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Punta Colorada: The Value of a Wave

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Punta Colorada: The Value of a Wave

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Summary:

This project explores the potential of dedicated and environmentally-aware recreation communities to be an effective lobbying organization for protecting the marine environment. Like other aspects of ecotourism, the surf community has significant leverage with their monetary, social and political resources and commitment, to be an effective broker for conservation objectives. Surf sites are also fixed features that are vulnerable to human impact and development. Here, I explore the power of the surf community to protect a vulnerable surf location at Puerto Escondido, Mexico. This case study exemplifies the economic value of “the wave” and details a novel approach for protecting vulnerable environmental sites by activating environmentally-conscious recreation collectives.

Introduction:

Tourism is an important tenant to strengthen the resilience of Mexico’s economy. Prior to the economic crisis of 1982, Mexico’s economy depended heavily on the import substitution industry. In 1982, mounting external debt caused a significant decrease in economic development. In response, Mexico spent much of the mid-1980’s adjusting its economic growth model towards an export-oriented market. To do this, a priority was placed on the sustainable resources such as the development of the tourism industry, as it was an appealing source of finance and maintained potential to strengthen Mexico’s international image (Brenner 2002). Today, Mexico’s tourism sector is a major contributor to the nation’s growth and development. In 2011, tourism constituted 13 percent of the nation’s Gross Domestic Product (GDP) (Pelas 2011) and ranks as Mexico’s third highest foreign exchange earner (Secretaria de Turismo).

FONATUR (Fondo Nacional de Fomento al Turismo) was created in 1973 to be Mexico’s national trust for the promotion of tourism. FONATUR, through a vigorous campaign for foreign capital, helped to create the mega tourism industry that Mexico has come to depend on to bolster its economy. However, Mexico’s developmental approach to its environmental tourist industry may not be sustainable in the long run. There policies were aimed providing a large volume of people access to these areas without regard to the fragile nature of these highly vulnerable ecosystems. Ultimately, these mass tourism developments failed to foster regional development and leave the environment in a state of ruin (Brenner 2002). For example, Mexico’s existing tourism policy promotes megaresort style coastal developments and this strategy is not only failing to promote sustainable regional development but has produced a plethora of environmental concerns.

The Mexican government has an ambitious goal of positioning Mexico as a world leader in tourism but has failed to keep pace with many other nations. As global tourism rapidly expands, Mexico has slipped from 10th place in 1990 in the world in international receipts

per tourist arrival to 23rd in the world for tourism receipts behind countries such as Turkey, Greece and Hong Kong (UNWTO 2011). This is to say that for every international arrival, Mexico, ranked 23rd, received \$530 compared to 10th place Turkey, which received \$770 in 2010. Costa Rica, now the world leader in this sector of tourism, receives nearly \$1,000 per international visitor; in contrast, they had relatively no ecotourism in 1986. In order to improve Mexico's global ranking, the government correctly argues they must become both competitive and sustainable. For this, the United Nations World Tourism Organization (UNWTO) has praised Mexico's Accord "the first country to support a global agenda for tourism."

The term 'ecotourism' has been around since the late 1970s and by the 1990s was the fastest growing sector of tourism at 10% to 34% a year (UNWTO). However, the industry has evolved to a new concept, which goes hand-in-hand with ecotourism and is coined as "sustainable tourism." Sustainable tourism is defined as tourism that "meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future" (WTTC, UNWTO, and Earth Council, "Agenda 21 for the Travel & Tourism Industry," 1995). While ecotourism is often thought as involving nature-based tourism, sustainable tourism is applicable to all facets of tourism, even conventional forms by adapting good practices. Sustainable development should be economically, environmentally and socially sustainable. In contrast to the Mexican model of the mid-1980's, this concept puts an emphasis on high value, rather than high volume tourism. For example, 43% of "eco-conscious" travelers from the United States are willing to pay a 5% premium for responsible travel, and 40% are willing to pay up to 10% more (CMI Community Marketing Inc., "Green Traveler Survey," 2011). In this spirit, the United Nations World Tourism Organization (UNWTO) along with Conservation International, World Wildlife Fund and International Tourism Partnership have developed good practices for site selection. These include not building projects larger than 30 rooms in or around high biodiversity areas or biological corridors. Narrow areas of shoreline that are backed by lagoon/wetland systems are not appropriate for development (CREST 2012). It is this emphasis on socially- and environmentally-conscious tourism is likely why the lofty goals of Mexico's 1980's economic revolution failed.

In order to stay competitive in the international tourism market, Mexico attempted to incorporate the concepts ecotourism into its failing policies. Despite these efforts, the implementation of these strategies has still fallen short. One example is FONATUR, the agency responsible for promoting tourism and choosing sites that are economically, socially and environmentally sustainable. Many of their coastal development plans incorporate the language to meet consumer needs and investment preferences but lack the good practices and rigor needed to reinforce its implementation. Despite their stated goals, FONATUR oversaw the development of Cancun. Although it has brought a great wealth of tourism to the area, development was very harmful to the lagoon, reef, sand dunes, and ground water which ultimately lead to the localized extinction of local species (Dean and Pesenti 2003).

