

## Development of an Erosion Control Program to Reduce Sediment Loading Rates from Land-Based Sources to the Coral Reefs of Culebra, Puerto Rico



Punta del Viento Area

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## Summary

This report summarizes our visit to Culebra for coordination for the implementation of a sediment and erosion control program in Culebra, Puerto Rico. Visit took place from April 20th to 23rd of 2012. The main objectives our trip were to contact local NGO, community leaders, Culebra Municipal personnel and local machine operators to present our project and plan of work and to schedule a workshop for the end of May 2012.

## Punta del Viento

On Friday April 20th we arrived in Culebra in late afternoon and proceeded to visit the Punta del Viento site (Figure 1). We reviewed the site plan and concept for restoration for site #1 (Figure 2), the impact of a construction site for a new home

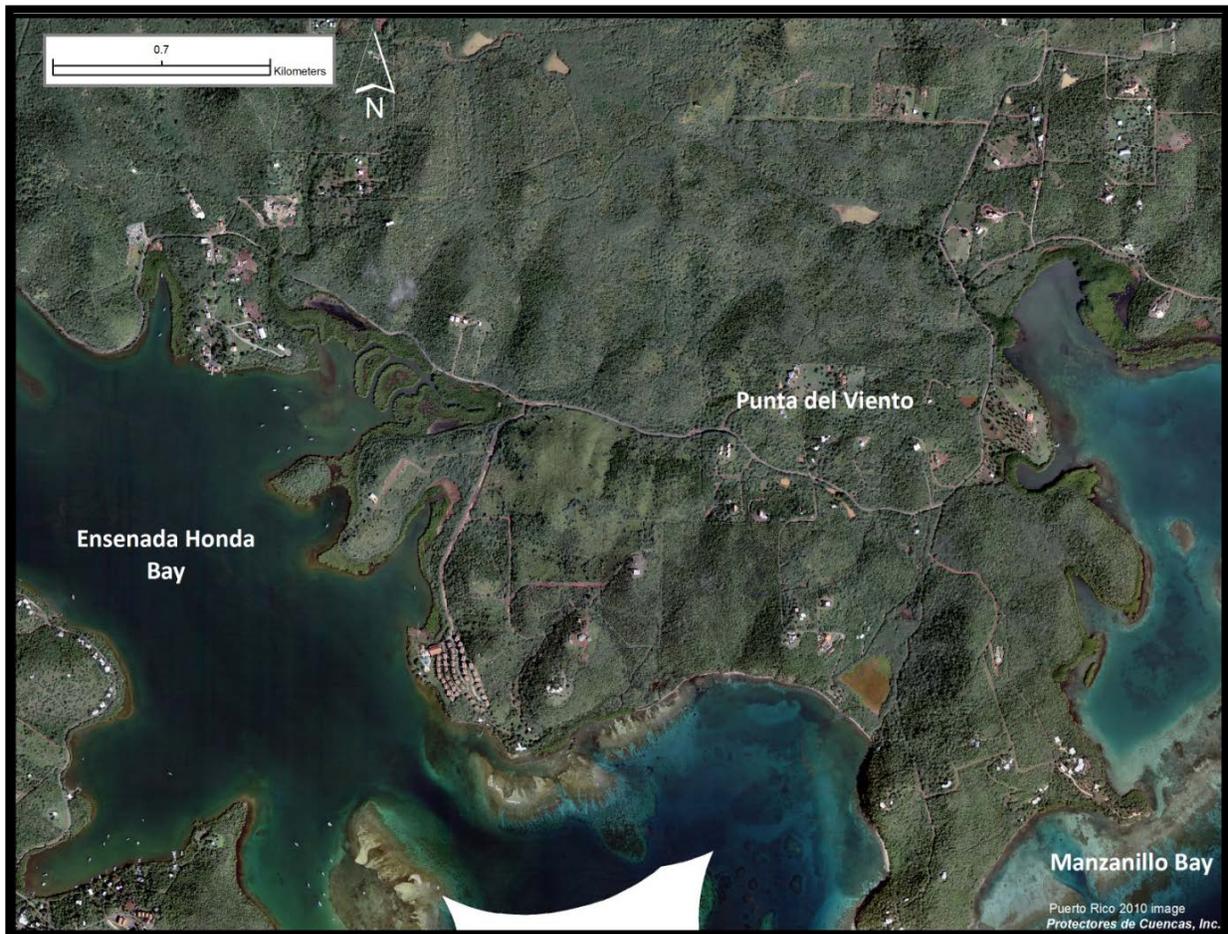


Figure 1. Punta del Viento area

(Figure 3) and recently created road (Figure 4) on the way to Punta del Viento Estates which is typical of road building occurring on the island.



Figure 2.  
Illustrates one  
of the road  
areas for  
stabilization in  
Punta del  
Viento



Figure 3.  
Illustrates new  
home building  
close to a  
sensitive bay  
with Acropora  
species



Figure 4.  
Example of  
new and  
frequent  
impacts  
created by  
road  
building in  
Culebra

In Punta del Viento estates we also viewed a new road which was unnecessary from a traffic flow standpoint and very steep and erodable -- it was also not part of the development plan and will create erosion that transports sediment to the nearshore reef areas (Figure 4 and 5). If the parties agree it would make an ideal site for reforestation of dry forest endemic to the area.

