Bren 2014-2015 Group Project Proposal:

Title: City of Santa Barbara Sea Level Rise Vulnerability Assessment

Proposers:  
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Client:  
City of Santa Barbara (John Ledbetter, AICP, Principal Planner, (805) 564-5470 x2569, jledbetter@santabarbaraca.gov)

Bren Faculty Sponsor: James Frew, Professor of Environmental Informatics

Proposed Project

Objectives: The City of Santa Barbara is in the process of updating the Land Use Plan component of the City’s Local Coastal Program in order to better adapt to a changing climate. In order to facilitate in the update of the Land Use Plan, the objectives of this project are as follows:

- Conduct a detailed vulnerability assessment of human populations, critical infrastructure, environmentally sensitive resources, public access, and recreational facilities using past and current vulnerability assessments as a framework.
- Prepare a set of preliminary adaptation measures to address the short-term and long-term impacts of sea level rise.
- Prepare a comprehensive Sea Level Rise Report to summarize findings.
- Develop a Communications Strategy to increase community awareness and participation in the sea level rise adaptation process.

Significance:  
In the coming decades, climate change will pose many problems for coastal communities like Santa Barbara, CA. Projected changes in sea level and increases in storm frequency and/or magnitude put these communities at greater risk for more frequent flooding, inundation, and increased cliff, bluff, dune, and shoreline erosion. In order to protect their important coastal resources, such communities must make climate change adaptation a priority.

Santa Barbara has served as a leader in climate change response and the actions of this project can be used as a model for other coastal communities in California. In order to create the best adaptation policies, a comprehensive coastal vulnerability assessment is needed. The vulnerability assessment will consider critical infrastructure such as the Santa Barbara airport, Highway 101, the railroad, and water and wastewater systems; public access, such as One Thousand Steps Beach and the Mesa Lane Trail; and recreational opportunities, such as Arroyo Burro Beach and Chase Palm Park. The assessment will also consider coastal land use for hotels and restaurants as well as coastal dependent activities utilizing the harbor. Finally, the vulnerability assessment will serve as a baseline to help preserve sensitive ecological habitat areas such as Arroyo Burro and Andree Clark Bird Refuge.
Community awareness and involvement are a crucial element of implementing the new coastal adaptation policies. Communicating the results of the vulnerability assessment including the preliminary adaptation measures will be critical to the success of this planning effort. Important stakeholders of this project include the City of Santa Barbara, the local community, and other coastal communities in California.

This project will help the City of Santa Barbara more precisely assess coastal vulnerabilities and identify appropriate adaptation measures to be included in the Land Use Plan update.

**Background:**
The City of Santa Barbara has a broad understanding of projected sea level rise vulnerabilities. This understanding mainly stems from studies conducted by Gary Griggs (UC Santa Cruz). Griggs has conducted a Sea Level Rise Vulnerability Assessment specifically for the City of Santa Barbara. Griggs has also produced an adaptation guide, Adapting to Sea Level Rise: A Guide for California’s Coastal Communities, applicable to the entire state of California. This Griggs-Russell study recommends developing more detailed baseline data (flood maps) and adaptation planning studies. These studies provide a valuable foundation for a thorough investigation of targeted vulnerabilities such as vulnerable populations, critical infrastructure, environmentally sensitive resources, public access, and recreational facilities.

The Land Use Plan (LUP) component of the City’s Local Coastal Program (LCP) was originally certified by the Coastal Commission in January 1981. In the 33 years since the plan adoption, no comprehensive updates have occurred. The City’s LUP component of the LCP is in need of an update in order to improve the usability of the policy. An update would also induce achievable objectives for coastal adaptation and set framework for the City’s implementation plan. Furthermore, updated plans and policies would bring the City into conformance with the Coastal Act.

This is of heightened importance as sea level rise is occurring at accelerated rates and population density is projected to increase in coastal counties. Thus in an ecologically and economically active area, it is imperative that vulnerability assessments are conducted in order to inform coastal adaptation policies and management plans.

**Available data:**
This project will utilize the City’s existing ArcGIS map layers, including the recently updated Master Environmental Assessment layers to develop the more refined vulnerability assessments. The Griggs-Russell study compiles data from the Santa Barbara tide gauge (NOAA), historical aerial photographs of Santa Barbara (California Coastal Records Project), and LiDAR data from digital elevation models from NOAA’s 2009-2011 CA Coastal Conservancy Coastal LiDAR Project to analyze historic sea level rise rates and to project potential future flood elevations. These layers have been most recently updated per the 2012 National Research Council report on Sea Level Rise for the Coasts of California, Oregon and Washington, as recommended by the California Coastal Commission.
In addition, NOAA is currently conducting a vulnerability assessment of the ecological resources off the coast of Santa Barbara County. (Santa Barbara Area Coastal Ecosystem Vulnerability Assessment) This study will provide valuable and accurate data throughout the one-year term of the group project regarding coastal ecosystem welfare.

