

UNIVERSITY OF CALIFORNIA
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Evaluation of TURF-reserve effectiveness in Mexico

Work Plan Draft submitted in partial satisfaction of the requirements for the degree of
Master of Environmental Science and Management
for the
Bren School of Environmental Science & Management

by

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Executive summary

Anthropogenic pressure has caused significant impacts on marine ecosystems around the world. Overfishing, habitat deterioration, destructive fishing practices, pollution, and climate change are amongst the activities that directly affect fish stocks around the world (Halpern et. al., 2008; McCauley et al., 2015). Consequently, these activities might affect food availability and the economy of coastal communities and even whole countries, which emphasize the urgency of addressing these problems.

Multiple solutions have been proposed in order to manage fisheries and restore marine environments. The implementation of management measures such as Marine Protected Areas (MPAs) and No-Take Zones (NTZs) are commonly suggested as a way to help rebuild fish stocks and enhance fishing in nearby areas, especially for small-scale fishing communities.

Since 1999, the Mexican NGO Comunidad y Biodiversidad (COBI) has been helping on the management of fishing resources on coastal communities, and the implementation of more than 30 no-take zones to date. However, the proper evaluation of the effectiveness of each of these areas is limited to few methods; even fewer are the methods applicable to NTZs in Mexico.

This project aims to provide COBI with a framework to aid in the co-management of government-owned and fishermen-owned no-take marine reserves that COBI has helped design, implement, or monitor. The framework shall include a list of biophysical, socioeconomic, and governance indicators and provide real-world examples of how these indicators can be used to evaluate reserve success. In the first step to achieve these goals, the group will select biophysical, socioeconomic, and governance indicators to evaluate the effectiveness of no-take marine reserves in Mexico. the group will then gather data from different sources to perform the necessary analyses.

Most of the data will be provided by COBI, who performs regular ecological surveys on managed and control sites. Data regarding socioeconomic and governance structure of communities will be provided from COBI's surveys, and new surveys conducted by the members of this project. We will complement this information with information from Government Agencies (e.g. CONAPESCA). The group will use difference in difference analysis, which will provide us with an understanding of the effectiveness of each reserve, comparing the changes in time with control sites.

As guidance on our framework, we will write a guidebook in Spanish/English; it will be geared towards a non-academic audience to ensure that it is understandable and usable by all pertinent users (e.g. fishers, NGO's, managers, Government Agencies). Besides the assessment, the guidebook will provide recommendations for changes in the management of unsuccessful reserves. In addition, the group also plans to transform the framework into a friendly web-based app that could generate accurate results for evaluating effectiveness in real time.

Project objectives

1. Determine a set of biophysical, socioeconomic and governance indicators that can be used to evaluate the effectiveness of no-take marine reserves in Mexico.
2. Use the selected indicators to propose a framework for evaluating the effectiveness of no-take marine reserves in Mexico.
3. Develop an English/Spanish guidebook with the selected indicators that walks the user through the steps towards implementing our framework.

Significance

Overfishing and unsustainable fishing practices are some of the major threats to marine ecosystems around the world. Implementation of no-take marine reserves (i.e. areas where the extraction of one or more species is prohibited) is frequently proposed as a measure to help stocks rebound and to enhance nearby fishing areas. Though biophysical aspects are important drivers of the reserve's success, the effectiveness of reserves also depends on the socioeconomic status and governance system of the local fishing community.

Comunidad y Biodiversidad (COBI) is a Mexican NGO that promotes marine conservation through community involvement. One of their strategies has been to facilitate the participation of fishermen in the design and management of community-based no-take marine reserves in the Baja California Peninsula, the Gulf of California, and the Mexican Caribbean (Figure 1). COBI has been involved in the establishment of both government-owned and fishermen-owned marine reserves. These marine reserves can be no-take (fishing is off-limits), partially protected (extraction of specific species is not allowed), temporarily protected (only for a period of time) or a combination between temporal and partial protections. The legal recognition of private reserves depends on the submission of a written request (accompanied with a supporting document; NOM-049-SAG/PESC-2014) by the users to the government and its subsequent acceptance. From a total of 13 communities (21 reserves), three have legally recognized no-take marine reserves, eight have presented the document, one is beginning to engage, and one has decided not to move forward with their reserves (2009-2015).