Basis for using surf as a conservation tool:

- 1.) Surfers are a large community with financial, social, and political resources.
- 2.) Surfers are highly mobile and willing to travel great distances for good surf.
- 3.) Surfing has relatively low impact on the environment.
- 4.) Great surf breaks are rare.
- 5.) Surf breaks are highly susceptible to alterations.

1. Surfers are a large community:

Surfing is generally defined as the act of riding an ocean wave while on a surfboard or more broadly on a bodyboard or “bodysurfing.” (Martin 2012). In its most pure form, surfing is a person riding a wave on a board. In reality, surfing is little more; in relation to other sports, very little gear is required for surfing. With access to a wave, a board, and possibly a wet suit, a surfer can enjoy unlimited, environmentally-friendly entertainment.

The multi-billion dollar surfing industry has come a long way since its humble beginnings. It originated around 1890, when Polynesian Princes began surfing in Hawaii (Finney and Houston 1966). Surfboard material and designs have also changed dramatically; once dense, solid and flat boards have evolved into much lighter, fiberglass boards that yield increased flexibility, speed and maneuverability. The once standard 16-foot board of Hawaii has been replaced by a lineup of boards ranging from 6-foot fish-tails that allow youngsters to whip in and out of waves to 10-foot ‘guns’ built to the harness the raw power of 80+foot waves.

With advancements in modern surfboard fabrication technology, the price of boards has fallen and thus has reduced the barriers to the surfing community. Today, surfing can be found in every country that touches water and there are an estimated 23 million surfers worldwide (International Surfing Association). One in 10 Australians call themselves surfers (Gemba 2010) and in the United States alone there are an estimated 3.3 million people surfing (Wanger et al 2011).

2. Surfers are highly mobile and willing to spend extra money for good surf:

In parallel with the grass-roots surf communities, surfing has become big business with consumers willing to spend disposable income for equipment and surfing holidays in remote places. As surfing grows at an annual rate of 16% (Buckley 2002), many surf spots have become overcrowded and surfers are expressing “surf rage” in established surfing countries such as Australia, Costa Rica, Brazil and the United States. Overcrowding combined with a decrease in costs to travel, has lead surfers to travel

greater distances for longer periods of time to experience great surf in pristine conditions. This idea is most romantically depicted in Bruce Brown's (1966) movie, *The Endless Summer*; the movie two idealistic surfers on their adventure around the globe to find epic waves. Since that time, surfers have been inspired to scour the world's coasts for the next best secret spot (Towery & Pruett, 2002). This lifestyle-driven sport has prompted millions of people to "take to the salt" and chase the perfect wave.

Moreover, riders from around the world compete in the Association of Surfing Professionals (ASP) World Tour, International Bodyboarding Association (IBA) Tour, and Big Wave World Tour, along with various other small surfing circuits (Association of Surfing Professionals). These competitors are sponsored by multi-million dollar companies, flown around the world and ooze with sex appeal.

Being highly mobile and willing to spend a considerable amount of money, surfers have been targeted by many coastal communities looking to boost their ocean economies. A study in 1995 by Earnst and Young found that the Rip Curl Pro at Bells Beach in Australia brought over 20,000 visitors spending \$860,000 on surfing merchandise and a total increase in direct expenditure of \$2.11 million (Cited in Murphy and Bernal 2008). It is now estimated that surf equipment of the three largest surf companies account for US\$15.5 billion a year (Rendell and Rodwell 2013). A study by Chad Nelsen quantified surfing tourism in the United States and estimated that surfing adds \$2.2 billion dollars to the United States' ocean economy (2011).

As communities continue to cater to the traveling surfer it is important that they protect their pristine environments to ensure the future sustainability of surfing in their community (O'Brien and Ponting 2013).

3. Surfing is relatively low impact and does not disrupt the environment:

Surfing is overall a very environmentally-friendly sport. In most cases, surfers gain access to the surf break by swimming off the shore. They have an incentive to not interact with any reef or beach bottom as both can damage their board or their body. Ideally, a surfer catches a wave and rides until it ends and then paddle back out to where the waves without ever touching the seafloor.

Nevertheless, there are still some environmental issues with surfing. Surfers do not stay in their backyard and always walk to the beach for a good session. They won't blink twice at the notion of spending hours driving around searching for the best dawn patrol spot or at the option of flying across the globe for great waves. In this sense, surfers have a large carbon footprint. A study by Cornuelle in 2009 showed that the Association of Surfing Professionals' (ASP) annual contest tour accounts for 24 tons of CO₂ per surfer. But, when you compare this to professional baseball where teams play nearly 90 away games a year and Major League Baseball's All-Star week consumes 120,000 kilowatt-hours of energy and 600,000 gallons of water in one stadium, the environmental impact of professional surfing is relatively little [The Greening of Professional Sports].

