

# UC San Diego

## Capstone Papers

### **Title**

Business Plan: China Coral Conservation Center

### **Permalink**

<https://escholarship.org/uc/item/5qk3n6m8>

### **Author**

Cao, Bowen

### **Publication Date**

2013-04-01

# Business Plan

## China Coral Conservation Center



**Bowen Cao**

Co-founder/ President

Master of Advanced Studies

Marine Biodiversity and Conservation

Scripps Institution of Oceanography

University of California, San Diego

## Content

1	Why China Coral Conservation Center (CCCC) is Needed -- Existing Problems---	4
1.1	Biodiversity and ecosystem services of coral reefs-----	4
1.2	Coral Reef Status in China-----	4
1.3	Local Threats to Coral Reefs-----	7
1.3.1	Overfishing and Destructive Fishing-----	7
1.3.2	Mining Coral for Lime as Building Construction Material-----	8
1.3.3	Pollution and Sedimentation-----	9
1.3.4	Tourism-----	10
1.3.5	Coral and Ornamental Fish Trading-----	11
1.3.6	Aquaculture-----	11
1.4	Existing Coral Reef Conservation Efforts in China-----	12
1.4.1	Sanya Coral Reef National Marine Nature Reserve-----	12
1.4.2	Xuwen Coral Reef National Marine Nature Reserve-----	15
1.4.3	Blue Ribbon Ocean Conservation Society-----	16
1.5	Conclusion-----	17
2	What CCCC is Going to Do in the Early Stages -- Information Campaign-----	17
2.1	Necessity of Information Campaign-----	17
2.1.1	Lack of public awareness-----	17
2.1.2	Examples on successful information campaign -----	19
2.1.2.1	Campaign for Sustainable Fisheries Management at Andavacoata Coast, Madagascar-----	19
2.1.2.2	Viral Marketing-----	21

2.2	Information Content-----	22
2.2.1	Flagship Species-----	22
2.2.2	Endangered and Unique Species-----	24
3	How CCCC Will Do It – Approaches-----	25
3.1	Local community – Pride Campaign-----	25
3.1.1	Procedure-----	25
3.1.2	Information Carriers-----	26
3.2	General public in China -- Viral marketing-----	27
3.3	Conservation science community in English-speaking countries-----	27
3.3.1	Translation of Research Paper-----	27
3.3.2	Conferences and Workshops-----	28
4	Our Team-----	28
	References-----	30

## **1. Why China Coral Conservation Center (CCCC) is Needed-- Existing Problems**

### **1.1 Biodiversity and ecosystem services of coral reefs**

Coral reefs are often called the “rainforests of the sea” because they are some of the most diverse ecosystems in the world. They cover less than 1% of the ocean floor, yet provide a home for 25% of all known marine species, including fish, mollusks, worms, crustaceans, echinoderms, sponges, tunicates and other cnidarians (Spalding and Grenfell, 1997). Coral reefs commonly exist in shallow tropical waters, but deep water and cold-water corals are also found in smaller scales in higher latitude.

The global economic value of coral reefs is estimated at US\$ 30 billion annually (Cesar et al., 2003). They provide a variety of ecosystem services including fisheries, tourism and shoreline protection.

Coral reefs are vulnerable ecosystems, partly due to their sensitivity to water temperature. They are under heavy pressure. Already, 27% of coral reefs have been permanently lost due to human activities and with current trends, a further 30% are at risk of being lost in the coming thirty years (Cesar et al., 2003).

### **1.2 Coral Reef Status in China**

Thirty four percent of all coral reefs on earth are found in Southeast Asia, with 50 out of all 70 coral genera living there. Coral reefs in Southeast Asia are also the most threatened in the world. About 95% are at risk from local threats (i.e.,

coastal development, overfishing, destructive fishing, marine-based pollution, and/or watershed-based pollution), with almost half in the high and very high threat categories. The few places that are in the low-threat category are located in the more sparsely populated eastern areas as shown in Figure 1 (Burke et al., 2011).

