Instructional Related Activities
Report Form

SPONSORS	DEPARTMENT
Don Rodriguez Kiki Patsch Linda O'Hirok May 2016	Environmental Science and Resource Management

ACTIVITY TITLE	DATE (S) OF ACTIVITY
ESRM Spring Lecture Series "Those Dam Beaches"	2/11, 2/18, 3/3, 4/7, 4/14, 4/21, 4/28

PLEASE EXPLAIN (1) DESCRIPTION OF ACTIVITY; (2) HOW DID THE ACTIVITY RELATE TO A COURSE(S); AND (3) WHAT YOU LEARNED FROM THE PROCESS.

The environmental lecture series sponsored by the ESRM program in the spring of 2016 generally followed the theme of "Those Dam Beaches" with a range of talks that included coastal resilience and fostering climate resilient communities, beach access in California and the struggle for balance in the coastal community, taking a look at the history and update of removing Matilija Dam, understanding storm and climate impacts to the California coast, climate change, sea level rise, and coastal retreat, the economics of adaptation to sea level rise in Monterey Bay, and restoring the cloud forest and harnessing fog on Santa Rosa Island. Planned and organized by Professors Rodriguez, Patsch, and O'Hirok, a goal of the series was to provide insight into local, national, and global environmental issues for university and community.

The first lecture in the series was presented by Dr. Kathryn McEachern, USGS Biologist. Dr. McEachern discussed the role of fog in the cloud forests of Santa Rosa Island and how fog may contribute 30% to total precipitation at received at higher elevations. A century of overgrazing has caused accelerated surface erosion and considerable loss of vegetation. Dr. McEachern spoke about the techniques they are developing to harness the fog to restore cloud forest communities and reduce downstream erosion and beach changes. The presentation was energetically delivered and enthusiastically received by students and community members numbering over 40 participants and was podcast for use in a series of ESRM courses and posted on the ESRM program website.

For the second lecture in the series, Lily Verdone, Coastal Projects Director of the Nature Conservancy, spoke about fostering climate resilient communities in the coastal zone. Ms. Verdone addressed the mission to the Nature Conservancy to conserve lands and waters on which all life depend by creating Land Trusts and developing science-based models. She stressed that the Nature Conservancy is not an advocacy organization but innovates through habitat reclamation protects 119 acres and 5000 river miles. In particular Ms. Verdone focused on climate change and sea level models that

predict significant losses of wetlands globally. California has already lost 90% of its wetlands. Estimated costs to major cities will be in excess of 1 trillion dollars. The Nature Conservancy Coastal Resilience Approach included assess risk, identify solutions, take action, and measure effectiveness. For example, innovative designs for shore protection include using nature such as dunes rather than hardscape to protect our coastlines to make them more resilient to change. Ms. Verdone's lectures addressed a range of scale from global to local and examples of Ormond Beach restoration were particularly relevant because many of our classes, research, service learning, and B-WET programs utilize Ormond Beach. This podcast lecture was attended by 45 attendees and was also posted on the ESRM program website for use in our classes.

The third speaker in the series was Dr. Dan Reineman, Bill Lane Center for the American West Stanford University, spoke about "Beach access in California: the struggle for balance in coastal management." Dr. Reineman discussed the ongoing conflict of public access to beaches, coastal management, and private property. He focused on the concepts of connecting "value" to "place", which needs to be better understood and measured. Abstract spaces versus meaningful places. Dr. Reineman presented the idea that the bonding of people to a place creates pro-environmental behavior. He introduced many of our students to the Public Trust Doctrine which is explored in our Environmental Law, Water Resource Management, Coastal Processes, National Parks, and Land Use courses. He also discussed the evolution of the California Coastal Commission. Our coastal resource provides a link between ecosystems and societal benefits which has an economic value. Local examples he used were familiar to most of us and therefore more impactful identifying these places as "democratic commons". Dr. Reineman also discussed the "coastal squeeze" and presented relevant examples related to densely-packed coastal development and the impacts associated with increases in sea level. He raised questions about coastal management and difficulty in finding a balance. This podcast lecture was posted on our ESRM program website. Approximately 30 people attend this lecture.

