



## **TRIP REPORT**

**September 24-29, 2012**

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## **I. EXECUTIVE SUMMARY**

The Baja Project team, along with fellow IR/PS student Graeme Wood and USC graduate student focusing on green technology Omid Sarvian, visited El Barril from September 24-29, 2012. The primary focus of the trip was to monitor the progress of the health clinic initiative, visit households with solar panels to assess future energy needs, distribute the first round of scholarship money to new recipients, as well as advance other current projects. The team was able to accomplish all of its goals and feels that significant progress was made on all initiatives during the trip.

The team was concerned to see that very limited progress had been made on the health clinic since their last visit to El Barril in June. The base was partially constructed, but the clinic is nowhere near where it was supposed to be according to the timeline previously drafted with the health committee. Baja Project consultants held two meetings with the health committee to try and gain a better understanding of what was impeding progress and to make a new action plan. During the first meeting, a lot of fingers were pointed and concerns were expressed that while Delfino had showed up to work, he did not have the technical skills to construct the clinic and needed someone to guide him. The health committee expressed interest in hiring an “albañil” or mason/contractor to guide them through completing the project. Ramón’s brother-in-law, Aron, was in town and expressed interest in the job. We explained the project to him and he gave us a proposal stating that he would want 3,000 pesos a week to complete the project by the end of December. A contract was drafted, but progress cannot move forward until we have confirmation from the fishermen that they are willing to pay, or until we have some of the money secured to be able to ensure payment to Aron.

The team was also fortunate to have a green energy specialist, Omid Sarvian, join us on this trip. Seeing as our June trip was so short and was consumed with administering the health and energy survey, we felt that we were not able to dedicate enough attention to proper installation and maintenance of both new and old panels distributed by Baja Project consultants. Omid visited all of the houses that purchased solar panels in June to ensure that they were properly installed and to provide tips on proper maintenance. He also gained a better understanding of the energy needs of the community in order to make recommendations for future solar panel use, seeing as the community generator has not been running for most of the summer.

The team also had the opportunity to attend a meeting with the fishing cooperative, which just underwent a change in leadership. This was a unique opportunity, seeing as we do not have the opportunity to meet with them often due to their work schedule. During the meeting, Baja Project consultants learned that the cooperative has launched their own aquaculture initiative nearby and has already received permission from the government to move forward with the project. ProNatura is also working with the cooperative to help them get internet set up in their fish house so that they can properly document their activities and share them with government officials.

Overall, the trip was incredibly productive. The team will continue to stay in contact with the health committee members to move forward with signing the contract, as well as advance other current project. We look forward to another exciting trip in December, when four new first year consultants will join us.

## **II. INTRODUCTION & OBJECTIVES**

The main objectives of the trip were to monitor progress of the health clinic and create a new action plan, evaluate solar panels previously distributed, distribute scholarship money, as well as follow up on other key projects including aquaculture, womens' cooperatives, and the community garden.

## **III. ITINERARY**

**September 24-29, 2012**

**Monday 9/24\***

10:00am Meet at Avis car rental  
11:00am Depart for El Barril  
1:00pm Stop in Ensenada and meet Luis for lunch  
3:00pm Depart Ensenada  
2:00am Arrive in Guerrero Negro

**Tuesday 9/25**

8:00am Depart Guerrero Negro  
12:00pm Arrive in El Barril  
2:00pm Meeting with ProNatura  
3:30pm Go to town to set up meetings and visit community garden  
5:00pm Participate in conservation activity hosted by CONAP and ProNatura  
8:00pm Dinner/Reflection

**Wednesday 9/26**

8:00am Breakfast/Morning meeting  
8:30am Go to town, participate in second part of conservation activity

9:30am Talk to Zaira about salary and checked on solar panels distributed on last trip

12:30pm Lunch

2:00pm Meeting with fishing co-op/check on Agustín and Emilia's solar panels

4:30pm Meeting with Mar Azul

6:00pm Health committee meeting

8:00pm Dinner/Reflection

9:00pm Data entry from health and energy survey

#### **Thursday 9/27**

9:00am Fishing/ visit aquaculture spot

1:00pm Distribute solar panels to Zaira and Rosa/set up meeting with Zaida/get information about Jonny's school

5:00pm Community soccer game

6:00pm Community gathering with ProNatura and CONAMP

8:00pm Dinner with ProNatura to discuss budget

#### **Friday 9/28**

8:00am Check on water with Agustín

9:00am Visit Zaira teaching kindergarten class

4:00pm Health committee meeting part 2

6:00pm Aquaculture meeting

#### **Saturday 9/29**

6:00am Depart El Barril

12:00am Arrive in San Diego

\*Note- the team had originally planned to leave for El Barril on Sunday, 9/23. We received news the day before from Luis that the road from Guerrero Negro to El Barril was particularly bad and that he would be leaving from Ensenada on Monday if we wanted to follow him down. We decided to be safe and follow Luis on Monday, which proved to be a smart decision.

## **IV. FINDINGS**

### **A. Water Resources and Purification**

#### *Summary of Prior Progress:*

The water in the community continues to be managed by Agustín, who charges and distributes the water to members of the community and is responsible for making sure the filtration system is clean and the water is drinkable.

*Trip Objective: Speak to Agustín about the water purification system and methods of increasing the sustainability of water management.*

Agustín informed the consultants about the difficulties of cleaning out the filters and operating the system alone. The consultants suggested to Agustín the possibility of training a youth from the community who is interested in learning about the water system. He said he is willing to train someone if there is interest, thus the consultants have been speaking to the youth in El Barril about that possibility. Agustín also spoke about the continual problem of savings mechanisms for future repairs in the purification system.

#### *Future Objectives:*

The consultants realize that the water system needs to be managed in a more sustainable manner. We will continue to search for laboratories in Guerrero Negro that are able to test the water from El Barril and train in more depth how to maintain the water purification system. Until that is arranged, the Baja Project will continue to test the water in a lab in San Diego after the trips done by plane (April 2013).

