48	fri		fw verts
Carol Keiper	6	fri		plastics
Kevin Kelley	143	sat		endocrine
Sunghye Kim	180	sat		rtp
Jo Kitz	39	fri		invasive
Carl Kloock	36	fri		cont
Gregg W. Langlois	65	fri		red tide
Jarrood Larson	35,93,97	fri	mol	poster, cont
Gwen Lattin	2	fri		plastics
Jane Lee	98	fri	eco/evo	poster
Jeong Hee Lim	155	sat		atm

ALPHABETICAL LIST OF ALL PRESENTERS

Name	Abstract No.	day	award	symposia
Gar Abbas	46,76	sat		fw verts + poster
Joseph Abellera	77	fri	eco/evo	poster
M. James Allen	43	fri		fw verts
Tony Andrady	3	fr		plastics
Rich Anthony	124	sat		plastics
Amy J. Arispe	78	fri	eco/evo	poster
Joan M. Backey	32	fri	noi	cont
Howard C. Bailey	156, 157	sat		env pol
Suzanne M. Baltzer	79	fri	physical	poster
Dustin Bambic	55	fri		runoff
Jonathan N. Baskin	44	fri		fw verts
Steven M. Bay	70	fri		sediment
Chris Beegan	66	fri		sediment
S.H. Bryant	45	fri		fw verts
Leslie J. Buena	80	sat	eco/evo	poster
Erick Burres	71	fri		volunt. Mon
Chris Cagle	64	fr		red tide
Mark H. Capelli	127	sat		fw verts
David A. Caron	59	fri		red tide
Ivona Cetinic	63	fri		red tide
Hee San Choi	139	fri	mol	cont
May Chow	185	sat		rtp
Brenton Chuck	162	sat		rtp
Wesley Chun	117	fri		poster
Damien K. Cie	15	sat	eco/evo	cont
Molly Colvin	81	fri		poster
Gerry Del Rio Cortes	83	fri		poster
Nat Cox	38	fri		invasive
Neven Dabbousi	82	fri	eco/evo	cont
Sanjit Datta	176			RTP
Jessica DeGiacomo	84	fri	mol	poster
Russell V. Di Fiori	85	fri	physical	poster
Xin Deng	145	sat		endocrine
Sarah Douglass	86	fri		poster
Sabrina Drill	87, 128	fri, sat		poster + fw verts
Dent A. Earl	28	fri	eco/evo	cont
Matthew Edwards	17	fri		cont
Marcus Eriksen	8	fri		plastics
Edward L. Ervin	132	sat		fw verts
Richard Evans	61	fri		red tide
Mark E. Fenn	152	sat		atm
Ryan Ferrer	50	fri	eco/evo	fw verts

REVISED

SOUTHERN CALIFORNIA ACADEMY OF SCIENCES and SETAC

Annual Meeting, May 12 - 13, 2006, Pepperdine University, Malibu

Sessions are in the Seaver Undergraduate Campus, Rockwell Academic Center

FRIDAY, May 12, 2006

<u>Event</u>	<u>time</u>	<u>room</u>	<u>Abstracts</u>
Registration	8:00 - 2:00	Rockwell Courtyard	
SCAS Events			
Plastics in the Marine Environment	9:00 - 2:40	Elkins Auditorium	1-9
Contributed papers, Session 1	9:00 - 10:40	AC 210	10 - 14
Rocky Reefs	1:20 - 5:00	AC 210	15 - 24
Contributed Papers Session 2	9:00 - 5:00	CAC 125	25 - 36,139, 140,142
Invasive Species	9:00 - 10:40	AC 215	38 - 41,141
Fresh Water Vertebrates	1:20 - 5:00	KSC 130	42 - 50
Urban Watershed, Runoff Sampling	9:00 - 10:40	AC 245	51 - 55
River Dynamics and Runoff Plumes	1:20 - 2:20	AC 245	56 - 58
Red Tides	2:20 - 5:00	AC 245	59 - 65
Welcome	11:00 - 11:15	Elkins Auditorium	
SCAS Plenary Speaker: Friday	11:15 - 12:15	Elkins Auditorium	
Dr. Mark Gold	Executive director, Heal the Bay		
Impact Science: Its role in Natural Resource and Environmental Protection			
SETAC EVENTS			
Sediment Quality Objectives	1:20 - 3:00	AC 205	66 - 70
Volunteer Monitoring	3:20 - 4:40	AC 205	71 - 75
Atmospheric Deposition	3:00 - 4:40	AC 215	152 - 155
SCAS AND SETAC			
Poster Session and Social	5:00 - 7:00	Fireside Room	76 - 117

SOUTHERN CALIFORNIA ACADEMY OF SCIENCES and SETAC
Annual Meeting, May 12 - 13, 2006, Pepperdine University, Malibu
Sessions are in the Seaver Undergraduate Campus; Rockwell Academic Center

SATURDAY, May 13, 2006

<u>Event</u>	<u>time</u>	<u>room</u>	<u>Abstracts</u>
Registration	8:00 - 2:00	Rockwell courtyard	
SCAS Events			
Plastics in the Marine Environment	9:00 - 2:40	Elkins Auditorium	118 - 124
Fresh Water Vertebrates	9:00 - 5:00	KSC 130	125 - 138
SCAS Plenary Speaker: Saturday	11:00 - 12:00	Elkins Auditorium	
Dr. Stuart Sumida	Professor, Cal. State Univ. San Bernardino		
From Traditional Comparative Anatomy to Digital Special Effects: Why you Need the 'Old Dog' to do New Tricks			
SETAC EVENTS			
Endocrine Disruptors	9:00 - 10:40	AC 245	143 - 147
SETAC Plenary Session	12:10 - 1:40 Elkins Auditorium		
Roundtable on the Palos Verdes Shelf - see inside program for details			148 - 151
Environmental Pollution	2:00 - 3:40	AC 245	156 - 160
Research Training Program			
Session 1	9:00 - 5:00	AC 210	161 - 173
Session 2	9:00 - 5:00	AC 205	174 - 187

**Southern California Academy of Sciences,
Annual Meeting 2006**

ADDENDA AND CORRECTIONS

Location and Rooms have been changed since the printed program.