There are issues of sunscreens and waxes entering the ocean. Traditional waxes are petroleum based but new waxes have limited harmful products. Traditional sunscreens can be detrimental to reefs. Certain types of these sunscreens can cause coral bleaching by awakening dormant viruses in symbiotic viruses. As they awake they cause coral polyps to bust and die while spreading more of the virus. Water samples around reefs affected by sunscreen show 15 times more coral-damaging viruses present (Danovaro et al 2008). Surfers can now choose to limit these harmful toxins by purchasing alternatives with less environmental impact.

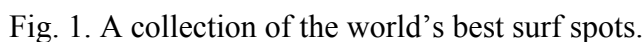
4. Great surf breaks are rare:

Good surfing spots are rare. Consistently great surfing breaks are even more rare (Scarfe et al 2003). The reason for this is the highly variable conditions that must be present in order for a wave to be surfable.

Waves are driven by winds and the wave size depends on the strength of those winds. The area of the water exposed to the wind is known as fetch. A wave is created when winds disturb the ocean surface and pushes the water causing a response. This response is propagated and grows over time if the winds continue to disturb the medium. A wind of certain strength is only capable of producing a certain “size.” This means that the wave size is a product of both the speed and duration of the overlaying wind gust. Also, the larger the fetch—the area affected by the winds—the larger wave will be. These larger, longer waves are more suitable for surfing because as the wave grows in length it also grows in depth. Each wave generated may have different speeds and wave periods. Longer period waves are faster and separate from smaller waves. This separation forms long trains that hit the beach in swell lines, known as sets. The deeper the wave, the more interaction there will be with the ocean floor causing the wave to rise once it has reached its near shore environment. The bathymetry of the ocean is incredibly important when determining the type of surf at a particular spot. Local factors such as rivers, reefs, sand bars and jetties determine how the local bathymetry works (Scarfe et al 2003).

The best surf is created by a tightly packed “onion” low-pressure storm with many narrow isobars that pushes to an area of high pressure. The high-pressure system does not affect the surf but rather ensures good weather at the surfing area. The low-pressure storm creates strong winds over a large area and for a long period of time. These waves move towards the surfing break without being disturbed by any islands, atolls, or continental shelf that disrupt the sets or create drag slowing down the waves. Areas of deep canyons and relatively small continental shelves allow the wave to move along without being slowed down until it meets the local bathymetry. The local bathymetry determines where and how the waves break. This is where personal preference plays a role in determining the best breaks. Whether the wave is a shore break, is located next to an offshore reef, or comes in the form an A-frame, barrel, ramp, bowl or wedge determines the types of surfers attracted to that particular break (Mead and Black’s 2001). Consistent offshore winds, blowing from the shore to the ocean, are important to a break.

Due to the large number of environmental factors that must be present to have good surfing, good surf spots are rare. While there is debate around the world over the best surf spots, it is widely accepted that some places are surfing meccas. These surf “hot spots” are considered great for their consistent waves that provide enjoyable rides.



Internationally there are seven waves that are recognized to be standards of surfing. While all seven waves have very different breaks, they share some key attributes. All

have access to consistent swells with potential for large storms, possess great offshore winds, work in a variety of conditions, and very importantly, are still relatively pristine.



Figure 2. Six of the world's seven best surf spots.

The seventh, not pictured above, international standard is the "Mexican Pipeline" of Puerto Escondido, Oaxaca Mexico.



Photo 1. Mexican Pipeline in Puerto Escondido

5. Surf breaks are highly susceptible to alterations:

Due to the highly variable nature of surfing, it is important to preserve the conditions that make a spot great. The quality of a wave is highly-dependent on the wave climate—the wave period, height and direction as explained earlier. Therefore, during coastal development, wave quality and environment can be altered leaving a wave unsuitable for good surfing. There are two categories of threats plaguing surfing. There are immediate threats, which can wipe out a surfing break instantly, and chronic threats, which slowly degrade the experience over period of time (Surfrider).

One doesn't have to look far to find examples of immediate and chronic threats. A famous example of an immediate threat was when a dredging project in Mundaka, Spain ruined a world-class bodyboarding wave over night. Mundaka was a tour stop on the International Bodyboarding Association Tour and surfers stopped visiting after the dredging. A case study done by Murphy and Bernal in 2008 quantified that the potential value lost from a dredging project was nearly \$4.5 million USD for a community of 1,200 residents. Malibu Beach and Imperial Beach in Southern California are classic examples of how chronic threats can slowly plague a wave. Due to water quality issues, Imperial Beach is deemed unsurfable many days out of the year because of health concerns involving raw sewage flowing from Mexico.

History of Puerto Escondido:

Puerto Escondido is a quintessential coastal fishing village in the state of Oaxaca, Mexico. With approximately 25,000 inhabitants (Historia de PE), Puerto Escondido still remains the “hidden port” as the name refers to in Spanish. The people of Puerto Escondido have long claimed they are “people who live from the sea.” Traditionally, Puerto Escondido has a very strong fishing tradition, but in recent years, the fishing industry has declined (Tomzap.com).

