City of Newport Beach
Coastal/Bay Water Quality Citizens Advisory Committee Minutes

Date: February 9, 2012
Time: 3:00 p.m.
Location: Fire Conference Room

1. **Welcome/Self Introductions**
   Committee Members present:
   Chairwoman/Mayor Nancy Gardner
   Council Member Michael Henn
   Dennis Baker
   Tom Houston
   Jim Miller
   Randy Seton
   Janet Rappaport
   Roberta Jorgensen

   Guests present:
   Monica Mazur
   Nancy Skinner, SPON
   Dan Purcell
   Jim Mosher
   Jochem Schubert, UCI
   Brett Sanders, UCI
   Timu Gallien, UCI

   Staff present:
   John Kappeler, Water Quality Manager
   Shari Rooks, Public Works Specialist
   Chris Miller, Harbor Resources Manager
   Shannon Levin, Harbor Resources Supervisor

2. **Approval of Previous Meeting's Minutes**
   Need to Approve January 12th Meeting Minutes

3. **Old Business**
   (a) **Bay and Ocean Bacteriological Test Results**
   Monica Mazur reviewed recent water quality test results within Newport Bay and along the ocean shoreline.

4. **New Business**
   (a) **Brett Sanders,** from the University of Irvine gave a presentation on UCI's Coastal Flooding and Beach Erosion Research Project. (See attached PowerPoint Presentation.)
   - The UCI research work was used by Everest to provide their Balboa Island Seawall Report to the City
   - No noticeable sea level rise since the '80's in California
   - High-high tides always occur in winter and summer and never in fall or spring
   - Statewide predictions are biased against over prediction

ACTION: Tina Gallien to forward copy of Professor J.J. Reed's article on Resonance in Newport Bay (circa 1980's) to Randy Seton.

(b) Shannon Levin, Harbor Resources Supervisor presented an update and status of the Pump-Out Stations within Newport Harbor. (See attached PowerPoint presentation).

- There are 5 public pump-out stations and 11 privately owned pump-out stations.
- Stations are tested 5 days a week during June – September and 3 days a week during October – May.
- Charter boats are required to have onsite pump-out station at dock or provide proof of service provided my mobile pump-out service.
- We have used oil stations at the Yacht Basin to recycle used bilge pads and oil.
- Harbor Patrol wants to be more aggressive in enforcing dye tab testing of vessels in the harbor. They have been looking at plans similar to the one used in Avalon.
- Harbor Resources is applying to the Department of Boating and Waterways for a grant to receive 75% reimbursement for replacement of our pump-out stations. Each one is expected to cost $20K.

5. Public Comments on Non-Agenda Items

- Randy Seton has his copy of the Dana Point Harbor Tool Kit

6. Topics for Future Agendas

(a) Bacteriological Dry-Weather Runoff Gutter Study (Phase III)
(b) Prop 84 ASBS Grant Program
(c) Green Streets Program
(d) Big Canyon Project
(e) Coastal Dolphin Research Program
(f) Rhine Channel Project Wrap Up
(g) G3 – The Green Gardens Group
(h) Sub-committee Update on Dana Point Tool Kit

Set Next Meeting Date

The next meeting date was set for March 8, 2012, at 3 PM in the Fire Conference Room.

7. Adjournment

The meeting was adjourned at 4:35 pm.

Coastal Bay Water Quality Committee
February 9, 2012

PUMP-OUTS IN NEWPORT HARBOR

BRIEF HISTORY

- 1976
  - Regional Board for water quality and EPA for protection of swim beaches
  - Newport Bay designated a "No Discharge Harbor"
  - Discharge of vessel sanitary wastes prohibited
- 1988
  - Regional Board sought to increase vessel pump-outs from 6 to 13
- 1990's through today
  - Installation and repair of five pump-out stations