Before starting the decision-making process, COBI visits the interested fishing community, records basic social and economic data, and performs underwater ecological surveys that provide a baseline of the overall status of resources and their marine habitat. Fishers then design their reserve based on their traditional management practices and local knowledge, as well as the guidance provided by COBI. During the process of implementation of the reserves, COBI trains fishermen to collect biophysical data (underwater ecological surveys and oceanographic monitoring).

After more than 15 years of collaboration with fishermen, COBI has been involved in the creation of 29 community-based no-take marine reserves (21,106 hectares) distributed among 13 different communities in the Gulf of California, Pacific coast of Baja Peninsula, and the Caribbean. They also collaborate with government agencies to design and monitor 10 Marine Protected Areas (617,703 hectares) that have no-take marine reserves (58,348 hectares) within their perimeters (i.e. core zones). While these numbers represent a major advance in terms of marine conservation and community involvement in Mexico, the extent to which these reserves have met their objectives is unclear. Each community has unique culture, natural resources, vulnerabilities, and governance structures. This hinders the use of conventional frameworks that evaluate the effectiveness of no-take marine reserves, and calls for the development of an appropriate tool capable of measuring effectiveness under the current scenario.



Figure 1: Regionalization of COBI’s working areas (in blue) and the fishing communities with whom they collaborate (labels). Source: COBI

While few frameworks have a social, ecological, and political approach, none of them are especially tailored to the currently available information for Mexican no-take marine reserves. For this reason, COBI requested a framework for practical fisheries management that could be translated into a guidebook to assess the effectiveness of no-take marine reserves, and applied by community members. This guidebook will provide COBI with the framework necessary to evaluate the effectiveness of no-take marine reserves in Mexico, and will help members of the communities to evaluate their own marine reserves.

Background and Literature Review

Currently, only a few frameworks provide indicators of effectiveness of MPAs (Pomeroy et al., 2015) and fisheries (Basurto and Nenadovic, 2012; Ostrom *et al.*, 2007, 2009). Pomeroy et al.’s (2015) framework provides a comprehensive list of biophysical, socioeconomic, and governance indicators of success and how these indicators may be measured to evaluate Marine Protected Areas. However, the framework is general and not designed to specifically evaluate no-take marine reserves.

Basurto and Nenadovic (2012; Modifying Ostrom et al 2009) suggest creating a classification system that would include the characteristics of commercially-important species, demographic information about fishers, and the local governance system to evaluate the success of small-scale fisheries. This framework would help highlight the differences between successful and unsuccessful fisheries. Though useful, this framework is still in development and it is unclear which indicators will be helpful in evaluating the success of marine reserves in Mexico.

While the frameworks mentioned above provide a large portion of the indicators, we will perform literature review that covers particular case studies where no-take marine reserves have been evaluated. We will focus on case studies that include evaluations of the socio-economic, ecological or

governance aspects of marine reserves. We will evaluate cases in Mexico, but will also focus on significant literature from other countries, as well as, meta analyses and reviews.

We will also perform a thorough review of Mexican regulations related to the implementation of community-based no-take marine reserves, and general fishing regulations. An intensive review of the documents that the communities have submitted to the government will also be performed, which will enable us to extract further information (e.g. landings) that will be valuable for the project.

Data Management Plan

i. Describing the research data

Our project requires different types of data. At a general level, we will require biophysical, social, economic, and governance data for a list of indicators we select. Data will provide information for before and after the implementation of the reserves. Biophysical data includes species richness, abundance, size (fish), invertebrates, algae cover, coral cover, as well as habitat heterogeneity. This information exists for the reserve areas, and for control zones often located within the TURF or management area. These data is collected via underwater ecological surveys, which are performed once a year as part of the monitoring program of each reserve, and follow standardized methodologies (e.g. Fernández Rivera Melo *et al.*, 2012; Shuman *et al.*, 2010).