In the past, Puerto Escondido was a less travelled destination in Mexico (Tomzap.com) because of the lack of ground transportation infrastructure. With the recent construction of an international airport and a proposed improvement to the local roadways to Oaxaca City and Mexico City, the area is increasingly more accessible to international and weekend tourists. With increased accessibility surfing has become another import income for Escondido locals (Historia de PE). There are three main surfing areas of Puerto Escondido; there is Zicatella also known as the “Mexican Pipeline,” La Punta, and Punta Colorada, (exclusively a bodyboarding wave). Zicatella, widely-accepted as the “best beach break in the world”, (Bigwaveblog, Surfline, tomzap) draws surfers from all over the world, which also surf the other world-class surfing areas in Puerto Escondido. This collection of different surfing breaks provides a diversified portfolio that provides good surf in almost any condition year round.

While it is hard to tell when exactly people from Oaxaca started surfing in Puerto Escondido, the first US citizens discovered the perfect waves in the 1950s but were not equipped with the correct boards needed to ride the 25-foot monsters. Later, in the 1960s a collection of draft-dodging surfers found the area and tried to harness the power of the world’s strongest sand bottom surfing break. This set up a small community of Americans who moved to the area and were visited by other friends looking to catch the perfect wave. In 1975, several magazine articles published articles showing the wave they called “Mexican Pipeline” after the similarity to Hawaii’s famous “Pipeline” surf break. From then on, surfers from around the globe began to descend on Puerto Escondido and try their luck at harnessing the power of the waves. Many of these surfers left behind their boards for the locals to use. This is most likely when locals started surfing. Now, Zicatella has been home to the professional surfing, bodyboarding, and X Games competitions and three “Wave of the Summer” rides that give a prize to the best surfed wave of the year (Surfline-Puerto Escondido Surf History).

Surfing in Puerto is infamous because the waves work under a variety of circumstances. While most Southwest swells work best, a variety of surfing breaks allow for waves in Puerto Escondido to be rideable under a variety of conditions. Ideal swells start as a compact storm off the coast of Chile nearly 3,000 miles away and build over a period of 36 hours as it approaches the Oaxacan coast. The tightly packed fetch, with winds of 40-55 knots, allows for swell height to rise and periods to become longer. With no islands to

alter the swell, the pristine and deep waves do not meet any continental shelf or canyon until a hundred meters off shore where it is refracted over a shallow reef and sent towards the shore. Fifty meters out the swell “pops” up on the large deposits of sand to create the infamous Puerto waves. The 8-20 foot wave is incredibly fast and highly unforgiving (Surflife).

As with so many pristine habitats around the world, the Puerto wave is not in the pristine state that the American surfers found it in the 1960’s. When word got out about the perfect waves, many surfers flocked. Locals and investors took the opportunity to develop the area for tourism often with little consideration for future sustainability. Soon a plethora of hotels, roads, and resorts appeared destroying the setting to which so many were initially drawn. According to the local surfers, Puerto’s perfect waves also suffered (via conversations with local surfers). The prized Zicatella wave has seen its fair share of alterations. The construction of a sea wall has altered sediment flow, which builds the sand bars needed to create the powerful wave. It now takes the sand bars much longer to recover after large storms. The construction of a main boardwalk and beachfront restaurants has shoaled up sands and multi-story hotels block perfect offshore winds. While the wave is still considered world class, it is far from its original state. It is uncertain how much more degradation can occur before surfers decide it is not worth spending all the money to surf.

More recently, the waves at Zicatella and Punta Colorada in Puerto Escondido, Mexico came under threat by the proposed construction of a marina and a new sea wall. The proposed coastal development project includes the development of a lagoon, 1.15 miles of beach front, and 275 acres of land (Manifestacion de Impacto Ambiental Modalidad Particular 2009) as well as the replacing a sea wall with a new embarcadero. This construction can be seen in the map in Appendix C.

This development project is problematic on several counts. First, the lagoon is home to dozens of birds, crocodiles, red mangroves and a fish nursery. The adjacent beach provides critical habitat for three species of nesting sea turtles (olive ridley, leatherback, and green) while a rocky point provides habitat for the only sustainable fishery left in the area, an oyster fishery. Second, the construction in the lagoon would require dredging of Punta Colorada—the location of the world-class bodyboarding wave. Removing the seawall and building a new embarcadero could seriously affect the sediment flow that builds the sand bars needed to make Zicatella the world’s finest beach break. Finally, the development plan involves the removal of red mangroves that provide essential ecosystem services.

Here I address the question of whether the surfing community and industry can be effectively utilized for the purpose of environmental conservation. As detailed above, surfing is big business and this coastal development project would degrade and destroy very popular waves. Therefore, is it possible to protect, and even clean up, an existing environment based on the value of a wave?

Valuing a Surf Break:

Valuing recreational goods of environmental services is a potentially tricky proposition. Economic costs and benefits are traditionally estimated based on existing market values. While environmental services often lack any sort of existing marketing value, it is still possible to calculate a service's worth based on individuals 'willingness to pay.' Total willingness to pay is equal to the summation of the use value, option value and intrinsic value. Use value is the direct benefit from consuming or using a good, option value is derived from knowing you have the option to use the good in future if one so desired and intrinsic value is the benefit gained from knowing that good exists (Tietenberg, 2007).