1988 GOAL

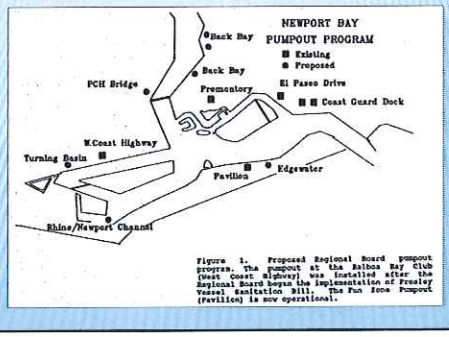
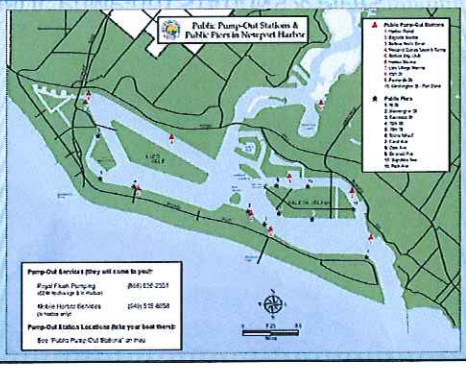


Figure 1. Proposed Regional Board pumpout program. The pumpout at the Balboa Bay Club (West Coast Highway) was installed after the Regional Board began the implementation of Proxmire Vessel Sanitation Bill. The Fun Zone Pumpout (Pavilion) is now operational.

TODAY'S RULES AND REGULATIONS

- R8-2005-011
  - Testing Criteria
  - Marinas with over 50 slips
- NBMC
  - Transient renters- submit to testing
  - Live-Aboards- submit to testing
  - Charter Vessels- submit to testing and onsite pumpout or mobile service

PUBLIC PUMP-OUT STATIONS & PIERS



PUMP-OUT INSPECTION PROCESS

- Inspect public stations
  - 4 CNB pump-out stations with 5 pump-outs
  - Testing
    - 5 days a week June-September
    - 3 days a week October-May
    - Dye test
    - Vacuum test
- Privately operated, publically available stations
  - Private responsibility
  - If there is a problem the public calls Harbor Resources who gains compliance with the operator

INSTRUCTIONS

1. Uncoil the **ENTIRE** Hose
2. Remove Discharge Cover from Tank
3. Connect Hose
4. Turn on Suction Pump
5. Pump Holding Tank
6. When Complete, Turn Off
7. Recoil Hose and Replace

VACUUM TEST

DYE TESTING

TROUBLE SHOOTING

Yellowmine Pipe

No Bilge- Used Oil Programs

WHAT'S NEXT?

- Pumpout replacement
  - Scheduling
  - Funding
  - Grant opportunities award up to 75%

HARBOR RESOURCES

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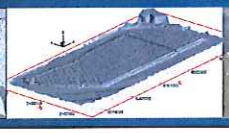
UNIVERSITY OF CALIFORNIA, IRVINE

Sanders Lab Activity In Newport Beach: A Review of Recent Research and Goals for the Future

Brett Sanders, Timu Gallien, Jochen Schubert, Morteza Shakeri
Department of Civil and Environmental Engineering
University of California, Irvine
UC Center for Hydrologic Modeling

Sanders Lab at UC Irvine

- Who are we?
  - Faculty, students, and researchers advancing hydraulic and coastal engineering science and technology and educating the next generation of engineers
- Interests and Expertise
  - Coastal Hazards
  - Urban Flooding
  - Resilient and Sustainable Infrastructure
  - Advanced Simulation Models and Data
- Vision
  - Hazard mitigation and climate change adaptation leveraging the latest science, data and models



Sanders Lab Activities in Newport

- 2007-2008 : Harbor Area Management Plan (HAMP)
  - Flood vulnerability study (extreme tides)
- 2008-2011 : National Science Foundation Grant
  - Integration of data (lidar) and models for high resolution prediction of tidal flooding
  - Validation using Jan. 2005 flood event
- 2010-2011 : Everest Study of Balboa Island Seawalls
  - Predictions of flooding (2025, 2050, 2100)
- 2011-2012 : USGS Collaboration
  - Coupling regional and local models to forecast coastal flooding
- 2011-2012 : California Department of Boating and Waterways Grant
  - Integration of sea wall and beach overtopping into an embayment flood model
- 2011-2014 : National Science Foundation Grant
  - Seasonal beach berms: erosion, overtopping and designs to minimize flood risk

Sanders Lab Activities in Newport

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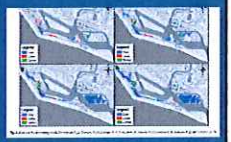
Amazing City Support at All Levels