In terms of socio-economics and governance data, we will focus on information that allows us to explore the effect of the reserve on the community. Economic data will include landings data from technical documents that each community submits in order to establish its no-take zones and landings data by cooperative from 2000 to 2015, which was compiled by COBI through the Federal Institute for the Access of Information (IFAI). This includes monthly landings, price per Kg, and total value of the catch by economic entity (i.e. cooperative, free fishers) and resource.

Governance data will include the laws and regulations posted by the Mexican government, information about fishing cooperatives, and information collected through a survey conducted by the project during the summer of 2016. We will collect information about how fishers organizations are structured, types of fishing permits, how fishers are organized, number of fishers in a community, involvement of NGO's and other characteristics.

For social data, we will rely on surveys COBI conducted in the last years. These surveys seek to determine economic dependence upon fishing, level of education, perception of conservation, resource conflict, and understanding of laws and regulations. Our project will conduct a survey in summer 2016 to fill in gaps in social data.

Based on the size of preliminary data, we estimate that the biophysical dataset will be at least 500 Mb. Landings data will be significantly larger, initially taking up to 1.5 Gb. Social data will not exceed 500 Mb. In total, we do not expect our entire data set to exceed 3.5 Gb.

ii. Data standards

Datasets will be standardized in a way that allows replication of our results. All files will be stored as *.csv, a format that may be read by a wide variety of programs. We intend to combine the different databases into a single database that contains all the information needed. This will not only reduce the number of files that need to be maintained, but will also allow us to perform analysis more efficiently. Our data manager (Juan Carlos Villaseñor-Derbez) will have principal responsibility for ensuring data is properly formatted and maintained, but other team members will help format data as well.

iii. Metadata standards

A metadata file in tabular form will be associated with the final database. It will include origin of data (e.g. COBI, Mexican Government databases, field surveys by group members), methodology (e.g. transects, interviews, database mining), units, description, and a brief indication of how and where it was used. We will provide additional documents that explain the methodologies (e.g. the monitoring protocol or the questionnaires performed).

iv. Data sharing and access

While we aim to standardize everything into a single database, portions of it may not be completely disclosed (e.g. economic information of fishing cooperatives). For this purpose, we may *a)* provide the raw, separated databases that resulted from our database mining process and exclude those databases cannot be disclosed or *b)* provide the full database, but with suppression of the fields that cannot be disclosed. Metadata will be fully provided and will describe what information can not be disclosed. Files will be in *.csv format, and no proprietary software will be needed. The necessity of a Memorandum Of Understanding (MOU) is in discussion between the group and client.

v. Intellectual property and re-use

Data will be collected in two ways. 1) We will obtain socioeconomic, biophysical and governance data from both public (Mexican Government) and private databases (COBI), and 2) we will perform interviews to leaders of fishing communities and COBI representatives. As per our MOU, we will not be able to redistribute raw data. Bren will not have access to this data; only the group project members will have access. We will not be able to use this raw data after the completion of our project without prior notification to and approval from COBI.

We will be able to distribute our results via our project briefs, final posters, and in published papers in peer-reviewed journals so long as we give due credit to our client. We may share our analyses, models, code, and distribute user-friendly online tool for determining the effectiveness of reserves.

vi. Data archiving and preservation

All of our data will be stored in a Github organization, under different repositories. While some of our data will not be made available, we will provide our entire source code and databases that are not tied to the MOU. Data is also mirrored in a DropBox Team account managed by Juan Carlos Villaseñor-Derbez. Quarterly backups of the data will be made into an External Hard Drive Disk. In case data is needed in the future, interested parties should contact Juan Carlos Villaseñor-Derbez (juancarlos.villader@gmail.com).

Technical approach to solving the problem

i. Selection of indicators

We will determine a set of indicators that can be used to evaluate the effectiveness of no-take marine reserves in Mexico. These will represent a subset of indicators that have been proposed to evaluate Marine Protected Areas (Afflerbach et al., 2014; Pomeroy et al., 2004) or the sustainability

of socio-ecological complex systems (Basurto & Nenadovic, 2012). Indicators will be selected based on ease of collection, analysis, and interpretation.