See attached Overview FOR CORRECT ROOMS

Poster 108 - will not be given

Paper 140 – will not be given

**Paper 141 – is moved from Invasive species to Contributed Papers Session 2,
replacing paper 140 at 4:20**

Paper 167 – will not be given

Paper 168 – will not be given

Paper 172 – will not be given

Paper 181 – will not be given

ADDITIONAL ABSTRACT

41 ALTERNATIVE METHODS FOR INVASIVE WEED CONTROL

Ellen Mackey, Field Ecologist/Biologist, Los Angeles & San Gabriel Rivers
Watershed Council

The Los Angeles & San Gabriel Rivers Watershed Council has identified the control and removal of invasive non-native plants as an important focus area. This presentation will review the projects we have undertaken in this area, along with providing more detail on two non-herbicide removal methods: foaming and flaming. Our projects include invasives removal in wetlands and riparian habitat, monitoring and field mapping in river corridors, GIS mapping also along river corridors (under a grant from the CDFR), and a new program for developing native seed resources. All of our projects are collaborative, and one of our partnerships includes the members of the Los Angeles County Weed Management Area. As a part of that collaboration, the author recently edited the Best Management Practices for Vegetation Management (BMPs) for the LA County Weed Management Area (<http://acwm.co.la.ca.us/pdf/WeedBMPres.pdf>). The purpose of the document is to inform individuals, businesses and government entities about all of the currently known methods of vegetation management, effectiveness of the technique, cost, safety, and potential environmental impacts for those methods suitable for LA County. This document is designed to assist individuals, businesses and government agencies in developing Best Management Practices for an integrated vegetation management approach. As an outgrowth of

the research for this publication, we decided to further investigate two unfamiliar methods: foaming and flaming. As expected, results were mixed. In the presentation, the author will describe the results of the investigation.

My conclusion from preliminary investigations is that while we need more study to be conducted locally in a variety of situations, from roadsides to restoration projects, these alternative methods offer an interesting option for land managers that wish to avoid the use of the usual chemical control methods in specified, limited conditions.

SUBSTITUTE TITLE AND ABSTRACT

39 9:20 RIPARIAN HABITAT ENHANCEMENT THROUGH INVASIVE VEGETATION MANAGEMENT IN THE MALIBU CREEK WATERSHED

Jo Kitz, Program Director, Mountains Restoration Trust

Following the implementation of a five-year restoration and enhancement program along Malibu Creek, the Mountains Restoration Trust has preliminary data on the effectiveness of giant reed treatment methods. The methods employed by the Mountains Restoration Trust were implemented for a large-scale restoration with difficult access. The foliar spray and cut-and-daub methods were used for treatment of invasive species in Malibu Creek.

In recognition of the invasiveness of giant reed and its ability to displace native plants and associated wildlife species via the monopolization of soil moisture and shading as well as its ability to negatively affect the quality of aquatic habitat, the focus of the project has been the eradication of giant reed and other exotic plant species, relying on the natural revegetative nature of the native riparian species to recolonize the site.

Judith Lemus

is employed at USC Wrigley Institute for Environmental Studies".

Directions To SCAS Meeting Rooms

Elkins Auditorium:

The Elkins Auditorium is the large building facing the fountain with several sets of glass pane doors, right by the registration desk. Enter on either side.

KSC 130: Keck Science Center is attached to Rockwell Academic Center.

KSC 130 is in the first floor of the Keck Science Center. Walk through the RAC Natural Science lobby down the left side hallway. Look for a doorway into the adjacent third floor of the KSC on your left, directly across from RAC 130 (Note* RAC 130 is not KSC 130). Through the entry, take an immediate right and go down the stairways. Exit at the bottom floor and follow the hallway to KSC 130. Or, you can go to the end of the KSC hall and take the elevator down to the 1st floor or up to KSC/ AC.

CAC 125:

CAC 125 is on the first floor of the Cultural Arts Center. Walk through the RAC Natural Science lobby down the right side hallway. At the end of the hallway turn right. Continue straight through the doors in front of you, go outside and enter straight ahead into the CAC. CAC 125 is immediately on your right.

AC: The Appleby Center is the 2nd floor of the same building as the Rockwell Academic Center.

AC 215 is directly above the RAC Natural Science Lobby. Walk up the stairs adjacent to the RAC lobby. Continue straight through the set of glass pane doors and AC 215 will be on your right.

Turn right after the doors and **AC 210** is on the left.

Turn right after the doors and make another right before the end of the hallway. **AC 205** is on the right.

Turn right after the doors and make another right before the end of the hallway. Continue past AC 205 and around the next corner is **AC 245**.

Fireside Room: (Poster Session): Go to the Tyler Campus Center, enter the student cafeteria and walk all the way around the serving area to the far end. The doorway into the Hahn Fireside Room is next to the ocean view patio.

Break foods and box lunches will be served at the Registration area.