### **B. Aquaculture**

#### *Summary of Prior Progress:*

In April 2012, the Baja Project met with Los Callos del Golfo Aquaculture group, which at the time had been facing many setbacks. They had submitted their paperwork to get a harvesting permit from the government, only to have it sent back with a request for additional information. As of the last meeting, they had not re-submitted the paperwork, but were planning on doing so in the coming weeks.

*Trip Objective: Meet with CG aquaculture group to ascertain the group's progress thus far and find out what next steps are required.*

On September 28, 2012 the Baja Project met with seven of the CG members, just less than half of the group of 15. At the time, the group had still been waiting for the approval of the permit to harvest scallops (Mano de Leon) and oysters (Ostion). One of the group members, Arturo Villavicencia, is currently residing in Ensenada, and has

therefore been in charge of communication with CONAPESCA, the government organization in charge of approving the permit. Because there is a three-month waiting period for the permit and it was submitted on July 23<sup>rd</sup>, the group had not made contact with CONAPESCA regarding the status of the permit. The BP consultants urged them to make contact as soon as possible to see if there were any updates, and they committed to doing so.

During the meeting, the group brought up three primary concerns. First, they are having attendance issues from the existing members of Los Callos del Golfo. Their average meeting attendance is seven people, which does not make up a majority of the group of 15. Therefore, they are unable to make any concrete decisions. To confront this issue, the group has decided to hold three consecutive meetings, and each member must attend at least one. If a member does not attend any of the three meetings, he or she will be dropped from the group. So far they have had one such meeting, along with Manuel Maldonado, and again only seven members showed up. It will be interesting to see the attendance of the following two meetings, and how the group will take action to cut down the size of membership to only those whom have shown genuine interest.

A second concern for the group is the difficulty of harvesting the Mano de Leon scallops. The paperwork they submitted is requesting a permit for both Oysters and Scallops, but in their previous meeting with Mr. Maldonado, he stated that there was a 99% chance that the permit for oysters would not be granted, but the scallops would. The group expressed doubts about the large amount of seed capital needed, the intensive labor needed after the initial submersion of the seeds, the depth at which the cages would have to be (which would require professional divers), and the prolonged period of time before the investment turned to profits (1-2 years). The group began to brainstorm other ways in which they could generate income during the maturing of the aquaculture harvest, such as renting out their boats to octopus hunters or whale watchers. However, these activities also require special permits from the government, so the group will have to decide which permits they want to apply for and why.

The third and most overarching concern of the group is the extent to which Mr. Jameson is willing to fund the project's seed capital. Mr. Jameson has funded the initial steps of filing the paperwork, but once the permit is approved, there will need to be a significant investment to set up the facilities and get the aquaculture project into the water. The group would like a better sense from Mr. Jameson on his potential financial investment in the project. Although the group has been working closely with the government, they stated that they will not provide funding for the seeds, and that any funding from them comes very slowly (from 6 months to 1 year).

After the consultants left El Barril, we received an email from Luis stating that the permit had been approved for both scallops and oysters, but that the project had to be in the water within the next 15 days. The last the consultants heard was that a request for an extension had been made, to give the group a four-month window to implement the project. The consultants have emailed Luis requesting a detailed budget for the materials as soon as possible.



### *Future Objectives:*

Los Callos del Golfo is at an exciting turning point. With the permit being approved, the group is going to have to be able to make decisions about their next steps and actions they are going to have to take. The consultants are interested to see how the existing membership changes with lack of meeting attendance, and the new group dynamics once the size has been cut down. The group has also promised to make a list of one thing each member could contribute from existing resources to generate income while the seeds of the aquaculture come to fruit. The consultants believe this will be a good exercise for them to see what they have available to them and how they can make profits off of what they already have. For now, we will wait for the extension of the permit and remain in contact with key members to plan out the logistics and financials of next steps.

### **C. Electrification/Solar Panels**

#### *Summary of Prior Progress:*

The group received the remaining ten solar panels as a donation from 20kWatts to distribute throughout the trip. There were eight community members interested in receiving the remaining panels, and they were all excited to hear we had them in June. In order to be equitable, we decided to charge the same amount that the rest of the community members were charged for the first round of solar panels, which was \$50USD (\$650 pesos). Due to the recent ban on shark fishing, we thought that a lot of people would not have the money available to pay for the panels, but six of the families had their payment ready and received the panels upon paying. The panels are slightly different than the previous round because they do not have regulators, but we were able to work with each family to demonstrate how the units work. We also showed Don Toño, who previously installed the panels, so that he could help with installation after our departure. Luis will pay Don Toño \$5USD per installation and will also hold the remaining panels at La Mancha until the remaining families have the money to pay for them. Panels were distributed to the following community members:

- Beto Castro
- Argelia/Jose
- Manuel Aguilar
- Gonzalo/Gregoria
- Jibrán Alberto Aguilar
- Lupe y Ophelia Cardero

The following community members expressed interest but have not yet picked up their panels:

- Tochy/Isis
- Zaira/Marciel
- Facundo
- Domingo y Rosa (not in community right now)

*Trip Objective: With Omid, visit houses that received panels on the last trip to ensure that they are properly installed and working well. Also, follow up with families that expressed interest but had not yet picked up their panels from Luis.*

Consultants, along with green energy specialist Omid Sarvian, were able to visit all of the houses that received panels on the previous trip. Beto Casto and Manuel Aguilar were not in the community, and therefore we were unable to check the status of their panels. Argelia and Jose had not yet installed their panel, so we were able to help them by stringing the wire from the kitchen to the roof and also filling the battery with liquid. However, they wanted to construct a wooden base for the panel before putting it on the roof. Ophelia's panel is working great- she uses the light to work on her jewelry and crafts long after dark. Jibrán Alberto Aguilar also installed his panel and light, which is working perfectly. Gonzalo and Gregoria are planning to open a small store and are saving their panel to use there once it is open. Facundo also paid for and picked up his panel from Luis, and reported that it is working well. The consultants and Omid also helped Zaira and Isis install panels in their homes. One panel remains with Luis and is being saved for Rosa, who has expressed interest but once again was not in the community when we were there.