Indicators will be divided into three main sections: biophysical, socioeconomic, and governance. Biophysical indicators include those that can be extracted from COBI's yearly ecological monitoring program for reserve and control sites. Socioeconomic indicators are those that can be compiled by asking fishers, fishing cooperatives, communities, COBI's staff, or government databases. Governance indicators can be identified through the legal framework under which each community operates, expertise given by COBI staff, or directly from fishers and their organizations.

Indicators can also be categorized based on their objective:

1. Those that might be caused by reserves (*e.g.* increased fish biomass)
2. Those that are important in hindering/enabling success of the reserve, but not affected by reserve (*e.g.* cost of monitoring), and
3. A covariate that may provide further explanation of the results (*e.g.* environmental events that may have impacted the area).

The entire list of indicators will be evaluated by our Faculty Advisor, Client, and External Advisors. We will also perform a peer-review evaluation, in which our list of indicators and brief project description will be sent to renowned experts that may provide us with important feedback.

At the end of the project, we will also provide COBI will suggestions on how to improve selection of control areas for monitoring, select appropriate counterfactuals for analysis, and what additional data COBI should be collecting to evaluate the effectiveness of reserves.

ii. Types of Analyses

Preliminary analysis

We will perform a preliminary analysis of one community (Isla Natividad, with two reserves since 2006) to evaluate the appropriateness of our selected indicators. First, we will produce visualizations and obtain summary statistics for the entire database. This will allow us to identify trends, information gaps or other approaches needed to better evaluate the effectiveness of the no-take marine reserves. With this in mind, we will design surveys and use the entire summer internship (as indicated by the client) to address important gaps in information and perform selected analyses on available data.

The initial steps will include comparisons of harvested invertebrate and fish species abundances, species richness, biomasses, and size structures (for fish only) of samples inside the reserve vs. outside the reserve. We will also perform analysis on landings data, comparing Natividad Island and Cedros Island. Both Islands are relatively close to each other (~10 Km), share similar oceanographic conditions, but report their landings to different offices. Furthermore, Cedros Island does not have a reserve, and is thus a candidate to use as a counterfactual.

Difference in difference analysis

This analysis calculates the effect of the treatment (reserve implementation) on an outcome variable (*e.g.* fish size) by comparing the average change of the outcome variable over time in the treatment and control group (control zones outside the reserve). Treatment group: data collected in area of the reserve before and after reserve implementation. Control group: 1) data collected in the control zones outside of the reserve before and after reserve implementation, and 2) data from

close-by regions that have similar environmental and management conditions, but are not be subject the influence of a reserve.

Deliverables

i. Client deliverables

- Progress reports every 3 months to update COBI on our progress.
- Guidebook in Spanish/English designed for reserves' users and involved parties (i.e. fishers, managers, NGOs)(that explains how to evaluate the effectiveness of no-take marine reserves (under their different names and legal frameworks) in Mexico.
- Submitted peer-reviewed paper of our project

ii. Academic deliverables

- Work plan
- Website
- Final report
- Academic defense presentation
- Project brief
- Project poster
- Final presentation

Milestones

Activity	Start dd/mm/yy	Due dd/mm/yy
Workplan Draft (Objectives, Significance, Deliverables and Budget) for COBI and Bren	14/04/2016	20/04/2016
Summer internship work plan for COBI	17/04/2016	22/04/2016
Provide deadlines for deliverables to mark our progress	14/04/2016	22/04/2016
List of indicators and a 200 word description of why we chose them	20/04/2016	29/04/2016
Finalize selection of external advisors	14/04/2016	06/05/2016
Meeting in Mexico City to help COBI consolidate its databases	09/05/2016	12/05/2016
Acquire at least a description of COBI's metadata	12/05/2016	15/05/2016
Finalize selection of indicators through expert review	09/05/2016	27/05/2016
Design survey for fishers (if needed) or COBI staff (governance)	09/05/2016	27/05/2016

