SUMMARY
Aquarium of the Bay is a non-profit organization with a mission to inspire conservation of the San Francisco Bay, its watershed and all marine environments. As part of this mission, Aquarium of the Bay is a certified San Francisco Green Business. The organization has taken many steps toward waste diversion, energy conservation, and carbon footprint reduction. The Aquarium would like to increase its efforts in order to become a true environmental leader in the Bay Area, the zoo and aquarium industry, and beyond. Through this project, a group of Bren students will analyze the facility’s carbon footprint, life cycle assessment and/or water footprint in order to make recommendations as to where and how the organization can further reduce its impact on the environment. The students will use Aquarium of the Bay as a case study in order to develop a model of assessing the environmental impact of other aquariums.

OBJECTIVES
Some of the group project’s objectives will benefit the Aquarium immediately, while others may impact other aquarium operations in the future. The scope of the project will be collaboratively defined by the Bren Students and key staff at the Aquarium of the Bay. The main objectives of this project will be:

• Assess Aquarium of the Bay’s environmental impact. This assessment of the facility and its on-site activities may include, but is not limited to: (i) energy usage in offices, exhibits, and behind the scenes spaces, (ii) waste creation and diversion, and (iii) water use in administration and exhibit areas.
• Analyze the Aquarium’s environmental impact and make recommendations as to the areas in which the Aquarium can reduce its impact.
• Make recommendations as to methods and approaches the Aquarium can use to make those reductions.

Other potential objectives, depending on the scope of the project, could be to:
• Examine the footprint of products in the Aquarium’s retail stores.
• Expand the analysis beyond the daily operations of the Aquarium to include behaviors of employees and guests in their commute to the facility.
• Provide Aquarium of the Bay with a variety of recommendations for reducing the environmental impact based on feasibility, time, and monetary constraints.
• Create a model for other aquariums to use to assess their environmental impact.
GREENING AQUARIUM OF THE BAY: ENVIRONMENTAL IMPACT & RECOMMENDATIONS FOR REDUCTION

SIGNIFICANCE
Bren students and environmental consultants have become adept at assessing the environmental impact of many facilities, from small businesses to homes to large offices. The Aquarium of the Bay stands apart from these institutions in that it is home to many animals with specific energy input and waste output requirements. There is no model to assess and reduce the environmental impact of an aquarium, aside from the normal green practices of solar panels, recycled products, composting, etc. This may be the first study and recommendation of its kind of an existing facility. This project will be monumental not only in helping Aquarium of the Bay reduce its environmental impact, but in paving the way for other zoological institutions.

BACKGROUND
Aquarium of the Bay is a non-profit organization next to Pier 39 in San Francisco, affiliated with The Bay Institute based out of Novato, CA. Aquarium of the Bay has three main exhibits on two floors, including two 350,000 gallon tunnels with over 20,000 live ocean animals. The site employs approximately 100 staff and serves over 16,000 students, teachers, and chaperones during the school year through the free K-12 classroom programs. Additionally, the Aquarium is host to about 600,000 guests annually from around the world.

Aquarium of the Bay has taken strides to enhance its building and operations sustainability practices since its entrance into the San Francisco Green Business program in 2005 (see http://www.sfgreenbusiness.org/program-standards/ for more information on some of the goals the Aquarium has already met).

The Aquarium wants to increase its efforts but needs to assess the facility, its needs, and financial options in order to make the most efficient decisions with the resources available.

STAKEHOLDERS
- Aquarium of the Bay
- Association of Zoos and Aquariums (AZA)
- Aquarium of the Bay employees
- Other zoological institutions
- Aquarium members and the community
- Pier 39 and its tenants
- The Bay Institute

POSSIBLE APPROACHES AND AVAILABLE DATA
There are information, software, tools, and instructions for how to perform energy, water, and waste audits for many types of offices. Any of these can be applied, but must be expanded to truly assess an aquarium. Bren students will utilize the Aquarium’s husbandry department, on-call veterinarian, and resources such as AZA requirements to understand the specific needs of aquarium animals. Bren students and Aquarium of the Bay staff can access and use programs such as CEDA 4 for carbon footprinting. Furthermore, they can collaboratively assess the viability of analyzing the use of Life Cycle Assessment approaches and/or water footprinting techniques.
**DELIiverables**
A report and presentation to aquarium staff including:

- An assessment of Aquarium of the Bay’s facility and operations based on one or more of the following techniques: carbon footprinting, life cycle assessment or water footprinting.
- Recommendations for areas and ways to reduce the facilities footprint.
- A possible model for assessing the carbon footprint of other aquariums.
- Potentially, a Cost Benefit Analysis for options for reducing the Aquarium’s impact.

**Commitment**
Aquarium of the Bay is committed to finding more ways to embrace sustainable practices at their facility. The organization does this for the benefit of its staff and animals, but also for the benefit of other similar organizations and the environment. The Aquarium would like to be seen as a leader in its field by setting the bar high and offering an example for other organizations to learn from and follow. With education as part of its mission, the Aquarium is committed to supporting the Bren students in helping to meet environmental goals. Directors in all departments have signed on to this project and many have been involved in the development of this proposal.

**Financial Need, Support and Deliverables**
Aquarium of the Bay is committed to providing support to the Bren students. This support will be provided through email and phone communication, as well as through in-person meetings with different departments, including operations, facilities, education, husbandry, and finance. The students will have access to the facility as necessary. Aquarium of the Bay can facilitate introductions between the Bren students and necessary and applicable partner organizations, such as SF Green Business, AZA, and/or other aquariums. Aquarium of the Bay anticipates providing financial support for Bren students, including, but not limited to:

- Travel between San Francisco and Santa Barbara for occasional meetings.
- Potential tools or instruments for measuring the site’s footprint.
- Attendance at conferences or workshops.

To this end, Aquarium of the Bay has allocated $2500 in financial support to this project for 2011 to be used as the Bren students and Aquarium of the Bay directors see most fit throughout the course of the project.

**Internship Opportunities**
Aquarium of the Bay is able to offer one full-time internship or two part-time internships during the summer of 2011, allowing students access to aquarium staff and resources and giving them the opportunity to collect data. Depending on the use of the funds allocated for this project, the students may elect to use up to $2000 as a stipend for the internship.
REFERENCES