The team was also able to make contact with the founder of 20kWatts before departing for El Barril and received several replacement batteries as well as six solar lamps. After much debate about how to justly distribute the lamps, we realized that the lamps could be greatly utilized by the fishermen who go out late at night to work. They expressed interest at our meeting with the fishing cooperative, and to incentivize them to meet with us again the following day, we said that we would be raffling off the six lamps among the 13 boats. Many fishermen showed up to participate in the raffle and were incredibly excited about winning the solar lamps.

Upon arriving in El Barril, we received notice that the community generator had not been running for approximately two months. Fishermen were not making much income due to the ban on fishing, and the community was not able to come up with enough money to buy diesel to run the generator. While community members expressed concern, many were satisfied with the light and energy they were able to receive from their solar panels and individual generators. The team noticed a growing desire for families to manage their own energy situation instead of contributing to an unreliable community pot- a classic collective action problem.

*Future Objectives:*

Discuss a savings plan for the community generator and speak with Leo from 20kWatts about purchasing more solar lamps for community members.

## **D. Health**

### *Summary of Prior Progress:*

During the June trip, the Baja Project consultants were able to survey the community regarding their health and energy usage. The answers to the health questions indicated that the community members still travel to Guerrero Negro for a large majority of their health needs, demonstrating that they would benefit from a health clinic with the capability to house additional services.

The team was disappointed with the progress of the health clinic construction, observing that very little had been done between the April and June trips. There was a sense of indifference in the community toward the health clinic, as exhibited by the lack of advancement of the project. There were two men who were paid to work on the health clinic, though there were rumblings that there was tension between the workers. The consultants hoped that the shark-fishing ban would have a positive impact on the construction of the clinic, since the fishermen would have more free time to work on it.

The consultants convened a meeting of the health committee, with the social worker from the mobile health unit, Nadya. All agreed that progress was not sufficient on the new health clinic, and Nadya noted that attendance to the mobile clinic was abysmal and emphasized that women should urge their husbands to get health checkups for preventative care. The group discussed methods to encourage participation in constructing the health clinic, including having the health committee go from house to house to get time commitments from the men and creating a work schedule, or planning a fiesta with food and beer after a day of work. The consultants and Nadya stressed the need to establish a regular workday each week on the construction, and that the health committee encourage the community to work together to get the clinic built.

*Trip Objectives: To observe the construction of the health clinic and determine a better way to motivate the community to support the construction.*

The team held two health committee meetings during this September trip because we felt it needed to be a priority to figure out what to do with the idea of the new health clinic. The consultants saw that virtually nothing had been done in the two months since the last trip, and were very frustrated by the lack of initiative by the community. However, the consultants were also advised that the community generator had not been in use since late June because the community members were either unable or unwilling to afford the costs of the diesel so the community could have five hours of electricity a day. This was illustrative of the fact that the community is not willing work together for the collective good, which bodes poorly for the construction of the health clinic. Also, the shark-fishing ban was lifted on August 1<sup>st</sup>, so most of the men in the community prefer to fish and are even less likely to work on the clinic.

When asked if the new health clinic was something the health committee still considered a priority, they responded that it is. The committee admitted that the project

is lacking in organization, and suggested a change in the management of the project. The committee was interested in hiring a contractor and an assistant to make sure that the construction is completed. This would put someone who is capable of getting the whole thing done as the lead of the project, and the committee and community would be able to hold him accountable. There is a contractor in the community named Aron who is Ramon, the secretary of the health committee's brother-in-law. Ramon inquired and notified the health committee that Aron is interested in being in charge of the construction of the clinic. The health committee and the consultants discussed the possibility of utilizing Aron in the project, and brainstormed some elements that a contract with Aron would include. However, hiring Aron would be dependent on funding, and the community contributing to paying Aron's salary, which appears to be a big question in a community that refuses to pay for the generator. Additionally, Aron requested that he have an assistant on the project, as the project requires more than one person. The health committee has basically lost confidence that members of the community would volunteer to help. The team discussed a potential salary for Aron of 3,000 pesos a week, and 1,500 for his assistant. After discussing with Luis, it became evident that there is a conflict of interest between the health committee and hiring Aron, as most of the health committee members are related to Aron in some way and would not be the best in terms of monitoring and paying Aron. Luis also voiced concern that the community would refuse to contribute to the expenses to pay Aron and the assistant. Attached is the contract the Baja Project drafted after discussing the specifics with the health committee (see Appendix II). However, the consultants still have several reservations about the community's motivation, and are waiting to hear back from Ramon about whether or not the fishermen will help pay for the salaries.

The committee expressed slight dissatisfaction with the mobile health clinic's employees. The last time they were in El Barril was in July, and they were only available to see patients for a couple hours one afternoon. Committee members said that the community believes that the workers rest and enjoy their time at La Mancha rather than work hard in the community. However, the consultants reminded the other members that the doctor is giving exams to those who work and live in La Mancha. The health employees often have to sleep in their cars, so this is an opportunity for them to rest in a comfortable setting.

#### *Future Objectives:*

The Baja Project consultants are awaiting word from Ramon as to the decision from the fishermen on whether they will help fund the salary for the contractor and his assistant. After that word, the consultants will evaluate the necessary next steps. Claudia, the president of the health committee, agreed to write a letter to the government health division from the community about their concerns about the health workers.