- Letters of support to NSF
- Access to data (lidar, GIS)
- Tours of flood defenses
- Assistance in field work
- Accounts of historical events including photo-documentation
- Genuine interest in serving the public good

Benefits of Research to the City

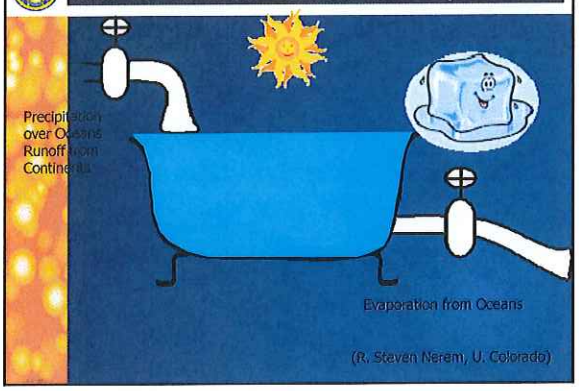
- Federal funding of highly relevant research
- Dividends from data (lidar) and IT investments
- Science, technology and human resources to support planning and emergency management
- Objective analysis for resource allocation
- An educated work force
- State and National leadership
- Foresight for the future



Outline

- Sea Level Rise and Coastal Hazards
  - Recent Science
  - Adaptation Options
- Coastal flood prediction
  - UCI research activity at Newport
- Future directions

Sea Level Rise - A Global Perspective

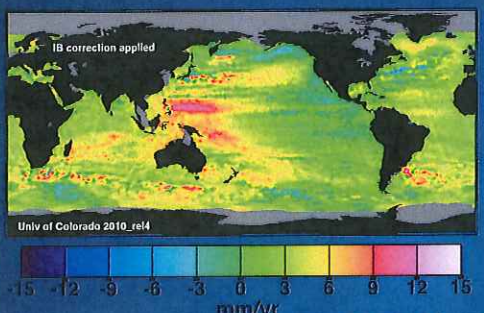


How High Could Sea Level Rise?

- Thermal Expansion (~1 m potential)
- Water Exchange with Continents (potential)
  - Greenland Ice (7 m)
  - Antarctic Ice (60 m)
  - Mountain Glaciers (0.7 m)
  - Land Storage Variations (< 0.5 m)
- Latest Global Projections for 2100
  - 1 m +/- 0.5 m
- Significant Regional Variations

(R. Steven Nerem, U. Colorado)

Spatial Variation in Sea Level Rise



(R. Steven Nerem, U. Colorado)

California Sea Level Rise

- Bromirski et al. (2011) : No significant
- er

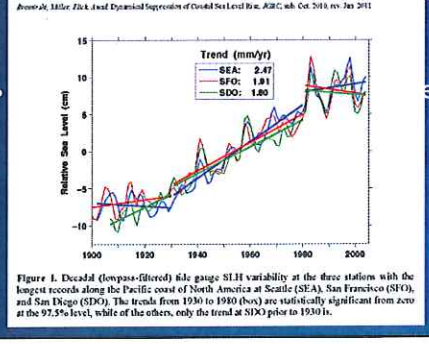


Figure 1. Decadal (lowpass-filtered) tide gauge SLH variability at the three stations with the longest records along the Pacific coast of North America at Seattle (SEA), San Francisco (SFO), and San Diego (SDO). The trends from 1930 to 1980 (box) are statistically significant from zero at the 97.5% level, while of the others, only the trend at SDO prior to 1930 is.

California Climate Change Center

- SLR Guidance Document (2010)

Table 1. Sea-Level Rise Projections using 2000 as the Baseline

Year		Average of Models	Range of Models
2030		7 in (18 cm)	5-8 in (13-21 cm)
2050		14 in (36 cm)	10-17 in (26-43 cm)
2070	Low	23 in (59 cm)	17-27 in (43-70 cm)
	Medium	24 in (62 cm)	18-29 in (46-74 cm)
	High	27 in (69 cm)	20-32 in (51-81 cm)
2100	Low	40 in (101 cm)	31-50 in (78-128 cm)
	Medium	47 in (121 cm)	37-60 in (95-152 cm)
	High	55 in (140 cm)	43-69 in (110-176 cm)

Note: These projections do not account for catastrophic ice melting, so they may underestimate actual SLR. The SLR projections included in this table do not include a safety factor to ensure against underestimating future SLR. For dates after 2050, three different values for SLR are shown - based on low, medium, and high future greenhouse gas emission scenarios. These values are based on the Intergovernmental Panel on Climate Change emission scenarios as follows: B1 for the low projections, A2 for the medium projections and A1FI for the high projections.