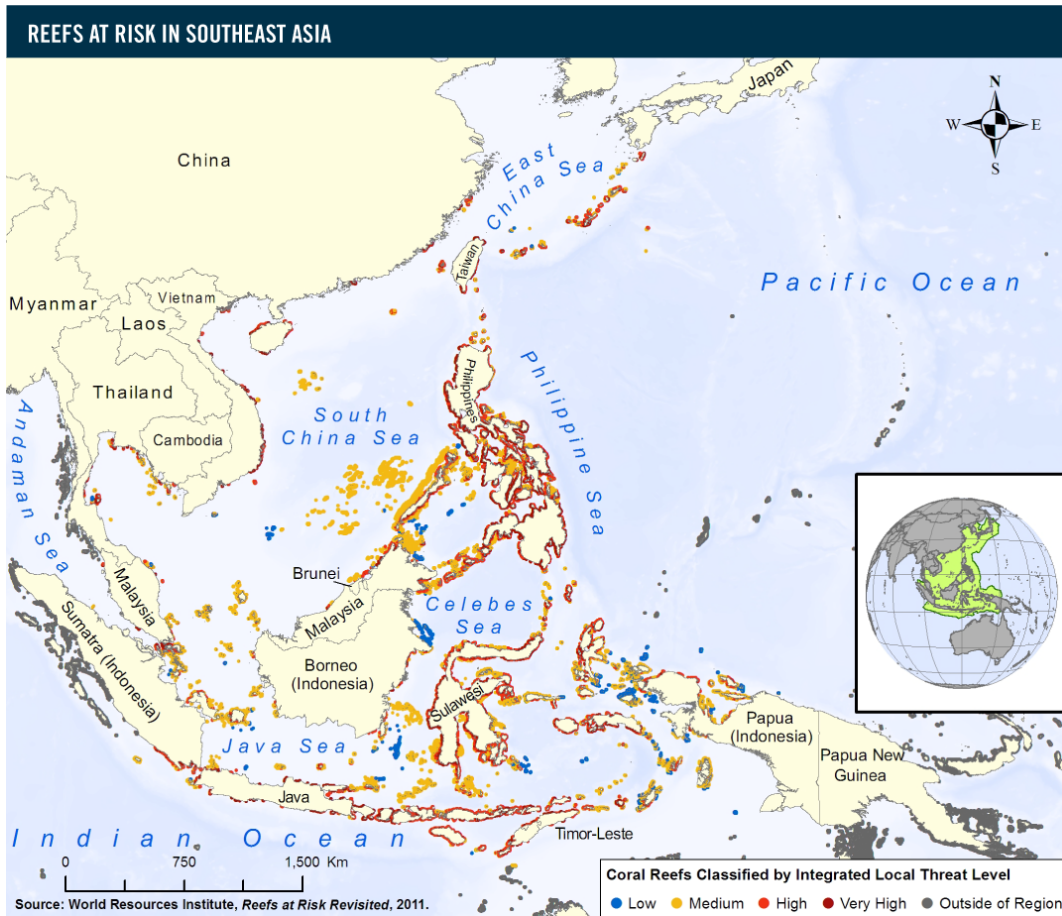


Figure 1: Coral Reefs Classified by Integrated Local Threat Level in Southeast Asia



Figure 2: Coral Reefs in China

As shown in Figure 2, coral reefs in China are located mainly at Nansha Islands, Xisha Islands, Zhongsha Islands, Dongsha Islands, Hainan Island, and sparsely along the southeast coastline. Among these coral reef locations, Nansha Islands, Xisha Islands, Zhongsha Islands and Dongsha Islands have no or little residents. Therefore, coral reefs there are under relatively low stress. In contrast, Hainan Island is the biggest island in China and has a population of 8.7 million. It is also one of the most popular vacation destinations in China, resulting from its beautiful shorelines, blue waters and what lies underneath them. With an economy that relies heavily on tourism, Hainan Island residents have a motivation to conserve the island's biodiversity and ecosystems by maintaining their abundant coral reefs.

However, recent research has found that coral abundance has declined by at least 80% over the past 30 years on coastal fringing reefs along the Chinese mainland and adjoining Hainan Island. On offshore atolls and archipelagos claimed by 6 countries in the South China Sea, coral cover has declined from an average of >60% to around 20% within the past 10-15 years. Climate change has affected these reefs far less than coastal development, pollution, overfishing, and destructive fishing practices (Hughes et al., 2012).

