NEWSBREAKER
CALIFORNIA SHORE & BEACH PRESERVATION ASSOCIATION
January 2004

President's Message

by David Cannon

Our beaches and shorelines will be facing an important challenge in the coming years. There will likely be continued problems associated with the ongoing erosion in many parts of the state and beach closures and postings due to poor water quality as we have seen in recent years. However, implementation of a component of the Clean Water Act will soon set the foundation for the future management of our beaches and shorelines. This component is known as the Total Maximum Daily Load (TMDL) and a brief summary is provided below. The summary is followed by a call to action for our organization so that impacts to our beaches and shorelines are incorporated into the TMDL development process.

In 1972, the U.S. passed the Clean Water Act (CWA), which required that the U.S. attain zero pollutant discharge to waters of the U.S. by the mid 1980s. Unfortunately, our society did not reach that goal within the required time frame, but we have endeavored towards the goal ever since. The strategy developed to meet the goal of the CWA has been based on a cascading strategy of what I like to describe as an "ease of implementation" approach, by which I mean doing the easier tasks first and leaving the hardest ones for last. The initial focus was on eliminating pollutants due to point discharges (e.g., wastewater treatment plants and industrial facilities) and it appears that we have done a pretty good job given that we do not see water bodies catching fire anymore. The next phase is focused on addressing pollution associated with nonpoint sources such as urban runoff and storm water runoff. Here again, the focus has been on the components that are easiest to implement such as best management practices at construction sites and so-called "end of pipe" solutions for control of runoff-related pollutants. The most difficult work yet to come will be trying to change society's behavior to reduce the level of pollutants at the true point source of these nonpoint sources (i.e., the individual).

So you may ask, and certainly should ask, "What does this have to do with beach and shoreline preservation?" Well, the method by which the U.S. Environmental Protection Agency (EPA) and State Water Resource Control Board (SWRCB) is planning to meet the goals of the CWA involves setting total maximum daily

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CSBPA Supports Young Coastal Scientists

at the California State Science Fair

by Steve Sachs, CSBPA member

The CSBPA continued its long-standing tradition in 2003 by recognizing three outstanding coastal projects at the California State Science Fair. The Senior Division Prize of $500 was shared by Katie Dolence, a senior at Claremont High in Claremont, and Brigitta Miyamoto, a junior at Redwood High in Larkspur. Eric Leidersdorf, an 8th grader at Viewpoint School in Calabassas, received the $250 award for the Junior Division.

The abstracts for these three creative and polished projects follow this introduction. Please take the time to read them – you will be impressed by the diversity of topics as well as the depth of understanding. You will also feel good about CSBPA's role in encouraging the next generation of coastal scientists!

As one of the CSBPA judges at last year's event, I can report to you that the State Science Fair is a very worthwhile, even inspiring event for the CSBPA to be supporting. It is held every spring at the California Science Center (formerly the California Museum of Industry) in the heart of Los Angeles. It is the culmination of Science Fair competitions in Junior and Senior High Schools around the

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loads (TMDLs) of pollutants to each receiving water body and beaches and shorelines are the ultimate receiving water body in most coastal areas. More importantly, under the CWA sediment is considered a pollutant that needs to be regulated to achieve the goals of the CWA. Through the Regional Water Quality Control Boards, the EPA and SWRCB are currently working to set TMDLs for various pollutants of concern, including sediment. While it is not clear what the sediment TMDLs will be, it is highly probable that it will be lower than what is being delivered to our coastal waters today. Given the current loss in beach sand supply attributed to sediment trapped behind dams and in urbanized watersheds, how will any additional sediment reductions caused by the setting of sediment TMDLs impact our beaches and shorelines? What will the impact of sediment reductions to the nearshore coastal waters do to the nearshore habitat that relies on the nutrients, minerals, and organic material in the sediment that originates in the coastal watersheds? I think these are two important questions that should be addressed during the TMDL development process.

What can our organization do to make sure that the impact of sediment TMDLs on our shorelines and beaches is considered in the TMDL development process? My suggestion is that we should form a committee from interested members of CSBPA to develop a sediment TMDL strategy for our organization. Many, if not all, of the efforts to restore the natural flow of sediment to our shoreline areas will be impacted by the development of sediment TMDLs. In addition, the TMDL development process could impact beach nourishment efforts if the sediment loads associated with beach nourishment projects are included in the total allowable TMDL for coastal receiving waters. We cannot sit back and watch this story unfold without providing our input so I ask for your help in addressing this important coastal issue.