Ecosystems are often seen as not having a market value since there is no price at which they could be traded in a competitive auction setting. Many of those who value ecosystem services often feel that these areas are priceless and putting a value to items is what causes construction and degradation in the first place. But, in recent years there has been a growing effort to put values on ecosystem services. Economic valuations have been used to help conserve sharks, sea turtles, wetlands and scuba diving and surfing destinations around the world. Sharks are estimated to bring US\$314 million each year and suspected to double in the next 20 years through shark diving ecotourism (Cisneros-Montemayor et al, 2012). Mangrove habitats in the Gulf of Mexico have been shown to add an annual median value of US\$37,500 per hectare to the fishery yields (Aburto-Oropeza et al 2008). These values have helped give a broader picture of what would be lost if these resources were to be destroyed. The economic valuation of surfing has been coined "Surfonomics" and has gained traction in recent years. Previously, there was limited data on surfers and their use of the waves. A Travel Cost Study in Santa Cruz, California put a price tag of \$8.4 million to the Pleasure Point surf-break. This value was used in the fight to stop a seawall from being built that could impact the wave (Tilley 2001).

Methods

For this study, I used an Individual Travel Cost Method (ITCM) to assess the value added to the local Puerto Escondido economy by the Punta Colorada surf break. With the use of a 17-question survey, Appendix A, I was able to gather basic information about where each participant was from, how long he or she was staying in Puerto Escondido, and how much they would be spending during their stay. Also included were questions regarding their preference to surf Punta Colorada and whether they would return if the construction affected the waves. Surveys were administered in Puerto Escondido and through an online survey host. Surveys were available in both English and Spanish. I was able to conduct 32 surveys on-site and 121 Internet based surveys. On-site surveys were conducted on the beach, in cafes, hotels or anywhere I found bodyboarders who were in Puerto Escondido to surf. Using social media, surf organizations and surf magazines I was able to promote the survey. Through these organizations I was able to reach a much larger and diverse crowd than I could through direct survey methods alone. These organizations directed surfers who had been to Punta Colorada in the last year to my survey where they could then opt-in and take the survey in their homes. The reason

Punta Colorada was exclusively chosen for economic analysis because at the start of this study construction was set to only affect Punta Colorada and not Zicatella at Bahia Principal.

The surf season in Puerto Escondido is seasonal with the best waves coming during the rainy season (May through November) but visitors come throughout the year, as there is small to medium surf in the dry season. The tourism data for Oaxaca and furthermore Puerto Escondido is minimal making it much harder to calculate annual visitation. I spent five weeks in Puerto Escondido, two weeks in September 2012 and three weeks in April 2013. During my five weeks in Puerto Escondido, some surf sessions (broken into morning or evening) at Punta Colorada had zero surfers in the water but at times had over 50. In order to get a good understanding of how many people were in Puerto Escondido to surf Punta Colorada I interviewed local 'surf' hotels. This survey indicates that nearly 3,000 annual visitors bodyboard Punta Colorada in any given year. Throughout the year, an average of 58 people arrive each week to surf Punta Colorada.

Summary of Survey Results:

Survey results show that the average expenses on hotel, food, boat tours, and other expenses, was US\$67.80 per person/day. The majority of this sum was spent on accommodations and food—\$26.78 and \$18.78, respectively. Participants were also asked how many days they were staying. Some stayed as little as four days while others as long as 120 days. On average, bodyboarders stay 34.11 days and visit 1.59 times per year. We can obtain an estimate of the total economic impact of each survey participant by multiplying the (average expenditure per day) x (average length of stay) x (average visits per year) to obtain an estimate (US\$67.80 x 34.11 x 1.59) of US\$3,677.13 per person/year. This number is exclusive of any travel cost and is purely the money being spent in the local economy. Adding the average travel expenditure of US\$853.67 to get to Puerto Escondido, shows a total expenditure of US\$4,530.80 person/year.

For example, a surfer from Australia, with a full graduate degree, spent 120 days in Puerto Escondido to surf. He spent an average of US\$45 dollars a day, which brought his total amount spent in Puerto to roughly US\$5,600. His flight was US\$2,600, for a total expenditure of \$8,200. But, if you calculate the amount of money forfeited from his US\$200,000+ annual income (that he indicated he made) he had a minimum of \$66,667 lost income. Although this does not translate to dollars gained to the Puerto Escondido economy, this does help indicate the overall worth of the surf site to individuals.

Work by Nelsen et al (2011) proved surfers were neither broke nor uneducated. This study showed the median income of a California surfer was \$75,000 and that 62% of those surveyed had a college degree or higher. Education results were similar at Punta Colorada, with 59 % of participants having a college degree, Figure 3. The median income range among Punta Colorada surfers was US\$10-29,000 although 16 of the 119 participants who answered the question earned above US\$90,000. This difference is most likely due to where participants were from, which is addressed below. As many of the participants are from other parts of the world, when looking at incomes one need to also

account for Purchasing Powers of each participant's home country. The tourists who surf at Punta Colorada are also neither undereducated nor broke.