Take Luhuitou as an example. The Luhuitou coral reef is a fringing reef at Hainan Island. Since the 1960s, the reef has experienced several significant ecological changes. During that interval, the mean coral cover decreased dramatically from 80–90% in 1962–65 and to just 12% in 2009. There are few long-established coral colonies present, with approximately 80% being younger than 30 years old. This demographic pattern differs significantly from healthy coral reefs, which are typically dominated by large, well-established mature coral colonies. The authors of this study believe that the long-term decline of the Luhuitou coral reef has most likely been driven as a result of anthropogenic activities, such as overfishing, destructive fishing, reef rock digging, and aquaculture and tourism activities (Zhao et al., 2012)°

### **1.3 Local Threats to Coral Reefs**

#### **1.3.1 Overfishing and Destructive Fishing**

The rapid growth of the coastal population in countries around the South China Sea is putting increasing pressure on coral reefs, especially because they are



being used as fishing grounds. Lacking the economic ability of fishing in high seas, most of the coastal communities are fishing on nearby coral reefs. Overfishing and destructive fishing practices, such as using explosives and poisons, have caused serious degradation of coral reefs in the South China Sea. With decreasing fishery resources, which is partly due to the ongoing coastal development, some fishermen choose to use destructive fishing practices. Explosives and poisons are widely used in fisheries in the South China Sea, where 50% to 60% of coral reefs are threatened by these destructive fishing practices (Burke et al, 2002).

In remote areas, explosives are the main threat because they can be easily homemade by fishermen. A fisherman can throw an explosive 5m away into the water and just wait to harvest dead and stunned fishes that float onto the surface. A beer-bottle-size explosive can destroy coral reefs of an area of 5m<sup>2</sup>. The mortality rate of the coral on the affected reefs is 50% to 80%. The conservative estimation of the economic loss for 1km<sup>2</sup> destroyed coral reef is \$60,800 per year for potential tourism (Cesar, 1996).

Cyanide is the main poison used for fishing. Target species are fishes with high economic value, including the Napoleon Wrasse (*Cheilinus undulatus*), Humpback Grouper (*Cromileptes altivelis*), and Coral Trout (*Plectropomus leopardus*), among others. Fishermen spray cyanide into the cracks of coral reefs where fish take refuge, and harvest the poisoned fishes that float up. The poison not only kills a large number of fish eggs and larvae, it also bleaches the coral reef (Lan and Chen, 2006).

Driven by high profits, overfishing and destructive fishing activities are likely to continue (Lan and Chen, 2006).

### **1.3.2 Mining Coral for Lime as Building Construction Material**

There is a long history of residents around the South China Sea mining coral to produce lime because live coral contains little impurities. Some coastal villages still keep the tradition today. Cement factories use coral reefs as raw material of limestone, and aquaculture ponds are often built of reefs. The mining activities destroy habitats, eliminate the aesthetic value of coral landscape, decrease fisheries production and exacerbate coastal erosion. With extremely low growth rates, it would take decades, centuries or even longer for coral reefs to restore themselves to their original states (Wang and Zhao, 2001).

### **1.3.3 Pollution and Sedimentation**

The input of large quantities of sediment can result in turbid water. It can block light and cover the corals, suffocating them, lowering their growth rate and affecting their ability to anchor. The input of pollutants can also cause eutrophication. With harmful algae competing for living space, the growth and reproduction of corals are inhibited. Thus coral reefs are sensitive to sediment and pollutants (Lan and Chen, 2006)..

The coastal development of the South China Sea region has posed an increasing threat to local ecosystems. Human activities, including land reclamation, lumbering, and mining, bring sediment and nutrients to coral reefs. Many coastal communities and cities have incomplete sewage systems, and some even discharge

sewage directly into the sea. Sewage brings high concentrations of nutrients and pollutants to coral reefs, which can change the community structure of species present. In the South China Sea region, Biochemical Oxygen Demand (BOD) in annual domestic wastewater is approximately 6,600,000t, only 11% of which is treated; BOD in annual industrial wastewater is more than 450,000t. More than 10,000,000t fertilizer is used and 78,804,000t solid waste is generated each year (Talaue-Mcmanus, 2000). These go far beyond the self-purification capacity of coastal ecosystems, diminishing the live coral coverage of the reefs and resulting in a loss of ecosystem services and functions.