## **E. Scholarship Program**

### *Summary of Prior Progress:*

On the last trip, the consultants chose and notified the scholarship recipients. The three chosen, Sergio, David, and Omar will receive \$400 a year to be split into 3 payments to help their families with the cost of secondary school. We distributed books to all the applicants, and the students seemed to really appreciate them. The consultants discussed with Johnny's family about the potential to establish a university scholarship program, and his sister promised to get information about his university and give it to the consultants during the September trip.

*Trip Objective: To distribute the first payment of the scholarship money for the year, with a paper for them to write how they utilize the money.*

The consultants distributed payments of \$133 to Sergio, Omar, and David. We included a document so Baja Project will be able to track their spending and be sure the money is all going to educational costs. The students and their family were very thankful for the money, and we explained the situation to them about including their receipts and documenting their costs on the paper that was included. Zurisaday also is still receiving a scholarship of \$800 per year, but the consultants could not find the family in the community. Luis informed the team that their family had moved and doesn't plan on returning to El Barril.

While we attempted to be as transparent as possible in the awarding of scholarships, there are still some people who are asking us for scholarships via Facebook or in person. One family had a daughter who is very smart (Yohuanna) but their family made too much to get a scholarship. However, her father manages one of the houses owned by Americans, and do not get paid on a consistent basis. Another student, Victor, has parents who are struggling financially. He would have been a better candidate for a scholarship initially if the team had been informed that he was going away to school this year. Johnny's family had the information about the university that he is attending, and provided us with that so we can further research that opportunity.

### *Future Objectives:*

The team plans to research Johnny's university, and the potential to make payments directly to the university to help support his education. We will continue to disperse the payments on the next trips.

## **F. Preschool/Kindergarten**

### *Summary of Prior Progress:*

Because of the timing of our last few trips, the consultants had never witnessed a class

being taught by the Kindergarten teacher, Zaira. They had spoken to her regarding her salary, which is partly funded by CONAFE with \$1000 pesos per month (\$78 USD) and partly funded by Mr. Jameson with \$5020 pesos/month (\$396 USD). Mr. Jameson has expressed interest in stopping the financing of her salary, as it is unsustainable.

*Trip Objective: Observe Zaira with the children and determine how the Baja Project can help her to look for alternative funding options for her salary.*

During the September trip, the consultants were able to attend a Kindergarten class session as well as talk to Zaira about her salary and alternatives ways of funding it. However, when BP first got to town, Zaira had not been giving classes that week because the primary school teacher was out of town due to his daughter being sick. She claimed that the children did not show up to class when their brothers and sisters could stay home, so she found it not worth her while to show up either. The consultants spoke with Zaira about the importance of her keeping to the state school calendar, and not the El Barril school calendar, as many times throughout the year the teacher, always from out of town, has to leave and halt instruction. She agreed that it was important to continue instruction, and therefore held class the following day.

The kindergarten class currently has five students: Jesus, Ismael, Aymara, Fernanda, and Diego. Two of the children are in their 3<sup>rd</sup> year and studying letters and numbers, and three of them are in their first year, starting with pictures and simple tracing. The amount of supplies found in the classroom is meager at best, with old, dirty toys and minimal books. The BP consultants have expressed interest in purchasing some new materials for the classroom, including a battery-operated boom box so that Zaira can incorporate music into the classroom, something she feels has been lacking.

The most exciting news regarding the kindergarten is Zaira's enthusiasm in an online teacher certification course she found through the town's old primary school teacher, Ivan. The program is called "Educadora de Preescolar", run by the Instituto Maurer. It is a 19-month program that costs \$429 pesos per month (\$34 USD), with an initial fee of \$150 pesos (\$12). The school will send Zaira the materials each month, including an exam. At the end of the 19-month period, she will go present at CENEVAL, the national center for evaluating higher education, in Ensenada in order to get her Kindergarten Teaching Title. Once she has this title, the government will be fully responsible for paying her salary. Also, the school will be able to get more materials and maintenance from the government once she is officially certified.

*Future Objectives:*

Talk to Mr. Jameson about sponsoring Zaira's higher education certificate through the Mexican government in order to increase her quality of teaching as well as disconnect her from salary dependence on an outside source.

## **G. Fishing Co-op**

### *Summary of Prior Progress:*

In the trip of June 2012, the consultants arrived in El Barril the day after a ban had been passed on shark fishing—the main livelihood of the fishermen during the summer months. Because of this, the majority of the fishermen were not working. While conducting the community health survey, the consultants observed many of the fishermen sitting at home, watching TV, simply waiting for the ban to lift instead of searching for alternative means of income.

*Trip Objective: Talk to the fishermen about the ban, alternative means of generating income during this time, and coordinate with ProNatura on their Sustainable Fishing Initiative.*

In September, the consultants were able to join a meeting with the fishing co-op—a first for the current second year students. In the past, the consultants had been warned that the fishing co-op was uninterested in working with the Baja Project, and that they had a difficult time forming business relationships with women. However, this meeting proved to be very productive for Baja Project-Fishing Co-op relations.

We learned that they have a permit for aquaculture that was granted in August of this year, and that they had a 4-month window to get the project into the water. This came as a surprise to the consultants, as they did not know that the Fishing co-op had submitted a request for a permit for aquaculture. It is also interesting that they have no interest in working with Los Callos del Golfo, because of differences in opinions and deep-rooted community social conflicts. (Those that work at La Mancha are labeled as wealthy with an unfair advantage against the rest of the town).