Coastal Flood Hazards

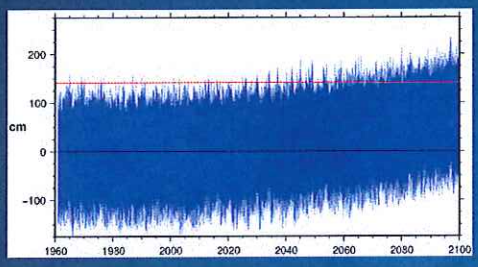
- Hazard=Tides+Waves+Storms+El Nino+SLR

Coastal Flood Hazards

- Tides
  - Gravitational effect of moon and sun.
  - Height changes of 2-3 m
- El Nino
  - Height to change up to ~10 cm
- Storms
  - Height change ("surge") up to ~20 cm.
- Waves and Swell
  - Height changes of up to 2-3 m over periods of seconds.
  - Extra surging caused by infragravity waves (periods of 1-2 minutes)
- In embayments, tides may amplify or dissipate by 5-10 cm
- Major floods avoided in recent years (e.g., 12/2008) thanks to a flat ocean!

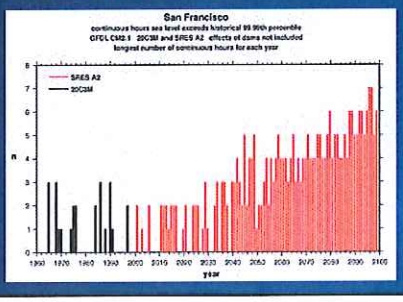
Expect Increase in Flood Frequency

- Tide+SLR Predictions for San Francisco (Cayan et al. 2009)



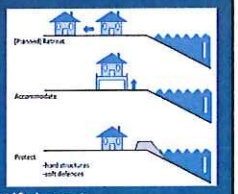
Expect Increase in Flood Frequency

- Number of Flood Events Per Year (Cayan et al. 2009)



SLR Response?

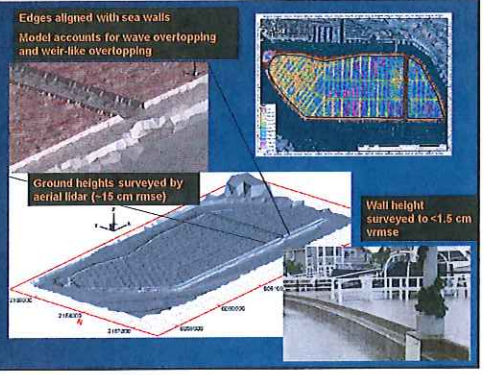
- Mitigate vis-à-vis reduced greenhouse gas emissions
- Adapt (Nichols et al. 2011)
  - Retreat
  - Accommodate
  - Protect
- Best options?
  - Local decision-making
  - Economic impacts
  - Social impacts
  - Environmental impacts
- Predictive models
  - Visualize the future and quantify impacts
    - Support cost-benefit studies
  - Forecasting flooding from storm events
    - Support emergency management and reduce vulnerability
- Cost-benefit analyses have shown that it is worth investing to protect high value areas (Nichols et al. 2011)



UCI Newport Study (NSF Grant)

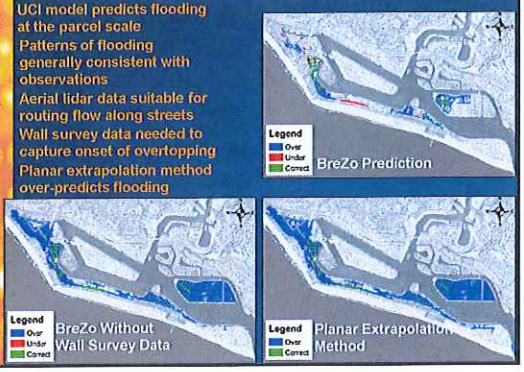
- Model extreme tide event of Jan 10, 2005
  - Localized flooding due to overtopping of sea walls within embayment
  - Model domain covers harbor and extends offshore
  - Model forced by ocean height boundary condition
  - Model resolves tidal amplification in bay (< 5 cm)
- Key data
  - City photographs of flood impacts
  - Aerial lidar survey (15 cm rmse)
  - RTK survey of flood walls (1 cm rmse)
- Flood mapping models
  - UCI model (BreZo) for embayment and overland flow
  - Planar surface projection ("Bathtub") based on ocean height
    - Standard method used for State-wide SLR assessment