In general, the closer the coral reefs to densely populated areas, the greater the degradation.

#### **1.3.4 Tourism**

The rich biodiversity of the coral reefs and low travel costs of the South China Sea region attract a large number of tourists from all over the world every year. Tourism-related activities and industries such as native arts and crafts sales, restaurants, and hotels bring significant income to the coastal nations and local residents. Coral reefs are important in the tourism industry. Take Malay Peninsula as an example. There is higher biodiversity in coral reefs on the East Coast than that on the West Coast. With live coral cover rate from 55% to 70%, the East Coast has far more tourists than West Coast.

Hot spots of reef tourism in the region include El Nido and Pulau in the Philippines, Mu Koh Chang in Thailand, Nha Trang in Vietnam, Layang-Layang in Malaysia and Sanya in China. In the past 20 years, these areas have been through

rapid development, rapid enough to exceed the ecological carrying capacity of these spots. There are phases of the development of the tourism that affect coral reefs: the construction of the facilities and the actual activities tourists enjoy. In the construction phase, the harm includes land-leveling, coral mining for building materials, and excavating yacht waterways. After the spots open to tourists, the impacts include the direct discharging of untreated wastewater, boats anchoring on reefs, and diving tourists stepping onto reefs or taking pieces of reefs with them (UNEP, 2004).

### **1.3.5 Coral and Ornamental Fish Trading**

Countries around the South China Sea have been exporting corals and ornamental fish to Japan, the U.S. and Europe for their high aesthetic value. Although many countries have issued bans on coral mining activities, it is still difficult to prohibit such practices in the near future due to the high profits involved. This has caused serious damage to the coral resources in the South China Sea (Lan and Chen, 2006).

### **1.3.6 Aquaculture**

Farming of coral fishes and shellfishes has become popular in the South China Sea region. The most common species in aquaculture is the lobster. Farmers collect lobster larvae from coral reefs and then put them in to artificial ponds. They also collect benthic invertebrates such as starfish and mollusks as food for lobsters. The excessive harvesting of invertebrates can destroy the community structure of

the coral reefs and also reduces the economic benefit of aquaculture in the long run (Lan and Chen, 2006).

#### **1.4 Existing Coral Reef Conservation Efforts in China**

##### **1.4.1 Sanya Coral Reef National Marine Nature Reserve**

Sanya Coral Reef National Marine Nature Reserve was founded in September 1990. According to the brochure I received when I visited the management office in April 2013, it has a management office, a coral reef museum and 3 monitoring stations. The management office is hidden beside an abandoned railway and there's no sign indicating where it is located. The reserve used to have a website in 2010, though it did not provide any information on what the reserve organization had done in the past, what it was doing currently, or what it would do in the future. It even disappeared when I checked in September 2012. The coral reef museum was in the plan, but never came into existence. The 3 monitoring stations are still in the planning stage after 20 years.

News says that until February 2013, Sanya city government had invested over US\$1 million into coral reef conservation (<http://www.sanyatour.com/about.php?op=newscon&id=2558>) . Yet another news piece shows in 2007, when building a resort called Sanya Guobinguan in Luhuitou (a reef area), coral reefs were severely damaged (<http://www.hi.chinanews.com/hnnew/2008-01-22/101784.html>). As shown in Figure 3, there are broken coral reef pieces all over the beach.