Cristian from ProNatura was also at the meeting. He proposed a project where ProNatura will provide Internet for the fishing co-op in exchange for the fishermen keeping detailed records of what fish they are catching and from what areas of the ocean. This is to keep track of the density of fish populations in the area, as well as ensure that the fishermen are not fishing in government-protected areas. The fishermen seemed very excited about this proposal. However, the consultants brought up the fact that the co-op does not have electricity. The fishermen pledged to install solar panels in a way that would support an Internet modem and router as well as a desktop computer. The Baja Project offered to donate one of the desktop computers donated last year to the fishing co-op, as a means of forging a positive relationship with the group. We also promised to hold another workshop on basic computer skills, as many of the fishermen did not attend the previously held one. All of the members verbally agreed that they had interest and would attend the workshops. The consultants also held a raffle with the fishermen with solar-powered lanterns that were donated by 20K Watts. Each panga (boat) entered its name into the raffle, and 8 winners were chosen at an event put on by ProNatura at the Kindergarten later that night. The

fishermen were very pleased with the lanterns, as they are able to take them out on their boats at night to aid them in their fishing.

Overall, this trip was very successful in terms of the BP strengthening relations with the fishing co-op.

*Future Objectives:*

Revisit the status of the ice truck and icehouse, hold a basic computer skills workshop for the fishermen with a high level of attendance, meet with the co-op each trip to El Barril to continue relations and help develop the organization that is central to the economy and livelihood of El Barril.

## **H. Community Garden**

*Summary of Prior Progress:*

In June, we found the garden to be dry, with no plans to plant anything until the fall. Don Toño told us that the previous harvest had been successful, but they wanted to move the garden to a more easily accessible location near the secondary school, where water would be brought to the plants with an irrigation system of hoses. The community had turned a document in to the government, and was waiting to hear back as to whether they were approved for additional funding to move the garden.

*Trip Objective: To check up on the garden and the status of the move.*

The community received the funding to move the garden, and had prepared the site to plant later in the fall. Everything seems to be on track to move the location. The consultants visited the current location of the garden and found it to be very dry. There were a few tomatoes under the shade that were still good, but the plants were all dead.

*Future Objectives:*

We will continue to monitor the garden in this move, and see whether we can be of any help in the future.

## **I. Women's Co-ops**

*Summary of Prior Progress:*

The different cooperatives have been working on creating more jewelry to sell and more importantly trying to find new strategies to find markets outside of El Barril. They have found it difficult to sell their products due to the remoteness of the community and the absence of telecommunications in order to find reliable markets.



*Trip Objectives: To check on the progress of the cooperatives and see how the Baja Project can support their endeavors.*

AMBAR's president, Claudia, was invited to participate in the 'Encuentro Mujeres Artesanas' in Chiapas in early September 2012 hosted by CONANP, where she participated in workshops about producing jewelry with other indigenous women of the country. In preparation for the event, AMBAR had four women working in the cooperative (Zaira, Isis, Ofelia and Claudia) making jewelry to possibly sell at the conference. Unfortunately it was not an event to sell products, but to expose women to different types of jewelry from all different areas of Mexico. This was an opportunity for AMBAR to interact with other small women's cooperatives from around the country and learn about their selling strategies, as well for AMBAR to increase its production. Claudia requested support of CONANP of 6,000 pesos and was able to purchase business cards, tools and materials for all four participants to produce more jewelry. Claudia has also created a Facebook page in August 2012 with her products and has been able to sell four items thus far.

Mar Azul, the cooperative lead by Lupita and Chela, have been meeting 2 hours a day for the past two weeks in preparation for an 'Encuentro de Mujeres Artesanas' in Bahia de Los Angeles that will happen at the end of October 2012. They have been making jewelry to sell at the gathering, although it will most likely be another exposition event.

In November 2011 CONANP had workshops in El Barril, which Mar Azul participated. By May 2012, Mar Azul cooperative requested support from CONANP to increase their jewelry production and in September 2012 Mar Azul received the money that allowed them to increase their jewelry production. Mar Azul is now producing more jewelry with shells and traditional materials from the Baja region in order to continue receiving support from CONANP. The cooperative is very excited to participate in the 'Encuentro de Mujeres Artesanas' and to expose their products.

Both cooperatives asked for support of the Baja Project in buying specific materials that are not easily found in Baja California and the consultants will bring them in the December trip such as zippers, clips, etc.

*Future Objectives:*

The Baja Project will continue to support the cooperatives to expand their sales, specifically by facilitating access to different materials and by helping with the different sales strategies such as Facebook. Claudia, who initiated selling her products on Facebook, will assist other cooperative members such as Ofelia to also create a Facebook page and market the jewelry and purses.

## **J. Telecommunications**

### *Summary of Prior Progress:*

Eight members of the community have come together (Lino, Luis, Nicolasa, Delfino, Rodrigo, Oscar Escondido, and one of the schools) and approached Desarrollo Social about getting internet in the community. These members have offered to pay a certain amount in order to get the lines in the community, and are asking for help from the government in covering the remaining costs. If approved, the community would have eight lines initially but would have the capacity for up to 32 lines if other members of the community became interested in obtaining them.

Luis traveled to Ensenada the Monday before our arrival in June to handle several matters, one of which was the telecommunications initiative described above. Unfortunately, his contact at Desarrollo Social was not there to speak with him during his visit. There was not much time on this trip to discuss the future of the project, but Luis seems hopeful that he will get the opportunity to speak with his contact to get more information in the near future. Also, we asked Cristián from Pronatura if he has heard anything about mining in El Arco and he said he did not hear for anything and did not think that the project was likely to happen anytime soon.

*Trip Objective: Get an update from Luis about his communication with Desarrollo Social about the Project. If nothing has moved forward, get contact information from Luis and reach out to them on behalf of Luis.*

During the September trip, BP consultants learned that the person who Luis had originally been in contact with in Santa Rosalita about installing the telecommunication equipment, fell ill and would not be able to complete the project in the near future. However, Luis has been speaking with another person who has agreed to help with the project. There are still eight community members involved in the project, each of whom has fronted a minimal amount of money for the initiative. Luis has been in contact with Desarrollo Social in Ensenada about getting the remaining funds in order to get the project started. Luis seemed confident that there would be internet in the community in one month.