Peter Sheydayi from Ventura County Public Works Agency was our fourth speaker in the series. Mr. Sheydayi presented about "Matilija Dam, taking another look: a brief history and update" and discussed pre-dam conditions, dam construction, dam impacts, and dam removal models. Matilija Dam was constructed in 1947 to impound water but its life was short-lived when it filled with sediment in a relatively short period of time. Two major impacts of the dam are it impedes the migration of steelhead trout and impounds sediment that nourishes Ventura beaches. Beach loss is of particular interest to ESRM and our students because our Summer Research Institute research has been investigating beach erosion and nourishment for the last five years. Mr. Sheydayi said that plans to remove the dam were presented as early as 1970 but feasibility studies first begun in 1998 have finally presented four options for dam removal. These include progressive dam notching, drilling holes in the dam to let turbidity move the sediment out, temporarily store the sediment upstream, and remove the dam and allow sediment to flush downstream during a large storm event. After evaluating risks, constructing orifices with gates in the dam was deemed the best option. Mr. Sheydayi's presentation was extremely interesting for students interested in our Environmental Law course and

Ecological Restoration where alternative approaches to rehabilitation and associated risks need to be evaluated. There are no perfect solutions. The presentation was well attended by 45 students, faculty, and community members.

The fifth speaker, Dr. Patrick Barnard, USGS Pacific Coast and Marine Center, Santa Cruz, discussed "understanding storm and climate impacts to the California coast. Dr. Barnard's research focusses on large scale coastal change from days to centuries. In particular he studies nearshore processes utilizing different field techniques such as LiDAR and drones to develop topographic surveys to inform for coastal management decisions. His work includes beach monitoring to develop numerical models to understand coastal processes, estimate littoral cells, shifting shorelines, sand wave formation and movement, and predict the impact of storms and sea level change on coastlines employing their Coastal Storm Model System (COSMOS). This presentation was well attended with students and faculty. Many ESRM students completing their coastal capstone projects were particularly interested in the discussion after the presentation. The podcast lecture was posted on the ESRM program website for use in our classes.

Our sixth speaker was Dr. Gary Griggs, UC Santa Cruz, Director of the Institute of Marine Science. Dr. Griggs presented an entertaining assessment of "climate change, sea level rise, and coastal retreat". Dr. Griggs introduced his lecture by presenting examples of episodic climate change over millions of years, the evidence supporting climate change such as ice cores, bristlecone pines, sediment cores, pollen, and the many theories that explain climate change such as variation in the earth's orbit. His focus was on current changes in our atmosphere, increases in CO^2 researched by Keeling starting in 1958 and the impact it is having on our coastlines. These impacts include ice caps melting, heating of the ocean and subsequent density changes, and an increase in sea level. Dr. Griggs discussed techniques for measuring changes in sea level and debunked myths that climate change is not a real threat to our coastal environments. In particular he stressed that extreme events, hurricanes, storm surge, wave runup, king tides, will have significantly greater impacts on coastal environments as a result of sea level increases. Many of the examples Dr. Griggs presented were very familiar to us especially the example of Broad Beach and beach nourishment. Our classes and ESRM research have also focused on the effects of beach erosion at Broad Beach. He emphasized the "planned coastal retreat" is the only viable option because hardscaping our beaches with sea walls and armor (33% California coast) only constrains them further. Dr. Griggs lecture was thought provoking and very well attended (45). His podcast lecture is available at the ESRM program website for class use.

Our last speaker was Dr. Philip King from the Department of Economics at CSU San Francisco. Dr. King spoke about "comparing coastal climate adaptation strategies for southern Monterey Bay" where shoreline erosion is the greatest because of historic sand mining on the beach which is sold as aggregate primarily used in porcelain manufacturing. Dr. King presented a four-pronged approach to preserving our beaches including stakeholder engagement, physical modeling, economic analysis, and beach ecosystem index which quantifies the value of our beaches. The model looked at four