Figure 3: coral reef pieces on Luhuitou Beach (<http://www.hi.chinanews.com.cn>)

The resort cost US\$90 million to build and it was a project supported by the city government. When the journalist Xinli Wang asked the management office why the reefs were destroyed and if it was done legally, the officer just responded, “why do you have so many questions?” (<http://www.hi.chinanews.com/hnnew/2008-01-22/101784.html>)



Figure 4: The Stele of Sanya Coral Reef National Marine Nature Reserve (<http://www.hi.chinanews.com.cn>)

As pointed out by Professor Qiu from University College London in *The Sanya Coral Reef National Marine Nature Reserve, China: A governance analysis*, the governance approach adopted in the reserve is characterized by significant decentralization (*i.e.* many roles have been devolved to the local government). However, this has led to the undermining of strategic conservation objectives by local economic development priorities, through the rapid development of mass tourism involving both the private sector and the local government. This reliance on economic incentives has provided alternative livelihoods and resources for the management of the MPA, but has also incurred environmental and social costs. Overall, it can be argued that the current governance approach cannot effectively

address the full spectrum of challenges encountered, in that these costs appear to outweigh the benefits. He also suggested that in order to improve the governance of the reserve towards more effective and equitable outcomes, strengthened leadership from the central state would be needed, as well as a sense of community stewardship towards the MPA. Studies done by Burke et al., Lan and Chen (2006) and Hughes et al. (2012) have all suggested that raising public awareness of the coral conservation issue in the South China Sea is imperative.

However, in the 2010 book, *Coral Reefs and Their Biodiversity in Sanya*, there's a systematic plan for long-term monitoring and management of the reserve. It located the monitoring stations, set monitoring content and indicators, gave monitoring methods and designed forms. The book also suggested a Sanya coral reef GIS system and a coral reef information database. The situation is becoming more hopeful. Yet the participation of the general public and local communities is important.

#### **1.4.2 Xuwen Coral Reef National Marine Nature Reserve**

Xuwen County is a little known place just opposite of Hainan Island across the Qiongzhou Channel. The reserve was founded in 2007 and there are 3 offices: management office, environment and resources office, and technology and research office. Since it's a newly founded reserve, there's no systematic plan to monitor and manage the reserve in the book *Coral Reefs and Their Biodiversity in Xuwen*, which is dedicated to the Reserve in Xuwen. However, the office has carried out several coral



reef information campaigns. According to *Coral Reefs and Their Biodiversity in Xuwen*, the reserve has managed to prevent direct damage to the reefs.

Based on the information given on Xuwen Campaign Website (<http://www.xc.xwie.com>), I believe Xuwen is seeking opportunities to develop a tourism sector. To maintain the success in the future requires awareness of the importance of coral reef ecosystems by the local community.

### **1.4.3 Blue Ribbon Ocean Conservation Society**

Blue Ribbon Ocean Conservation Society is an NGO founded in Sanya in 2007. It is the first NGO focusing on marine conservation in China. Its goals are to: 1) publicize the implementation of policies and regulations related to marine conservation; 2) raise public awareness about marine conservation; 3) attract volunteers to form marine conservation initiatives, and 4) promote research on marine conservation. The organization has over 10,000 volunteers and has organized a variety of activities aiming to raise public awareness and encourage local communities to participate in marine conservation.

(<http://www.blueribbonocean.org/>).

Based in Sanya, Blue Ribbon Ocean Conservation Society also has organized a number of coral reef related activities, including coral conservation seminars and beach campaigns.

However, the organization is focusing on much broader issues than on coral conservation alone. Moreover, it is under the supervision of Sanya Ocean and Fishery Bureau, and thus has its limitations when there is a conflict of interest

between marine conservation and short-term economic growth. The organization has to comply with the local government, because in China every NGO has to find itself a supervisory government department and operate under it. In fact, if there is no government department willing to provide supervision, there is no way an NGO can exist legally (Regulations for Registration and Management of Social Organizations) .

## **1.5 Conclusion**

Due to the seriousness of the degradation of the coral reefs, the lack of action from the government and the politic situation for NGOs in China, we feel necessary to start an NGO based oversea to avoid the interference from Chinese government and solely focus on coral reef conservation. This is how China Coral Conservation Center started in 2010 in Los Angeles, California, USA.