### *Future Objective:*

The Baja Project will remain in contact with Luis and the group about the progress of their initiative and offer help in the form of consultation, letters to government, etc, to help move the process forward. We will also discuss the possibility of stopping in Ensenada to speak with Desarrollo Social on the December trip.

## **V. CONCLUSIONS**

The September 2012 trip to El Barril was a success. With the help of fellow IR/PS student Graeme Wood and USC green technology student Omid Sarvian, we were able to accomplish all of our goals. The priorities for this trip were to monitor the progress of the health clinic initiative, visit households with solar panels to assess future energy needs, distribute the first round of scholarship money to new recipients, as well as advance other current projects.

Baja Project consultants held two meetings with the health committee to try and gain a better understanding of what was impeding progress of construction of the health clinic, and to make a new action plan. During the first meeting, a lot of fingers were pointed and concerns were expressed that while Delfino had showed up to work, he did not have the technical skills to construct the clinic and needed someone to guide him. The health committee expressed interest in hiring an “albañil” or mason/contractor to guide them through completing the project. Ramón’s brother-in-law, Aron, was in town and expressed interest in the job. A contract was drafted, and the Baja Project consultants are awaiting word from Ramon as to the decision from the fishermen on whether they will help fund the salary for the contractor and his assistant. After that word, the consultants will evaluate the necessary next steps.

The team was also fortunate to have a green energy specialist join us on this trip. Seeing as our June trip was so short and was consumed with administering the health and energy survey, we felt that we were not able to dedicate enough attention to proper installation and maintenance of both new and old panels distributed by Baja Project consultants. Omid Sarvian visited all of the houses that purchased solar panels in June to ensure that they were properly installed and to provide tips on proper maintenance. He also gained a better understanding of the energy needs of the community in order to make recommendations for future solar panel use, seeing as the community generator has not been running for most of the summer.

Los Callos del Golfo is at an exciting turning point. With the permit being approved, the group is going to have to be able to make decisions about their next steps and actions they are going to have to take. The consultants are interested to see how the existing membership changes with lack of meeting attendance, and the new group dynamics once the size has been cut down. For now, we will wait for the extension of the permit and remain in contact with key members to plan out the logistics and financials of next steps.

In conclusion, this trip was a very busy and productive. The Baja Project has serious concerns about the initiative being taken by the community to move projects forward between trips, and will continue to collaborate with community members while in San Diego as much as possible.

## Appendix I: Pictures



Baja Project consultants met with members of the fishing cooperative to discuss their aquaculture project and show them the solar lamps that were donated by 20kWatts.



Luis and the team meeting with the contractor, Aron, to discuss the responsibilities of the health clinic project.



Omid and Graeme helping to install a solar panel.



Members of the fishing cooperative with their new solar lamps.



Zaira with her students after class.

## Appendix II: Health Clinic Contract

### Contrato del Trabajo de la Clínica de El Barril, Baja California, México

28 de septiembre del 2012

- \$3000 pesos por semana o un monto igual- según a la pesca (cada 15 días, cada 10 días), un total de \$80,000 pesos para obra terminada (piso, paredes, azulejos, tubería, techo, electrificación sob instrucción de Luis).
- Horario: 8 horas al día, 6 días por semana con un ayudante de 8 horas por día, 6 días por semana
- Si trabajas más horas, pueden contar por la semana (máximo 48 horas por semana. Horas extras están pagados doble, pero necesitan estar autorizados por el comité de salud)
- Si trabaja un domingo, el pago es doble pero solo si el trabaja es absolutamente necesario y autorizado por el comité de salud
- No hay plazo fijo de terminación, solamente confianza en el progreso (en el 15 de diciembre el piso y las paredes serán construidos).
- Maricela Villavicencia Flores es la responsable del pago
- Luis Villavicencia es responsable de los materiales
- Ramón es responsable de las relaciones con la comunidad y la organización social del proyecto
- Arón es responsable de comunicar con Luis sobre los materiales
- Sí el albañil no puede trabajar por falta de materiales hay que pagarlo por estos días
- El albañil necesita pedir por los materiales con anticipación
- Los días 24, 25 y 31 de diciembre son de vacaciones

<b>Nombre</b>	<b>Descripción</b>	<b>Firma</b>
Jesús Aron Rochin Rochin	El Albañil	_____
Luis Villavicencia	Encargado de los materiales	_____
Maricela Villavicencia Flores	Encargada de los pagos	_____
Ramón	Responsable de relaciones comunitarias	_____
Alejandra	Comité de salud	_____
Emilia	Comité de salud	_____
Claudia Cisneros Cruz	Presidente del comité de salud	_____
Rodrigo	Comité de salud	_____
Lino	Comité de salud	_____
Karina	Comité de salud	_____
Claire Springer	Representante de Proyecto Baja	_____

## Appendix III: Energy Analysis

### Baja Project Executive Summary



El Barril, Baja California, Mexico  
Fariborz “Omid” Sarvian  
Consulting Engineer, USC Energy Club  
October 12, 2012

**Introduction:** We will review the Photovoltaic/LED lighting systems that were installed on this and previous trips by the Baja Project. I will also look at average energy consumption per household, types of energy production currently in use and recommendations, assessment of community based energy distribution, and future inquiries for community members to gain a better assessment.