Submit draft of Work Plan to Bren School	20/04/2016	04/05/2016
Revised Work Plan to faculty advisors, client, and external advisors	20/04/2016	20/05/2016
Spring Work Plan Review Meeting with faculty advisors, client, and external advisors	01/06/2016	01/06/2016
One-page summary of Work Plan Review Meeting	01/06/2016	10/06/2016
Final Work Plan to faculty advisors, client and external advisors	25/05/2016	10/06/2016
Submit website	20/04/2016	10/06/2016
Progress report for COBI	01/06/2016	10/06/2016
Self/peer evaluation	10/06/2016	10/06/2016
Fill in data gaps by talking with COBI employees, local fishers, and external advisors	13/06/2016	07/09/2016
Survey fishers (if needed) or COBI staff	13/06/2016	07/09/2016
Finalize data acquisition from COBI	13/06/2016	07/09/2016
Start working on data	03/08/2016	14/09/2016
Regroup and re-evaluate our progress and work plan	19/09/2016	23/09/2016
Start outlining data analyses we will perform	19/09/2016	23/09/2016
Select cases to be used as examples	19/09/2016	23/09/2016
Progress report to COBI	19/09/2016	23/09/2016
Perform data analysis (i.e. Application of indicators)	21/09/2016	18/11/2016
Visit a fishing community with advisor to help fill-in data gaps/learn more about COBI	11/11/2016	13/11/2016
Fall Review Meeting with faculty advisors, client and external advisors	18/11/2016	18/11/2016
One-page summary of Fall Review Meeting	18/11/2016	23/11/2016
OUTLINE of final report	18/11/2016	23/11/2016
Self/peer evaluation	09/12/2016	09/12/2016
Progress report to COBI	05/12/2016	09/12/2016
Draft of Final Report to COBI and academic advisor	30/11/2016	15/02/2017
Feedback of Final report	15/02/2017	01/03/2017
Prepare for our academic defense	22/02/2017	08/03/2017

Final version of Final Report	01/03/2017	22/03/2017
Submit Abstract for Final Presentation	01/03/2017	22/03/2017
Work on drafting Project Brief	15/02/2017	22/03/2017
Work on drafting guidebook	15/02/2017	22/03/2017
Progress report to COBI	08/02/2017	15/02/2017
Self/Peer evaluation	24/03/2017	24/03/2017
Draft of Guidebook to COBI	11/01/2017	12/04/2017
Submit Project Brief draft	03/04/2017	14/04/2017
Submit Project Poster draft	03/04/2017	14/04/2017
Take picture with faculty advisor for Final Presentation	03/04/2017	14/04/2017
Submit draft of Final Presentation	03/04/2017	14/04/2017
Submit Final Project Brief and Project Poster	14/04/2017	24/04/2017
Final Presentation	14/04/2017	24/04/2017
COBI reviews guidebook	14/04/2017	24/04/2017
Modify guidebook and translate to spanish	24/04/2017	24/05/2017
Progress report to COBI	22/04/2017	24/04/2017
Write and submit peer-review paper	04/01/2017	24/05/2017
Literature Review	13/04/2016	19/04/2017

Management Plan

i. Group structure and management

Project Manager (PM)

Caio Faro

Ensure group is on time to complete tasks; help resolve internal conflicts and difficulties.

Data/Computing Manager (DM)

Juan Carlos Villaseñor-Derbez

Control access to data and keep track of edits to raw data; organize data flow and modifications through Github; lead R programmer. Elaboration of data visualizations to be used in our blog. Main point contact with client. Along with Melaina, work as part of the analysis core team.

Financial Manager (FM)

Melaina Wright

Create financial budget; communicate financial expenditures; assist with reimbursements. Record meeting minutes. Along with Juan Carlos, work as part of the analysis core team.

Outreach Manager (OM)

Jael Martínez

Design and update group website and calendar; write blog posts for our website.