## **2 What CCCC Going to Do in Early Stage -- Information Campaign**

### **2.1 Necessity of Information Campaign**

#### **2.1.1 Lack of public awareness**

In 2010, the research group *Coral Reefs and Their Biodiversity in Sanya* conducted a survey to study public knowledge and awareness of coral reef conservation. The survey respondents included local farmers, fishermen, government officials, residents, students, teachers, NGOs and tourists. According to the survey, 75% of the local people do not know much about Sanya Coral Reef National Marine Nature Reserve. Over 40% do not know coral is an animal. Over a third of the people think coral reefs in Sanya are in better condition now than they

were previously while another third do not know about the status of the local reefs. Only 23% of the respondents know the real situation: the condition of coral reefs is much worse than 10 years ago. More than 40% of the respondents do not oppose the sacrifice of coral reef conservation for economic growth. Eleven percent of the respondents have bought coral reef pieces before and another 7% is going to buy them in the future. Seventy percent of those surveyed do not think the reserve is severely threatened. And almost 80% think it's necessary to have information campaigns about the reserve (Lian et al., 2010).

This survey shows a willingness of locals to learn about coral reefs, but a lack of access to the relevant information.

Another important issue is the livelihood of the local community. Yuqin Bian, Director of Blue Ribbon Ocean Conservation Society, told me when they were interviewing residents of Sanya in 2012, some former fishermen claimed their dissatisfaction. They said the coral reef conservation policy restricted their fishing activities resulting in decreases in their catch. Unable to continue fishing, they chose to join the tourism industry where they got underpaid and felt that it was difficult to support their families.

However, Sanya is one of the most expensive and popular vacation destinations in the nation. Income from tourism was over \$3 billion in 2012 in Sanya (<http://www.askci.com>). The reasons local workers are underpaid in the profitable tourism industry are complex. One reason might be that most hotels and travel agencies are owned and controlled by large companies outside Sanya

(<http://www.askci.com>). The large companies are important stakeholders and should be involved in the information campaign, too. According to the survey made by Lian et al., over half of the respondents had been diving in Sanya, and another quarter want to dive in Sanya (Lian et al., 2010). They dive for coral reefs. Companies in the tourism industry should know that if the local community does not receive compensation for coral reef conservation, there is an incentive for them to go back to their conventional livelihood and damage coral reefs. That in turn will harm the tourism industry.

## **2.1.2 Examples of successful information campaign**

### **2.1.2.1 Campaign for Sustainable Fisheries Management at Andavacoata Coast, Madagascar**

The Andavadoaka Coast runs along the southwestern coast of Madagascar and consists of over forty kilometers of coastline, which includes well-developed fringe reefs, barrier reefs and patch reefs. As a part of the third largest continuous coral reef system in the world, the Andavadoaka waters are teeming with marine life. More than 350 tropical fish species and more than 160 coral species have been found off the Andavadoaka Coast. And many more species remain undocumented; it is of critical importance to protect this rich marine environment. (<http://www.rareplanet.org>)

Campaign for Sustainable Fisheries Management at Andavacoata Coast, Madagascar is under the Pride Campaign Program of Rare Conservation. The Campaign manager, Gildas Andriamalala, is working with local fishers and

communities to eliminate the destructive practice of fish poisoning and the use of illegal nets that are threatening the health of the reef as well as the local fish population. In a region where over 50% of the population is under the age of 18, protecting these reefs and the fish species that depend on them for food and protection is critical to ensuring the livelihoods and food security of these youth in the years to come. (<http://www.rareplanet.org>)

Gildas has produced banners and radio ads that promote his conservation message across many villages. But to capture the attention and imaginations of fishers, youth and community leaders in the many small coastal fishing villages that rely on these waters for their livelihoods, he has taken the message to them by sea. The Campaign decorated and outfitted a sailboat that travels up and down this coastal region explaining the threats facing the local fish population and what fishers and communities can do about it. Working directly with fishers and other stakeholders, he aims to raise consciousness about the threats posed to their livelihoods and culture by these practices.

The Campaign has made progress. Within 20 months after the campaign started, by October 2010, leaders who believe they are the ones responsible for conservation enforcement increased from 88% to 100%; pirogue (traditional fishing boat) owners who feel they are responsible for conservation enforcement from 54% to 80%; pirogue owners who have warned any lawbreakers with respect to poison or seine fishing from 11% to 71%; pirogue owners who say they have helped in conservation enforcement from 7% to 51%; leaders who say they have helped with conservation enforcement from 11% to 62%; reported cases of poison

fishing fined from 0 to 25 cases. Fishermen who beach seine decreased from 100% to 50%; average number of nets/day used for beach seining during spring tide from 17 to 8.5; average number of cases of poison fishing/day during spring tide from 4 to 2. (<http://www.rareplanet.org>)

This example shows that with proper knowledge on the importance of a healthy ecosystem, local communities are willing to change their behaviors and engage in environmental conservation.