beach reaches of similar geomorphology that experienced different shoreline response in part because of the preventative measures taken. Sea level rise along a beach with a sea wall destroys the ecosystem as the beach erodes. Instead, managed retreat maintains the natural form protecting some of the ecosystem. Unfortunately, he stated that the California Coastal Act allows armor to protect private property. Dr. King presented models incorporating the options of beach nourishment (every 10 years), groins, armor, or managed retreat. Only managed retreat preserves some beach width; a narrowing in beach width decreases ecosystem services, invertebrates, and beach function. He developed a Beach Ecosystem Index Score which defines ecosystem health and thus a beaches ecological value. Less urban development increases ecological value. The three components of the simple linear model include physical (width, dunes, vegetation), biological (shorebirds, invertebrates), and human impact (armor, urbanization). The economic benefits and impacts include recreation, loss of land, and ecology. Beach width matters and has defined economic value and the only viable approaches are a combination of managed retreat and nourishment. This presentation was timely in that our ESRM Summer Research Institute has evaluated beach and ecosystem health with physical surveys but also has surveyed the public about their perception of beach health and how best to protect this precious resource. Approximately 40 attendees listened to Dr. King's podcast lecture which is posted on the ESRM program website.

All seven speakers touched upon the goals and objectives of the courses taught by professors Anderson (ESRM), Clarke (Communication), Wakelee (Political Science), Cartwright (Biology), Chapman (Biology), Norris (Biology), O'Hirok (ESRM), Patsch (ESRM), Rodriguez (ESRM), Steele (ESRM) consisting of, but not limited to: **BIOL 200** *Principles of Organismal and Population Biology*, **BIOL 313** *Conservation Biology*, **BIOL 312** *Marine Biology*, COMM 450 *Environmental* Communication, **BIOL 433** *Ecology*, **HIST 342** *Environmental History*, and a**ll ESRM courses.** Lectures were attended by students representing all those majors listed and others from across the campus.

Sanjana Chandrasekar
5/2/16
P.6

In the Botanic Gardens, we learned about density, salinity, and how to find crayfish ~~Finding~~ the density of the water was really fun, even though I fell in the water. I liked Madrona so much though I've been doing the water symposium for 5 years and this was my sixth year doing it, I felt memories coming back from previous years. Since I learnt about water, I understood more of the things they talked about. I really liked the game about saving water for how much food you eat. Overall, I really enjoyed both the trips

Ingrid Slattum
4-28-16
period
2

I really enjoyed our walking field trip to Madroña. At madrona there were a bunch of tables set up where we could go a listen and learn a cool fact about water. I learned that it takes a lot of land and water to grow some of the things we eat almost everyday. Potatoes are mostly water so it takes a lot of water to grow them. There was another table where it had samples of different plants. I found out and saw some of the plants that are native to where we live. I also learned you shouldn't grow too many plants that are non-native because these can mess up our cycle and probably need more water. We expecially shouldn't use too much water because we're in a big drought. One of the last tables I stopped at was where we learned about the density of water. We got to do a cool trick where we could float things on top of the water. It was really fun and cool. I liked that this trip we could do a lot of hands on activities. I would definitly like to go next year.

Eric Juels
4/28/16
P:2

Field trips

The field trip to the Botanical Gardes was fun. We learned about plants, water, and animals. We learned how to conduct different tests such as water temeratnre, oxygenation, and how fast the water flows. We did these tests with probes and timers.

The field trip to Medroñia was also fun. We learned about how water levels of the ocean are rising, how much land and water different foods take up to make, different plants that are native or invasive, how dams effect the environment, and how water runs off of the mountains. My favorite was how water runs off of mountains.

Emma He
4/29/16
P.6

Recently, we took 2 field trips to learn more about water. By that I mean that we tested the water, looked at the water flow, and searched in the water for living organisms. We also played a little game that used a tangerine to test the water flow in the creek. The other field trip we took was at Madrona Elementary. There we learned about the plants and animals near our surroundings. Plus, we learned all about our water supply and soil. My favorite part was when we looked at a small sand and lego model of a dam. That is what we learned and what I enjoyed at our field trips.

By Kiona Spielman

We learned all about how underground water, how fast it travels, and about crayfish. This is such an amazing ixperience for young 6th graders to learn about. With the help of many chanel state Island students and most of all doctor Hirck we learned many things about water. Such as How deep streams can be, and how fun and interesting streams, ponds, and all other water scorces can be. To others water sorces are just another flow of water. But stop and think about it sometimes, its spectaculars. Give me a W now an A now T now E now R

WATER!

Waw
Amazing
Terrific
Enteresting
Really fun
!o