Faculty Advisor

Christopher Costello

Meet weekly with students; participate in spring and fall review meetings; review and provide feedback on the work plan, defense presentation, final report, project brief, poster and final presentation; and assign grades to students for ESM 401A, B, C, and D.

PhD Mentor

Sean Fitzgerald

Participate in client, faculty advisor, and spring and fall review meetings; provide guidance on analyses; help increase our conceptual understanding of models and mathematical analyses.

Client (COBI)

Jorge Torre, Alvin Suarez, Stuart Fulton

Provide guidance on what they need; provide data and contact information of people that may have relevant data; participate in spring and fall review meetings; review and provide feedback on the list of selected indicators and other client-specific deliverables.

External Advisors

Maria Del Mar, Gavin McDonald and Fiorenza Micheli will provide our group with technical guidance and expertise for analysis, site-specific information, and provide suggestions for creating a guidebook with performance indicators to measure the effectiveness of no-take marine reserves .

ii. Meeting structure

During the spring quarter, our group will meet every Wednesday for 90 minutes to discuss the status of assigned tasks, assign new tasks, share information, and discuss concerns. The faculty advisor is expected to participate in the first 60 minutes of the meeting, unless the group is notified on the opposite. The remaining 30 minutes will be used by the group to debrief on the last findings. The group members agree on additional meetings during the week/weekend to cover urgent or specific subjects when necessary.

Our project manager, Caio, will schedule regular group and faculty advisor meetings, notify group members and our faculty advisor of that meeting, and book rooms for meetings. The person responsible for contacting our client and each external advisor will be responsible for coordinating possible meeting times for the Spring Review and other meetings, as well as, notifying our client and external advisors of determined meeting times and locations.

We will collaboratively create meeting agendas to distribute to our client before client meetings and our client, faculty advisor, and external advisors before the meetings. Melaina will document all meetings. A summary of the meetings will be generated and sent directly to our client and external advisors after meetings. For our faculty and PhD advisors, the meeting logs will be available on our group's Github account that they will have access to. All group members will have access to meeting logs on our group's Github account and will be notified via Slack when they are posted.

iii. Guidelines for interacting with faculty advisors, clients, and external advisors

The primary contact for the faculty advisor will be the project manager, Caio Faro. However, other groups members are encouraged to contact the faculty advisor regarding subjects within their assigned roles.

Likewise, client and external advisors will have a primarily contact on the group but might be contacted by other members if necessary. For our client, Juan Carlos will be responsible for the contact. The external advisors will be contacted by Caio (Maria del Mar) and Jael (Gavin McDonald), and Juan Carlos (Fiorenza Micheli). Melaina will be the main contact for economists at NOAA who may be potential advisors.

iv. Systems to ensure that critical tasks are completed on time

As requested by the client, the group created a Gantt diagram that lists time allotted to each milestone to ensure our project gets done on time. This diagram has been included in a Google calendar (calendar@turfeffect.org), and people responsible of a task will be listed on each event. The calendar has been linked to our Slack Team, and notifications with a summary of tasks are posted every Monday at 8:00. The calendar will be maintained and updated by Jael Martínez.

Additionally, at the end of each meeting, our group will create a list of things that must be done within the next week in addition to pre-determined deliverables. Our group's project manager will make sure that all projects get done on time. Each group member will notify other group members when they have completed assigned tasks.

v. Procedures for documenting, cataloging, and archiving information

Our group will be using Github to store information on meetings, deliverables, and our group's website. Github will archive all changes made by each individual group member. Our Slack Team will publically document all commits made to Github and document interactions between group members. As mentioned before, the information is mirrored in DropBox, and a quarterly backup of the entire information will be made.

Melaina will document all that is said during each group, client, faculty advisor and external advisor meetings. She will post the meeting logs to the group's GitHub and group members will be notified of its availability via our group's Slack account. All messages with clients, our faculty advisor and external advisors will have our group members CC'd so that all group members stay informed. One group member will save all these emails.