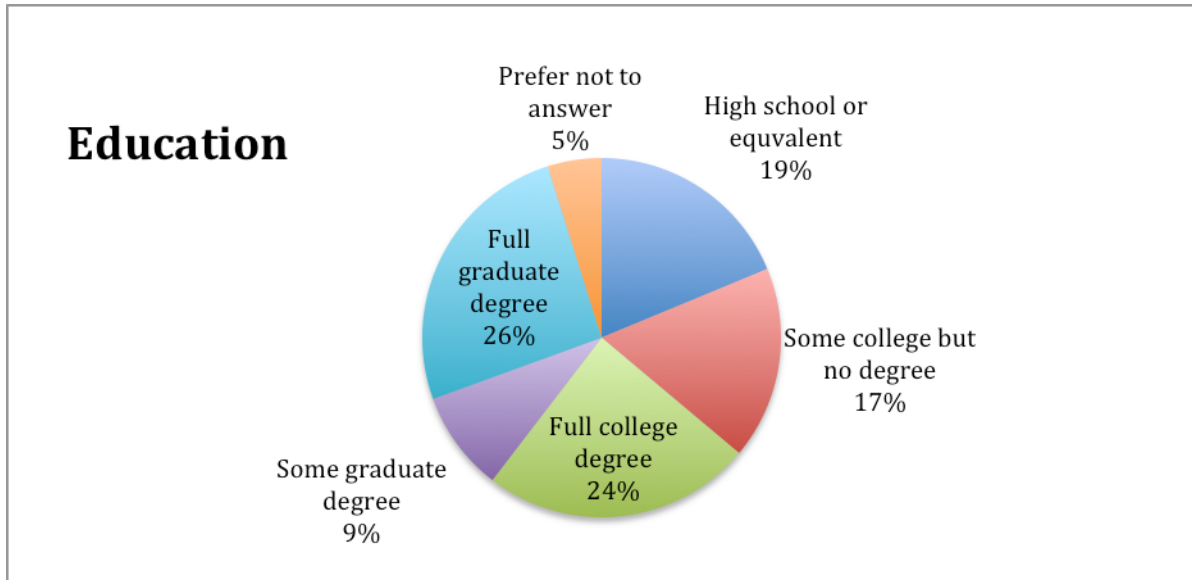


Fig. 3 Education levels of survey participants.

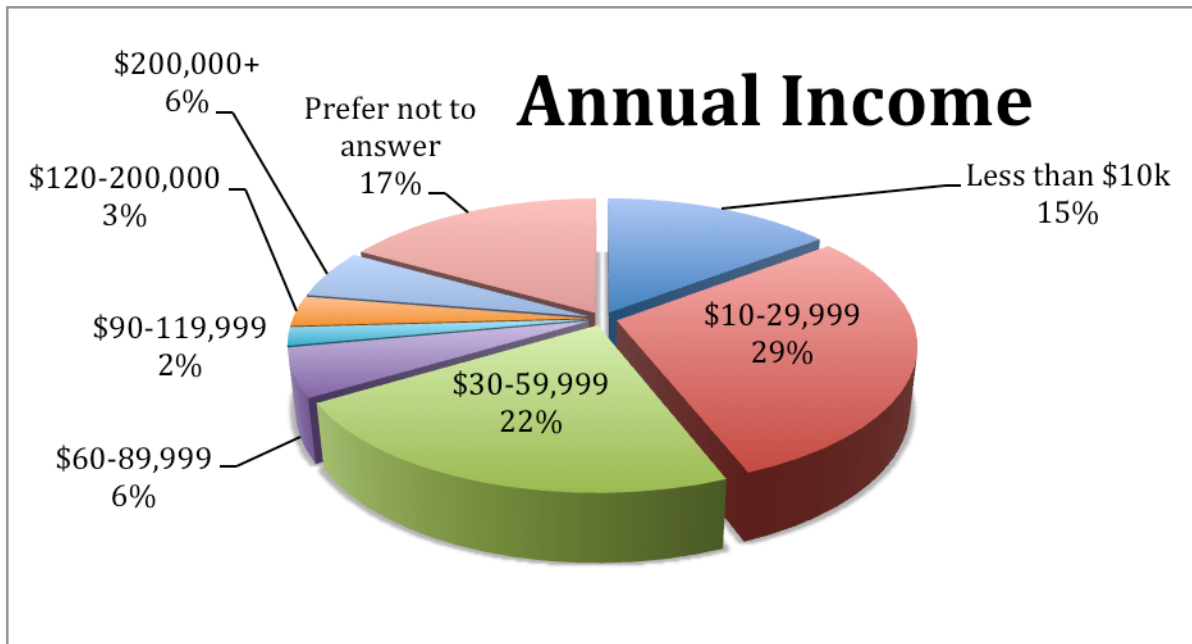


Figure 4. Annual income of the survey participants (\$US).