Governor Schwarzenegger Appoints Michael Chrisman Resources Secretary

Paraphrased from Steve Aceti's January 6th CalCoast update

Governor Schwarzenegger has appointed Michael Chrisman as Secretary of Resources. Chrisman has served as the undersecretary for the California Department of Food and Agriculture and as deputy secretary for Operations/Legislation for the California Resources agency. He has also served as the regional manager for Southern California Edison since 1996, and serves as the Chairman of the Board of both the Great Valley Center and the Sequoia-Kings Canyon National Parks Foundation. Governor Wilson appointed Chrisman the president of the California Fish and Game Commission, and Chrisman is the past president of the Agricultural Leadership Associates. Chrisman also served as a past director of the California Farm Bureau Federation and as a former advisor to the Assembly Republican Caucus on agriculture, water and environmental issues, among numerous other appointments.

Chrisman, who oversees a family farming operation in Tulare county, holds a Master of Science in Agricultural Extension Education and a Bachelor of Science in Agronomy/Plant Science from the University of Arizona. Chrisman's appointment, which requires Senate confirmation, has been supported by a variety of industry representatives and environmental groups.

PROFESSIONAL SERVICES

Business cards ads are not viewable in this on-line issue. They will be available in future on-line issues.

If you have an article that would be of interest to our group, we would like to see it. Please submit articles for the next newsletter to Holly Celico at Holly@coast.ucsd.edu.
Here is our publication schedule for this year:
April issue deadline: April 5, 2004
July issue deadline: June 21, 2004
October issue deadline: September 20, 2004

California Shore & Beach Preservation Association
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Long Beach, CA 90807
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Please make check payable to ASBPA and **mail to**: ASBPA, 1724 Indian Way, Oakland, CA 94611-1221.

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CSBPA Supports Young Coastal Scientists

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state. Among the many unique things to be found at the State Science Fair is the answer to this question: Where can you see 1,000 California teenagers hanging out together with no visible traces of body hardware (earrings excepted) or tattoos? There were actually 943 projects at the 2003 State Science Fair, the best of who-knows-how-many thousands of efforts put forth in 2003 by California's teens competing in Science Fairs at hundreds of schools. Our greatest challenge was not getting distracted by the many fascinating projects we passed on our way to the coastal efforts we needed to review for the CSBPA awards. Our biggest reward was the opportunity to talk with the students about their projects and their future college and career plans. One comes away from this experience with a lot of confidence in California's future.

An interesting note on the Junior Division award: Eric Leidersdorf donated his award to the Wiegel Scholarship fund, established by CSBPA to recognize outstanding coastal work by college students. This was a very appropriate gesture since Professor Wiegel provided guidance to Eric in developing his project. Also, perhaps Eric is looking ahead?

The 53rd annual State Science Fair will be held May 24-25, 2004 at the California Science Center. It will be another opportunity for the CSBPA to participate in a truly impressive institution and help develop interest in coastal science and technology. Please spread the word that we will be looking to recognize another group of outstanding projects this year.

Congratulations to all the 2003 Science Fair Winners!

A Study of Thermally Induced Marine Surface Currents Using IR Thermography

Abstract – Katie A. Dolence

A Study of Thermally Induced Marine Surface Currents Using IR Thermography builds upon three years of past research on thermally induced currents in marine and atmospheric environments. In 2000 (9th grade), my project titled *The Induction of Thermal Currents* proved that two standing bodies of water at different temperatures induced the formation of currents between them. In 2001 (10th grade), my project titled *The Induction of Thermal Currents in Earth's Ocean Systems* proved that the magnitude of temperature difference had an impact on the strength and rate of current flow. In 2002 (11th grade), my project titled *The Thermal Induction of Atmospheric and Marine Currents* extended the proof of thermally induced currents to the atmosphere. In each of the above explorations I focused on improving methodologies, data collection, and analysis within the confines of instruments available around our home. This year's project (2003), titled *A Study of Thermally Induced Marine Surface Currents Using IR Thermography,* utilizes very sophisticated thermography equipment to examine the behavior of currents under controlled conditions. I used two cameras, the model PRO 400DX un-cooled ferroelectric capable of video and the PD-300 super-cooled IR Imagining Radiometric providing direct pixel related temperature reading and data recording.