UCI Flood Model (BreZo)



Newport Study

UCI model predicts flooding at the parcel scale
Patterns of flooding generally consistent with observations
Aerial lidar data suitable for routing flow along streets
Wall survey data needed to capture onset of overtopping
Planar extrapolation method over-predicts flooding



Model Validation is Important

- Lack of validation is a widespread problem in flood risk management (Merz et al. 2005)
  - Planning decisions based on erroneous or biased flood predictions
- Everest Study (2010-2011) benefitted from a validated model.
  - *The only validated coastal flooding model in California!*

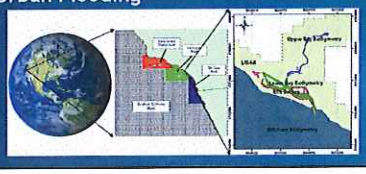
Towards Flood Forecasting

- Coastal flood events managed by City personnel
  - Tide valve operations
  - Seawall plugs
  - Beach berm construction
  - Pumps
  - Traffic management
  - Beach safety

- Uncertainty in ocean height, wave heights, and flood defenses (plugs on private property) makes flooding difficult to predict
- Collaboration with USGS to research the potential for short-term (< 24 hr) flood forecasting
- Research: flood damages can be significant reduced (50%) with just 1-2 hrs advanced warning

Towards Flood Forecasting

- USGS Modeling System: CoSMoS
  - NOAA GFS (Atmospheric Forecast)
  - WAVEWATCH III (Wave Forecast)
  - Swan (Coastal Wave Transformations)
  - Delft 3D (Coastal Ocean)
  - Xbeach (Wave Runup and Erosion)
- UCI (BreZo)
  - Urban Flooding



January 10, 2005 Event

- Forcing = CoSMoS
- Forcing = NOAA Tide Prediction
- Forcing = NOAA Tide Measurement

Forecasting Potential

- Study shows that local and global models can be combined to provide localized forecasts
- More research needed
  - More events should be studied
  - Alternative ocean models deserve consideration
- Forecasting Horizon
  - Tides (months to years)
  - El Nino (weeks to months)
  - Storms (hours to days)
  - Waves (hours to days)
  - *This is already happening in Newport*
    - *Newport on cutting edge of preparedness*
    - *More can be done*

Present and Future Directions

- Research into wave overtopping models
  - Need to quantify flows over walls and beaches to realistically map flood zones
- Research into beach erosion models
  - A major overwash event could wipe out parts of the peninsula.
  - How likely is this, and how can the risk be managed?
- Research into SLR adaptation options
  - Examination of retreat, accommodation and protection options
    - What works in southern California?
    - Economic, environmental, social context

Thank you

- Questions?

Acknowledgements

- National Science Foundation (CMMI-0825165)
- City of Newport Beach
  - Amazingly supportive staff
- Urban Water Research Center
- UC Center for Hydrologic Modeling

What can the City do?

- Review SLR adaptation guidelines provided by the State.
  - And examine the best approaches for the City
    - Soft: building and zoning policies, grade raising, emergency notification, insurance
    - Hard: sea walls, pump stations, tide barrier
  - Public/Private infrastructure could be a major challenge
- Increase awareness of flood hazards
  - Public cooperation is very important for reducing the *vulnerability* to flood damage
  - Consider enhanced outreach efforts
- Continue collecting flood data (photographs, tide height measurements)
  - Model for the State
  - Consider automated tide and wave measurements
- Continue supporting UCI research!
  - Local models and data
  - Local expertise

January 10, 2005 Event

- CoSMoS forecast of ocean height (Gallien et al. *in prep*)
  - Major improvement over NOAA tide prediction