1. LED Lights and Panels/Batteries given on previous trips: The bulbs that Leo Rossi gave were LED strips with an unknown wattage (it can be assumed it was less than 26W) hooked into 10W solar panels with 7Ah 12V batteries. Mr. Rossi’s set up could handle a few more of those light fixtures per battery and still operate well if not more efficiently. The effect of this would be to remove or reduce the need for more heavily energy consuming lights. My recommendation for the next tour would be to bring more of those light strips and wire them in parallel. One installation replaced a car battery used to power lights that was recharged by driving it around town for a while. IluMexico installed some similar systems with what seemed like a charge controller. These were having issues staying on longer than 30 minutes after sundown. It was not clear what the problem was as the voltage was still high. Problems could have been with the charger and with the batteries.
2. Electrical Loads: Purpose is to understand what electrical consumption would be if power was reliably produced.
  - a. Average electrical loads for each dwelling includes the following
    - i. Lights: 2-3 overhead lights typically incandescent, occasionally compact fluorescent. These lights were more often used at night but lack of sufficient indoor lighting could necessitate the use of these lights during the day time. As mentioned there are around 2-3 overhead fixtures per dwelling. Some of these are incandescent lights ( $60W_{\text{each}} \times 2.5 \text{ bulbs} = 150W_{\text{total}}$ ) while others are compact fluorescent ( $26W_{\text{each}} \times 2.5 \text{ bulbs} = 65W_{\text{total}}$ ).
    - ii. Refrigerator: One small to moderately sized refrigerator, 43-75Wh/h (energy consumption per hour, power will be higher but because a refrigerator doesn’t run



at 100% power for 100% of the time the aggregate energy usage is smaller) for a 6-15 Cubic foot refrigerator. Newer refrigerators are more energy efficient than older ones thus the variation. Refrigerators were not being used in any home during the visit as there was not a sufficient/reliable source of power to power them. They were instead more often used as a pantry.

- iii. Television: Small to moderately sized tube televisions at around 60-100W depending on size. These were used for 3-5 hours per day based on face to face surveys.
- iv. Washing machines: Some houses had washing machines. 920W estimated wattage but only used once in a while. All of the washers seen were top load washers which have a heavy water use per load requirement. This increases water and water infrastructure usage as well.

### 3. Off-Grid Solar Power

#### a. Current Systems Observed

- i. Solar Panels: Many houses utilized the abundant solar resource through solar photovoltaic panels. The sizes of the systems varied from 640W systems on fixed pedestals while others had a few panels on their roofs. Often different panel types were strung along together. This practice is not a good for the batteries unless each type of panel had a separate charge controller associated to it.
- ii. Safety: Safety was a huge concern for me as I toured these solar systems. I measured 19VDC and 9A coming off some solar arrays with poor wiring and wiring that was strewn across the floors. Batteries were stored inside and outside with terminals fully exposed (lead acid batteries can discharge several hundred to several thousand amps at once). If a child or even a healthy adult were to improperly handle or come into contact with these it could cause serious injury or even death. Recommendations were given to cover and enclose batteries allowing holes for convection air-cooling for battery longevity.
- iii. Regulators/Charge Controllers: Very few regulators/charge controllers were seen on systems. The largest solar system lacked a charge controller while some of the more moderate ones had one. A charge controller ensures the solar panels don't over charge or discharge the battery reducing the battery's lifespan. (Appendix 4)
- iv. Inverters: Inverters seemed to be in short supply within El Barril. Many people asked for inverters during walk-throughs. Inverters take the DC power from the panels and batteries and converts them to AC power, which is used in most appliances (refrigerators, TVs, computers). Proper wattage rating for inverters is needed to power heavy-duty items like refrigerators without overloading the inverter and burning it out. As inverters were something of a commodity some houses were able to fashion fans from old car motors that ran on DC power. These fans were hooked directly to the panels to supply cooling.

- v. Battery Use: Many houses that had solar panels used batteries as well as one (mentioned earlier) that did not have panels. The most common battery seen was the LTH L-8D-1125 car and marine starter battery. Many people with this type of battery had only 30mins of life on their batteries once the sun went down. This could be due to several reasons (Appendix 1) including it being a starter battery, over charging/discharging i.e. lack of charge controller or improper use of them, and using already old batteries.
4. Off-Grid Solar installations per house: Should a dwelling decide to install a full off-grid system for their house they would require the following at the very minimum:
    - a. Batteries: 515-1015 Amp Hour Battery Bank ~\$3,500-4,000.
    - b. Panels: 500W which is 5X100Wpanels ~\$1,000-1,500
    - c. Charge Controller: \$150-\$450
    - d. Inverter: 600-700W (minimum) around \$250-450
    - e. Total system cost: \$5,000-\$6400 for a basic system running a fridge 24hrs, TV 5 hrs., and 2.5x28W CFL light bulbs 5hrs per day.
  5. Community Power
    - a. Generator/Transmission lines: The 75kVA generator and power lines that were installed in El Barril represent a relatively large investment. That they are sitting idle represents a lack of utilization of the current infrastructure. These pieces of infrastructure will begin to deteriorate if not used. It should be noted that with the rising cost of oil, the remoteness of the town to a local fuel station, the absence of metering to determine individual energy use, and lack of payment enforcement of electrical use charges, running the generator full time would be an unsustainable endeavor.
    - b. Solar Field Option: With the abundance of solar energy in this town, a quick estimation of solar cogeneration system (appendix 2) was made. The estimated power consumption for each household is 1kW and there are an estimated 30 houses the system size needed would be 30kW. At a conservative price of US\$3.55/kW the cost of a solar system tied to the grid would be US\$106,000. With a lifespan of 25 years this would amount to \$4,260/year. This solar array would offset 30kW x 6hrs = 180kWh/day. The estimated output of the generator would be 10kWh/gallon using 18gallons/day of diesel for the same amount of power.  
 $(18\text{gallons/day}) \times (365.25\text{days/year}) \times (\text{US}\$4/\text{gal}) = \text{US}\$26,298$ . Thus using solar would give a return of US\$22,038/year in savings to the community (appendix 3).
    - c. Costs could be brought down further by:
      - i. Reducing electricity demand with more efficient appliances/lighting (making the 1kW value smaller.
      - ii. Reducing the energy used at night while the generator would be presumably running.