Using a scale of 2,000 to 4,000 visitors, I am able to multiply average trip expenditures to have a range of additional revenue brought to the Puerto Escondido economy by the surf break of Punta Colorada. Table 1 shows the annual expenditures associated with surfers coming to surf Puerto Escondido at 2000, 3000, and 4000 visitors per year. If we multiply the average dollar amount, US\$3,677.13, spent per visitor over the three visitation levels we have an estimated annual expenditures associated with surfing Punta Colorada. Even at the conservative visitation level of 2000 annual surfers, US\$7.4 million dollars is spent in the Puerto Escondido economy (exclusive of air travel.)

Table 1. Annual expenditures associated with surfing Punta Colorada to Puerto Escondido exclusive of travel expenses.

# Annual Surfers	Annual Expenditures Associated with Surfing Punta Colorada
2000	\$7,409,930.88
3000	\$11,227,168.00
4000	\$14,932,133.44

If things were to remain constant, we can calculate the amount of money generated by the existence of the wave over the course of a full generation. At the conservative level of 2,000 annual visitors to Punta Colorada, we can extrapolate that in 30 years the Puerto Escondido economy would benefit from an additional \$222 million USD from surfing interests.

Table 2 . The future added value of Punta Colorada over the course of 30 years.

Years	Potential Expenditures
1	\$7,409,930.88
2	\$14,819,861.76
5	\$37,049,654.40
10	\$74,099,308.80
15	\$111,148,963.20
20	\$148,198,617.60
30	\$222,297,926.40

By plotting surveyed participants origins we can begin to appreciate the pull of Punta Colorada. Figure 5 shows the distribution of participants. Of the 153 surveys, there were surfers from 30 countries and territories. Participants from the United States (31), Europe (27) and Australia (26) accounted for a large portion of those surveyed. This proves that surfers are highly mobile and willing to travel great distances for good surf.



Figure 5. Spatial mapping of survey participants.



Figure 6. Survey participants (blue pins) mapped in relation to the world's best surfing spots (small red stars) and the seven highest rated surf breaks as international standards (large red stars).

As seen in Figure 6, many of those surveyed live in close proximity to great surfing spots and closer to other international standard surf breaks than Puerto Escondido. These surfers are willing to forfeit a larger amount of time, and travel greater distances to surf the great Mexican waves in Puerto Escondido. Eighty percent of survey respondents would not come to Puerto Escondido if Punta Colorada was damaged or removed. Instead, they indicated they would go to Australia, Indonesia or Costa Rica.

Cost per individual surfer:

While the revenue potential from surfers visiting the area is high, there are costs associated with hosting these tourists. Having 2,000 visitors in the area results in a cost to the municipality, called direct incidental costs. Incidental costs are those the tourist would impose on the local community by coming to the area. As with all types of tourism, there is pollution (water, air, noise, litter), water consumed, a need for security (police, justice system) and infrastructure for travel, etc. This cost must be incurred by someone and should be accounted for when calculating an added benefit of having tourists come to visit a resource. The potential added revenue to the economy may be US\$ 7.4 million at 2,000 visitors but one would need to calculate the incidental costs before a realistic value added could be determined for Puerto Escondido.

This calculation would require a whole other study but based on several components we can estimate that the costs would be low. Puerto Escondido is still highly rural and the cost of living is still relatively cheap. There is limited industrialization and does not produce too much waste. The need for security is still minimal due to a low crime rate compared to other areas of Mexico. Although there are costs involved with having tourists coming to Puerto Escondido to surf, the benefits appear to be much greater than the costs.

Conclusion:

This study indicates that the surf break of Punta Colorada is a high value resource for Puerto Escondido and businesses that transport surfers to the town. While Punta Colorada is most likely of lower overall value than Zicatella, it is still highly valuable at all three annual visitation levels. Punta Colorada is exclusively a bodyboarding wave and therefore excludes other types of surfing activities. Despite the restrictive nature of the Punta Colorada break, survey respondents still indicate that 80% of them would not return to the region and not spend their money in Puerto Escondido if Punta Colorada was no longer accessible either because the break had been destroyed or severely damaged by development. Future development affecting the Zicatella break would likely see an even larger portion of the surf tourism sector leave Puerto Escondido.

At the beginning of this project, the construction project at Punta Colorada was relatively unknown outside Puerto Escondido; those few who were aware of its existence were opposed to it. Now, it is an international issue with the involvement of world champion surfers as Wave Ambassadors, environmental NGOs running media campaigns, political officials sponsoring surf events at Punta Colorada and the start of a grassroots organization named "Salvemos Colorada." This grassroots effort has been able to collect over 6,000 signatures from locals and the international surfing community. These signatures have been brought to Enrique Peña Nieto, President of Mexico and given the surfing community a voice.

In part due to the large opposition to the construction, the construction that was slated to start in September 2013 has been halted (as of December 1, 2013, the project has been stalled in the planning stage). Additionally, a new government will take over in January 2014 and should seriously reconsider the construction at Punta Colorada.