All budget information will be accessible on Github and communicated to group members in person or via Slack. Each group member will have access to our GUS account. Our financial advisor, Melaina, will keep group members informed about the status of the account and group expenditures. All group members will be made aware of group expenditures.

vi. Overall expectations of group members and faculty advisors

Our faculty advisor, Christopher Costello, expects us to have good organization, be committed, and work out our problems/questions amongst ourselves first before consulting him. He wants us to have the autonomy to make our own choices. He wants our group to make sure everyone is on the same page and have effective conflict resolution. He wants us to set clear expectations for other group members. Professor Costello says that we are his priority and can contact him any time. He wants us to keep him informed and will ask us for informal presentations of information and progress at weekly advisor meetings.

vii. Conflict resolution process

To avoid conflict, all group interactions will be in person or via our group communication and organization app, Slack. Slack will serve to document our interactions so that we can identify where miscommunication occurred. All Slack interactions will be available to each group member, so that mistakes can be corrected swiftly. All deliverables will be checked via peer-review before they are submitted.

Each task (whether it be writing an email or drafting a report) will be explicitly assigned to individual group members. If a member is experiencing difficulty completing their assignment or needs help, they shall immediately notify other members via Slack and ask for their help. The other group members will be expected to help him/her to the best of their ability and to be supportive of each other when difficulties arise.

Group members are expected to speak up if they feel the workload is uneven (i.e. the task assigned to them is too much for them or, on the other hand, they feel as though they are not being assigned enough tasks). Group members are also expected to notify other group members if their

availability to work on the group project changes (ex. Are travelling, family is visiting, are sick, etc.). If all else fails, tasks will be redistributed, the project manager will seek outside advice for resolving conflicts, or the project manager will talk individually with the group members who are experiencing difficulties.

Budget and Budget Justification

The TURFeffect Group Project does not expect to exceed the standard stipend provided by Bren School (\$ 1,300.00) on the basic operations of the project. The expected expenses for the project are specified in Table 1, and the justification for the expenses are provided below.

Table 1: Budget expenses for the TURFeffect Group Project.

Expense Details	Cost	Balance
<i>Opening Budget</i>		1300
Conference Calls	30	1270
Meeting Refreshments	30	1240
Project Briefs	250	990
Poster Production and Lamination	250	740
Conference Attendance Fee	400	340
Administrative Supplies	20	320
Business Cards	60	260
UCSB Vehicle Rental (3 days)	150	110
Remaining Budget		110
<i>Printing budget</i>		200
Printing	200	0

i. Description of expenses

Conference Calls:

Communication with the client is essential for the group. With the client being in a different country, sometimes with internet limitation, conference calls might be necessary. With a cost of \$0.05/min per line calling in, the group the group suggested a budget of \$30.

Refreshments:

Refreshments will be provided in eventual meetings with clients and external advisors at the Bren School. The suggested budget by the finance team is \$30.

Project Briefs and Final Poster:

A total of \$500 was suggested to cover the costs of these two required deliverables for the Bren School.

Conference attendance:

The group would like to present the project and its findings in conference(s), where it could be criticized and commented by experts. Though some of the members might have external funding related to this topic, other members do not. The suggested budget of \$400 refers to one attendance fee to the American Fisheries Society Meeting, but might be used to other conference and divided by group members.

Administrative Supplies:

Administrative supplies include pens, paper, folders, binders, dry-erase markers, etc. that will be used to help us keep organized and communicate our ideas for the project. The suggested budget by the finance team is \$20.

Business Cards:

The group will be networking with professionals at conferences, our site visit to Mexico, summer internships and through Bren events. Business cards will be important to establish and maintain connections and build cooperation to the project. The suggested budget by the finance team is \$60.

Travel:

Our group will be visiting one of the analyzed sites in Baja Mexico. We are planning to visit El Rosario, which is a 460-mile, 9-hour drive from campus. As none of us own a car, we plan to rent a UCSB vehicle for the trip. The cost would be \$50 a day. We allowed for 3 days of rental in the budget.

The remaining \$110 will help us cover any price changes or additional expenses we do not foresee.

Printing:

We are allotted an additional \$200 by Bren for printing (not to be used for project briefs or poster).

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