- iii. Reducing the size of the generator so that idle diesel consumption would be minimal and matching the energy demand of the town at nighttime loads.
6. Future Inquiries
- a. Energy Questionnaires: This will help determine the energy use of the town and how implementation of technologies/infrastructure will reduce this energy demand.
    - i. Frequency of trips to Guerrero Negro for food and fuel etc.
    - ii. How often and for how long are the TV, washer, lights on and used?
    - iii. How much energy do the TV, washer, lights, and refrigerator consume?
    - iv. Would watching the TV be sacrificed for powering the refrigerator if more consistent power could be supplied over night?
    - v. Assessing the transmission lines and getting one-line diagrams from installers.
    - vi. Determining the specifications for the diesel generator.

**Conclusion:** The donated solar panels that are being used to power the LED light strips are very useful to the community. The reliable source of lighting allows them to work later into the night. Future trips should install and hand out more of those light strips to take advantage of the power produced during the day and offset inefficient lighting use in the community. Community level generation would not work despite the existing infrastructure because there are no energy meters for equitable billing and no authority to collect what is due. Off grid individual photovoltaic systems seem to make the most sense as the area has high insolation values and is far from traditional sources of energy. Investment in these types of systems could allow for houses to run their refrigerators over-night, allowing them to reduce their trips to Guerrero Negro for groceries. Future questionnaires would be needed to determine specifics of energy use/habits, appliance and light power consumption.

Finally I would like to thank Mr. Jameson for the hospitality as well as the Baja Project for helping me with installations and treating me as a long time teammate. Also, a quick thank you to Nirat Patel for help with the community solar section calculations. I had a great time on this trip and left with a greater appreciation for the opportunities I have been given. I can't stop talking to friends and family about this trip and can't wait to return to Baja in the future!

7. Additional Notes not related to Community Power:
- a. Internet café for fisherman and students: Using a similar off grid system to the one listed in section 4 would be sufficient for a satellite internet communal hub. Although desktop computers are poorly suited to this task as battery backups on laptops kick in during power interruptions/ intermittencies and they tend to use less power by design requiring smaller less expensive batteries. Also further system costs could be decreased by installing a software program that only allows for 5 hours of use or so per day for the computers thereby ensuring enough power to run equipment without running out.
  - b. La Mancha Power Use: Using more energy efficient lighting and appliances would reduce energy demand for La Mancha thus reducing diesel consumption and noxious exhaust output that is localized near La Mancha. Diesel exhaust is considered carcinogenic among causing a host of other health issues. Part 4b shows how much the cost savings and exhaust savings could be if solar was used at least in

- cogeneration (appendix 2), although ATS would have to be substituted with something more sophisticated to remove interruption between switching and allow for greater loads should solar power be insufficient.
- c. Greywater: Reuse of lightly soiled (i.e. not from the toilet) water for irrigation would give local gardens and agricultural efforts a boost.
  - d. Thermal water distillation: Although no large-scale solar thermal water distillation apparatus exists, El Barril would benefit from its development. Such a facility would reduce the need for filters and complicated maintenance. It would also allow for water to be stored at higher heights for natural pressure release of freshwater. This is theoretical though.
  - e. Agriculture: Planting of desert dwelling plants would be of health and economic benefit to the town. An arid fruit tree of note is the date palm. Several date palms were seen on the visit and seemed to be thriving. The varied use of the palm from the fruit to the sap to the biomass as fuel makes it a great plant for such a remote region. Another possible type of agriculture is through aquaponics where waste from fish is sent to be filtered by plants that take the waste in as nutrients and produce fruits and vegetables. Tilapia is a good fish for this since it eats mainly lettuces and such.

## Appendix

1. Battery types:
  - a. Starter Batteries vs. Deep Cycle Batteries: Starter batteries are designed to push out a large amount of power within a few seconds. They achieve this by having a lead matrix, like a sponge, for plates. This gives a greater surface area for rapid energy production. Unfortunately this design is not well suited for deep cycle purposes where more energy is needed but stretched out over long periods. The thin sponge matrix dissolves and does not generate for this use. Deep cycle batteries are well suited for this because they are standard plates that can be depleted over and over again without losing too much power, ultimately lasting longer.
  - b. Flooded, AGM, Gel: Of the deep cycle batteries there are three types. Flooded batteries are supposedly cheaper (price searches quoted this as higher) and last longer than the AGM and gel type batteries but require maintenance which consists of refilling the battery with *distilled* water when it lowers. Refilling with distilled water may be prohibitive in El Barril as a source is more difficult to come by. Gel and AGM require the least amount of maintenance but have a shorter lifespan and are supposedly more expensive (although again this wasn't seen in practice).
2. Cogeneration: Generating power using solar power in the day and diesel generator at night. Requires the use of a auto transfer switch (ATS).
3. Cost of Diesel: The assumption uses US\$4 for the price of diesel per gallon. This assumption does not take into account the increasing price of diesel (diesel is currently at

US\$4.45) in the span of 25 years nor does it take into account the cost of procuring the diesel from sites 3 hours away by way of dirt road (fuel for cars to get the fuel, wear on vehicles, time and possible emergencies/hazards). The assumption also uses a low value for energy use. Probable energy use would be higher. With both these assumption made more accurate the value saved with PV would be much higher.

4. Charge Controllers: Over charging/discharging of lead acid batteries will damage the batteries and reduce their overall lifetime. The most commonly seen charge controller was the Steca Alpha Pulse Width Modulated (PWM) controller. This controller seems sufficient for some of the systems. Each controller costs around US\$45-70 depending on Amperage rating. Larger systems will require a larger amperage charge controller. PWM controllers while plenty good are not the latest technology. MPPT charge controllers while more expensive offer 30% more efficiency in charging batteries and allow panels and batteries to operate at their maximum rated powers. MPPT charge controllers are in the hundreds of dollars range. A good charge controller should allow for a 20-25year lifetime on batteries.