The visitors that come to Puerto Escondido to surf Punta Colorada are high value, long staying tourists that consider their travel as ecotourism. They spend on average 3.5 times the amount of tourists visiting Costa Rica and tend to stay in small, family run hotels which minimize leakage. Because the development both threatens the highly valuable surf tourism industry and endangers many species and inhabitants it is the opposite of what Mexico aims to do with their tourism sector. The local government would be better suited to protect the local surf breaks, create a natural reserve for the lagoon and surrounding area.

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Appendix A. Copy of Survey

Please help us determine what the Punta Colorada surf break means to you in order to inform future development decisions that impact waves throughout the world. You can help by completing this survey about your experience travelling to Puerto Escondido.

Please answer all questions as an individual (i.e. if you came to Puerto Escondido with a group, answer for yourself only). No information provided will be individually attributed to the respondent.

Please do not fill out if you have completed an on-line survey.

- 1) **Are you at least 18 years old?** Y N
- 2) **Where are you from?** _____ (City/Country)
- 3) **Tell us why you came to Puerto Escondido: (circle all that apply)**
 - A.) To surf/bodyboard
 - B.) To bodyboard Punta Colorada
 - C.) To see the waves
 - D.) To be with the surfing community
 - E.) To spend time with friends/family
 - F.) Other _____
- 3a) **Which of the above was the most important reason?** A B C D E F
- 4) **Did you fly to Mexico or within Mexico to travel here?** Y N
- 4a) **If “Y,” what was the cost of your ticket?** \$ _____ (\$ United States Dollar)
- 5) **Did you drive here?** Y N
- 5a) **If “Y,” what kind of vehicle do you drive?** _____
- 5b) **If “Y,” is it a rental car?** Y N
- 6) **Is surfing/bodyboarding the primary reason for your trip to Puerto Escondido?** Y N
- 7) **How many times have you traveled to Puerto Escondido ?**
In the last 365 days ? ____ In your life? _____ -
- 7a) **Is surfing Punta Colorada important when you travel here?** _____
- 8) **Do you come to Puerto Escondido when there is no surf?** Y N
- 9.) **Where would you go if surfing was ruined in Puerto Escondido?** _____
- 10) **Where would you go to surf if surfing was ruined in Puerto Escondido?** _____
- 11) **By the time you leave, how many days will you have stayed in the area?** _____
- 12) **Where are you staying? (circle one)**
Hotel Hostel With friends/relatives Camping Other _____
- 13) **What was the most important factor in your choice of accommodations? (circle one)**

Price Environmental-Concerns Location Other _____

14) **Approximately how much do you think you spent per day on: (\$ United States Dollar)**

Lodging: \$ _____
Meals: \$ _____
Boat Tour: \$ _____
Other expenses: \$ _____

15) **Do you consider surfing an ecotourism activity? Why or why not?** _____

16) **What forms of marine recreation are you actively involved in? (circle all that apply)**

Surfing Kayaking Fishing Waterskiing Scuba Sailing Other _____

Background Information

Note: The information you provide is confidential, and will only be used for demographic purposes.

Age _____

Are you: (circle one) **Male Female**

What is your age range? (circle one)

18-25 26-29 30 – 39 40-55 56 – 70 71 or above

Do you travel outside your home country for the purpose of marine recreation?

What is the highest level of education you completed? (circle one)

High School Some College Full College Degree
Some Graduate School Full Graduate Degree Prefer not to answer

Which range includes your gross annual income? (circle one) (United States Dollar)

Under \$ 10k \$10,000 - \$ 29,999 \$ 30,000 - \$ 59,999 \$ 60,000 - \$ 89,999 \$90,000 - \$119,999
\$120,000 – \$200,000 More than \$200,000 Prefer not to answer

Other comments? _

Thank you very much for taking the time to complete this survey! If you would like to be available for further questions, or if you would like us to share the results of the study with you, please leave your email address below.

Appendix B. Summary of Results

Age	# Participants	%
18-25 years old	57	36.77%
26-29 years old	37	23.87%
30-39 years old	42	27.10%
40-55 years old	10	6.45%
Education		
High school or equivalent	27	17.42%
Some college but no degree	25	16.13%
Full college degree	35	22.58%
Some graduate degree	13	8.39%
Full graduate degree	37	23.87%
Prefer not to answer	7	4.52%
Salary		
Less than \$10k	21	13.55%
\$10-29,999	42	27.10%
\$30-59,999	32	20.65%
\$60-89,999	8	5.16%
\$90-119,999	3	1.94%
\$120-200,000	5	3.23%
\$200,000+	8	5.16%
Prefer not to answer	24	15.48%
Travel outside Country for Rec		
Yes	132	85.16%
No	15	9.68%
	US\$	
Average Price of Travel	\$853.67	
Length of Stay	\$34.11	
Daily Spending		
Hotel	\$26.78	

Food	\$18.78	
Boat Tour	\$7.23	
Other	\$15.01	
Total	\$67.80	
Visits		
Yearly		1.59
Lifetime		4.95
Average yearly expenditure in Puerto Escondido	\$11,227,168.00	
Travel	\$2,561,000.00	
Total	\$13,788,168.00	

Appendix C: Proposed construction around Punta Colorada. Not pictured is the construction to the seawall and embarcadero.