Figure 4. Illustrates steep road



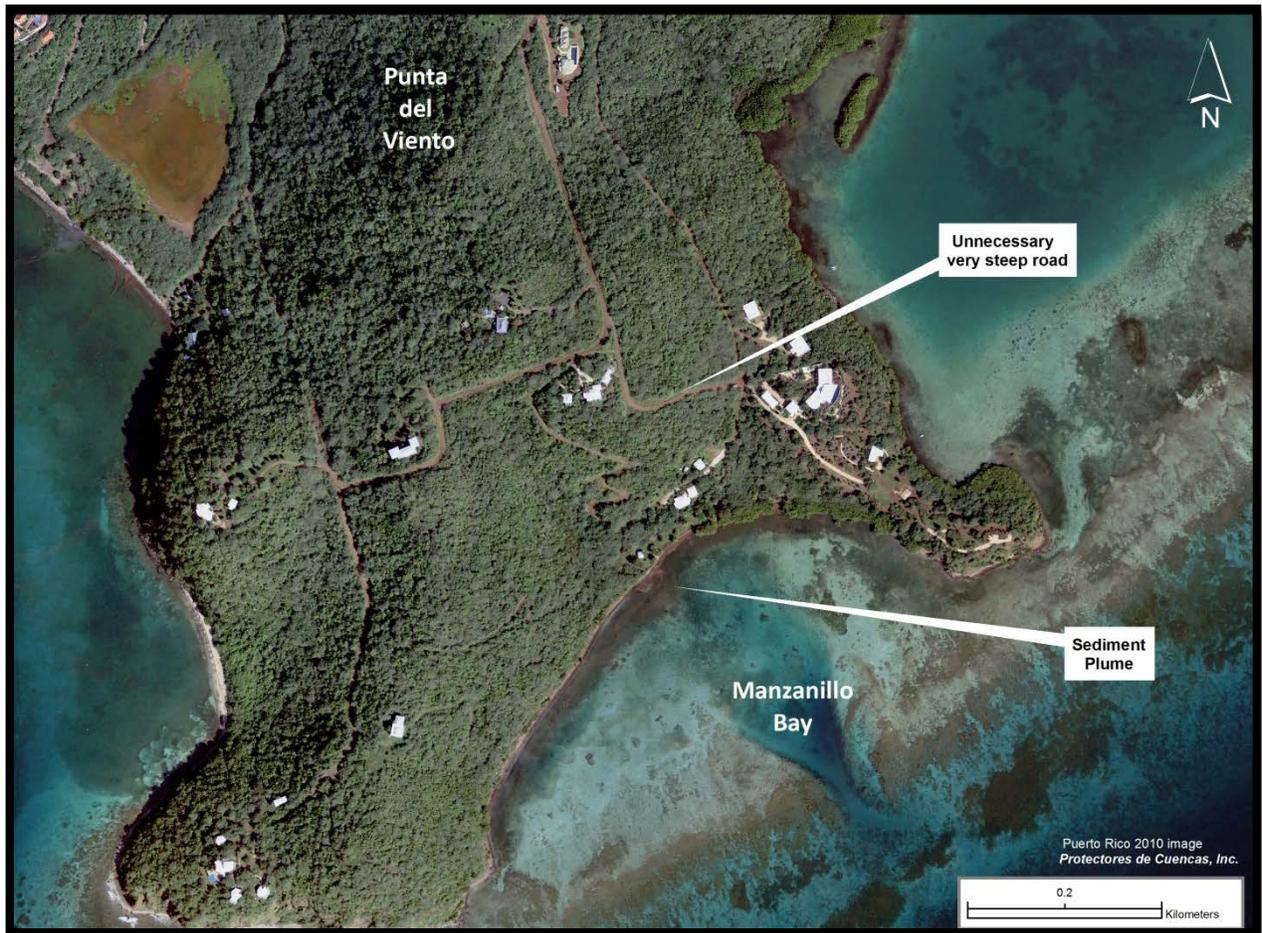


Figure 5. Illustrates steep road with impacts to nearshore waters

### **Burn site and uncontrolled clearing**

Another site visible from various places on the island was comprised of a large burn site and clearing for a new multifamily or other high/med density development project (figure 6). The site would make an ideal candidate for the use of hydroseeding and stabilization and low impact development practices to reduce potential impact to coastal areas.

We also viewed examples of roads that appeared to result in minimal erosion (Figure 7) as well as ones that were actively being constructed in a way where impacts were not being minimized.



Figure 6. Development site that was burned then cleared without any erosion and sediment control protection



Figure 7. Example of a road on a steep slope that seemed to have minimal impact - two track drive - minimal impervious cover and crowned in the middle

## Coordination Meetings

### Coralations

We met with Mary Ann on two occasions to discuss the erosion and sediment control project in detail as well as some of our work in Guánica. MaryAnn was able to fill us in on some of her work in Culebra and on pertinent issues relating to unpermitted or poorly planned development, dirt roads and clearing in Culebra.

### Sociedad de Ambiente Marino

We met with Edwin Hernández and Samuel Suleimán to talk about the project and also to get to know some of their work in Culebra associated with the coral farms and the assessment of coral reef health (Figure 8). We had the opportunity to help them create new structures for coral farms which they deployed the following day. Edwin also introduced us to some of the local fisherman, boat captains and other members of the community including Mairian Mercado Director of the Authority for the Conservation and Development of Culebra.