I made a variety of discoveries using these instruments. For example: 1) there is no lag in the commencement of the thermal current flow upon removing the barrier. This refutes earlier observations using the dye technique. 2) Thermal surface currents do not flow evenly out over the colder water but rather in pulses or waves generating from the interface. This refutes earlier observations that once started the flow appeared smooth and even. 3) Gradient changes as small as 1.5° C significantly speed thermal current flow. Much larger gradients appeared to be required using the drop-dye technique used in previous experiments by the author (Dolence, K.A. 2000, 2001, 2002). 4) Infrared is reflected from the surface of water in the same way visible light is reflected. Images of the foliage surrounding our pool can be clearly seen in the infrared photographs.

Reef to the Rescue: Which Artificial Surfing Reef Counteracts Beach Erosion Best?

Abstract – Brigitta E. Miyamoto

Objectives/Goals

The objective of this experiment was to determine which characteristics of an artificial surfing reef prevent beach erosion best.

Methods/Materials

A wave chamber constructed out of Plexiglas was filled with sand and water. A manual wave-generating crank was positioned at one end, and a sloped sandy beach at the other. Ten clay models of artificial surfing reefs, based on reefs in existence, under construction, or planned, were placed in the chamber and tested for their ability to protect the beach from erosion. After ten minutes of wave

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Reef to the Rescue: Which Artificial Surfing Reef Counteracts Beach Erosion Best?

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generation with each model, erosion was measured by averaging four beach sand inflection measurements. Beach erosion data for each reef were compared to the control situation in the absence of any reef, and to data obtained with other reefs.

Results

The results suggest that the best reef design for erosion control features a shallow-sloped, concave surface towards the incoming waves. The shallow slope presents a large surface area to effectively dissipate waves, and the curved concave surface additionally rotates the waves. A reef's profile facing the shore was found to be less important. Erosion also decreases if the reef is placed at an angle to the shore, further dampening waves by rotating them. Optimal erosion control is achieved by a reef that dampens waves by both dissipating and rotating them.

Conclusions/Discussion

The relatively recent technology of man-made offshore reefs was first used to condition waves to improve surfing, and was later found to have the desirable secondary effect of decreasing beach erosion. The logic behind using artificial surfing reefs to counteract beach erosion stems from the fact that the bathymetry, or underwater topography, is altered by the introduction of a reef; the wave's shape and energy, and the amount of sand it transports to and fro, are altered as the bottom of the wave passes over the reef. A dampened wave transports less sand to and especially away from the beach, and erosion is checked. This experiment investigated the effect of reef design on beach erosion, and showed that artificial reefs with geometries that both dissipate and rotate waves perform the best in combating erosion. The results support the idea for an increased awareness of this novel engineering approach for erosion control.

Summary Statement

My project involves the use of a wave chamber to investigate how the geometry of an artificial surfing reef affects beach erosion, and gives us an idea of a real-life application, especially the protection of the California coastline.

Help Received

My dad helped me design and build the wave chamber. A friend built the paddle out of spare parts.

Use Your Head(land)... An Experiment in Shore Protection

Abstract – Eric Leidersdorf

The purpose of this experiment was to compare the effectiveness of different methods of protecting the shoreline. The hypothesis was that a man-made headland could rival the effectiveness of a groin in protecting the shoreline, but maintain a more natural setting. Three tests were run: (1) an unprotected beach, (2) a beach with a conventional groin, and (3) a beach with an experimental, triangular headland. The experiment was conducted in a 1.2 m x 2.4 m rectangular wave basin using the same procedure for each test. The horizontal scale was 1:400 while the vertical scale was 1:80. Each test consisted of 6,000 waves run in sets of 60 to prevent recirculation in the basin. The wave height was 3 cm and the period was 0.42 seconds. The water depth was 7.6 cm. The slope of the beach was 1 on 6, which was equal to a 1 on 30 prototype slope. The beach went from 3.8 cm above water level (3.04 m prototype) to 7.6 cm below (6.08 m). The groin was 13 cm long, 7 cm wide, and 7.5 cm tall. The triangular headland was 9 cm long, 13cm wide at the base, and 4 cm tall.

To measure the changes in the beach, eleven profiles were surveyed before and after each test. Stations were created every 15 cm along the back wall of the beach. At each station, ranges were measured every 5 cm from the back wall to the toe of the beach. The test results indicated that the groin trapped the most sand. Not many sand grains were able to pass around the toe of the groin. However, since the groin trapped so much sand, it starved the downdrift beach. The headland did a better job of regulating sediment movement. It did not block as much sediment, but it did provide an obstacle for sediment transport path. In doing this, it did not starve the downdrift beach. In conclusion, the groin does a better job of retaining sand for the updrift part of the beach. The headland is not as effective for the updrift part, but provides more protection for the downdrift part. It also resembles a natural rock formation.