All sources of data would be incorporated into an updated vulnerability assessment. This would inform a preliminary coastal adaptation plan and a framework for a coastal management plan with implementation actions for the City of Santa Barbara.

**Approach:**
Initially, project members would review the Griggs-Russell City of Santa Barbara Sea Level Rise Vulnerability Study and NOAA’s current Santa Barbara Area Coastal Ecosystem Vulnerability Assessment. The team members will conduct the vulnerability assessments identified in the Objectives utilizing the newly digitized flood maps provided by the City of Santa Barbara. Vulnerability assessments will include the projected magnitude of sea level rise and its associated impacts, the sensitivity or exposure of the area to sea level rise or storm damage, and the ability of the community to adapt or respond to the predicted impacts³.

The next phase of the project would be to prepare a set of preliminary adaptation measures to address the predicted impacts of climate change on the various coastal resources. Then group members will summarize the results of the vulnerability assessments and associated adaptation measures in a comprehensive Sea Level Rise Report.

The final phase would be to prepare a Communications Strategy utilizing maps, charts, and illustrations to summarize the technical Sea Level Rise Report in formats suitable for a presentation at community forums.

**Deliverables:**
1. Sea Level Rise Report, comprising
   a. vulnerability assessments
   b. preliminary adaptation measures
2. Communication Strategy, comprising
   a. brief non-specialist summary of Sea Level Rise report
   b. supporting materials (video, maps, PowerPoint, etc.) suitable for presentation at community forums

Should the project need to descope, focusing on the earlier deliverables would still achieve a significant outcome.

**Internships:**
The City of Santa Barbara will offer two paid internships for the summer to work on this project. These interns will receive the estimated wages of $10.00/hour.
References


3. Ibid.


Budget and justification:
Project activities during the school year will not require additional funding greater than the $1,300 already provided by Bren.

Client letter of support
(Please see attached.)
January 22, 2014

Bren School Group Project Proposal Selection Committee
Bren School of Environmental Science & Management
2400 Bren Hall
UC Santa Barbara, CA 93106-5131

Re: Santa Barbara Sea Level Rise Vulnerability Assessment Proposal

Selection Committee:

We are pleased to offer a letter of support for the proposed Santa Barbara Sea Level Rise (SLR) Vulnerability Assessment. Based on our preliminary discussions with the two proposal authors, an exchange of background materials, and our close review of the proposal, we believe the proposal contains both environmental science and management components, and the project scope can be completed by April 2015. Equally as important, this project will fulfill a key task for the City as we move forward with our Local Coastal Program (LCP) update, and specifically, help the community understand the impact of sea level rise and available adaptation options.

The City is committed to addressing the impact of climate change along the Santa Barbara coast, as evidenced by associated General Plan goals and policies, a Climate Action Plan, and most recently, the LCP update. In fact, the California Coastal Commission has recently awarded the City a grant to assist with the LCP update, with an emphasis on SLR and coastal adaptation. The City’s Climate Action Plan included a preliminary SLR Vulnerability Study, conducted by Dr. Griggs of UC Santa Cruz, as noted in the proposal. The Coastal Commission has recognized the importance of this work as a foundation for the SLR component of the LCP update.

The proposed project will be a challenge, requiring the team to develop a basic understanding of the science of sea level rise, coastal ecology, coastal engineering related to SLR adaptation measures, and coastal planning for vulnerable populations, recreation resources and public access. Appropriate skill sets will include: data analysis, coordination with another ongoing study (for coastal ecology vulnerability assessment), GIS mapping, report writing, developing public presentation materials, and of course project management.

The City will provide the datasets and GIS base layers related to SLR in Santa Barbara, as outlined in the Griggs Study, and more recently updated by the 2012 National Research Council Report, *Sea Level Rise for the Coasts of California, Oregon and Washington*. In addition, the City will provide, or assist the team in finding, any other necessary datasets. Finally, the City will fund two paid intern positions over the summer working with our LCP update team, under my direct supervision. Please feel free to call or email me with any questions or comments.

Sincerely,

John Ledbetter, AICP, MURP
Principal Planner
(805) 564-5470 x 2569 jledbetter@SantaBarbaraCA.gov