Figure 8. Coral farm building (upper) and location for coral farms that were established (bottom)

## **Authority for the Conservation and Development of Culebra**

Meeting with Mairian Mercado Director of the Board of the Authority for the Conservation and Development of Culebra

1. Presentation of the project and our background.
2. She agreed to assist with erosion control training in road construction and land clearing workshops and to help with the logistics.
3. She recommended we contact Culebra Foundation for the place to do the workshops and Homeless Dog Café for catering services.

## **Culebra Fisherman Association**

Meeting with Lourdes Feliciano, Precedent of the Culebra fishermen Association and also owner of a local Hardware store,

1. Lourdes made a list of all the machine operators of Culebra and make contact with some of them during our visit to her hardware store. List is summarized in Table 1.
2. She compromised to help us contact and also to confirm participation of the machine operators in the project.
3. There are 7 Digger excavators in Culebra
4. Machine Operators charge a rate of \$50/hour including their time, Digger and Diesel.

## **Culebra Pubic Works Agency**

Meeting with Yolanda Rivera, Director of Public Works Agency of Culebra.

1. We updated the list of machine operators of Culebra and included the ones that work for Public Works.
2. We have her compromise to send public workers to participate in the project and training.
3. Culebra Municipality Digger and D-4 equipment is available for the project.

## **Mayor of Culebra**

We had scheduled a meeting with the Mayor of Culebra for Wednesday morning but it was canceled because the Mayor couldn't make it on time from the Main Island before we had to fly out of Culebra. We contacted his secretary, Tanyi Cruz, and exchanged contact information. She said that the Mayor will meet with us the next time we are in Culebra.

## **Culebra Foundation**

We contacted Luz Rivera the Precedent of Culebra Foundation (NGO) for the use of the facilities for the workshop of May and she said that it is available and we just have to make a letter of request (Appendix 1) to use the facilities. There will be no cost associated with the use of their facilities but if we can they accept donations.

## **Homeless Dog Café**

We contacted Homeless Dog Café for a quotation for breakfast and lunch for 20 people and the estimate was for a total of \$481.50.

## Initial Thoughts and Recommendations

1. Ultimately development of a set of road standards for Culebra for dirt roads and paved roads that the operators are trained to construct and which result in enforceable standards are a critical step in the reduction of future impacts in Culebra. The integration of erosion and sediment control measures into those road standards is critical as well -- basic practices correctly installed including silt fencing, check dams and sediment traps
2. Septic systems at resorts and high use homes -- pose a significant threat to coastal waters. Determining where these systems are negatively affecting nearshore WQ as well as direct discharges and sewer leaks is critical to improving water quality. In addition, the completion of the vacuum system that is well functioning is also critical to WQ.
3. Work with NRCS to perform a survey of all the existing sediment ponds in Culebra and identify the ponds that are receiving the most sedimentation and the ones that are closest to reaching their capacity – on that basis prioritize ponds for maintenance and improvements. Also identify any additional locations for sediment ponds including in locations where new development is expected to occur or is currently occurring to minimize future impacts.
4. Stormwater runoff is likely a significant issue in terms of pollution transport for coral reefs in Culebra -- there are two components of this stormwater runoff 1) runoff from impervious surfaces particularly in the developed areas of town and 2) runoff from a combination of dirt roads and relative low density development with sometimes large impervious structures (vacation homes) that generate considerable runoff.
5. Create a pilot set of stormwater projects associated with the ferry docks that drains to important nearshore reefs and the Luis Pena Marine Reserve downcurrent.

6. Address other major stormwater runoff issues in town as well as near the airport etc.

**Table 1. List of Machine Operators of Culebra**

<b>Name</b>	<b>Contact</b>	<b>Agency</b>
1. Luis O. Villanueva (Omar)	787-532-7643	Private
2. E. Vazques Mulero (Evi)	787-972-1427	Private
3. José R. Acosta Monel (Nando)	787-972-1422	Private
4. Edwin Acosta Monel (Wichi)	787-972-1422	Private
5. Julio Figueroa (Apa)	787-233-7340	Private
6. Poli Aquilina	787-435-2820	Private
7. Omar Gimenez	787-485-4071	Private
8. Abimael Carrillo	787-485-4071	Private
9. Anastacio Colón		Private
10. Luis A. Velazquez		Municipality
11. Alexis Ojeda		Municipality
12. Heriberto Ayala		Municipality
13. German Amaro		Municipality

## Appendix 1

27 de abril de 2012



Sra. Luz Rivera  
Presidenta Fundación de Culebra, Inc.

Estimada Sra. Rivera

Me refiero a usted en para solicitar el uso de las facilidades de la Fundación de Culebra durante la última semana de mayo del año en curso para llevar a cabo un taller para los operadores de maquinaria pesada de Culebra. El propósito principal de nuestro proyecto consiste en llevar a cabo un taller a los operadores de Culebra de técnicas apropiadas de construir caminos aplicando prácticas de control de erosión y sedimentación para evitar que los sedimentos tengan acceso al mar y causen daños a los ecosistemas marinos. Nuestra organización se especializa en manejo de cuencas y en la implementación de de practicas de conservación y restauración ecológica. El proyecto se estará llevando a cabo en el área de los caminos de Punta del Viento. La cantidad de personas que esperamos participen del taller es alrededor de quince y tendrá un largo de duración de entre dos y cuatro días.

De tener cualquier duda o de necesitar información adicional puede comunicarse con nosotros al 787-457-8803.

Cordialmente,



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