### **2.1.2.2 Viral Marketing**

Viral marketing, which targets a broad audience, can be used in environmental conservation information campaigns, as well. Viral marketing refers to marketing techniques that use pre-existing social networks and other technologies to increase brand awareness or to achieve other marketing objectives (Howard, 2005), in this case behavioral changes related to environmental conservation, through self-replicating viral processes, analogous to the spread of biological viruses or computer viruses. The message can be delivered by word of mouth or enhanced by the network effects of the Internet and mobile networks. Viral marketing may take the form of video clips, interactive activities or web pages. The most commonly utilized transmission vehicles for viral messages include: pass-along based, incentive based, trendy based, and undercover based. However, the creative nature of viral marketing enables an "endless amount of potential forms and vehicles the messages can utilize for transmission", including mobile devices (Howard, 2005).

A viral marketing campaign needs to meet certain requirements in order to achieve success. The information must be appealing to most of the audience and must be worth sharing with friends and family. A large platform, e.g. YouTube or Facebook must be used. An initial boost to gain attention is used, e.g. seeding, buying views, or sharing to Facebook fans. The content must be of good quality (Howard, 2005).

Perrier, the sparkling water company, had launched a viral campaign in 2011 on YouTube and appeared to be very successful. The campaign centered on a nightclub scene video. It is a simple and innocent video of a girl with her Perrier bottle walking towards a nightclub. To the right of the video is a thermometer that gauges how “hot” the video is based on views. The more the video is shared and viewed, the hotter it gets. At various levels of “hotness”, a new scene would be unlocked to reward viewers. The campaign had been active for a month before all of the scenes had been unlocked. When watched in its entirety, the video is basically a sexed-up club scene video with quite explicit product placement. YouTube indicates that it Perrier has gathered more than 12 million views. The campaign used two popular tools in viral marketing: group deals and unlocking rewards (<http://www.clickz.com/clickz/news/2078479/perrier-launches-effervescent-youtube-campaign>).

In viral marketing, what is important is to deliver value and what is more important is to deliver it with fun.

## **2.2 Information Content**

### 2.2.1 Flagship Species

For relaying important conservation messages to local communities and the general public, finding a flagship species that is important. For example, the polar bear has been used in the global climate change campaign to convey the impacts of warming on wildlife species. The polar bear may not be the most important or endangered species to the Arctic ecosystem, but it has the ability to get people's attention and sympathy, and therefore get the public's willingness to save the species by saving its habitat.

According to Maan Barua et al. (2010) in their *Defining Flagships Uses is Critical for Flagship Selection*, selection of new flagships should focus on species' cultural functional characters that enable them to carry out social roles or processes, much as biological functional characters contribute to ecological processes (Mason et al. 2005). The first step in flagship selection should be to identify needed uses of flagships. Ideally, a flagship should facilitate multiple conservation actions interlinked in practice. For instance, the polar bear could illustrate the global range and multiple impacts of climate change visually or verbally, providing a local connection or novel example and implicitly reminding people why they care. For coral reef ecosystems in China, the potential flagships could be the Dugong (*Dugong dugon*) or Chinese white dolphin (*Sousa chinensis*), which would lose at least part of their homes if the coral reefs vanish.

The second step is to match audiences to species. Anthropological data should be obtained on the attitudes of identified local or issue-related audiences



towards potential flagships, as existing attitudes can catalyze actions and enable conservation goals. Research on consumer investment in brands, images, and messages (Hollenbeck et al. 2008), and the manner in which they influence and amplify social values (Penazola, 1999), could also help match species to audiences. If a novel interaction between audience and flagship is desired, investment return on marketing must be considered. Polling here can be done through various ways on both social networks and surveys in local communities.

Thirdly, there have to be stories to tell. Narrative is one way to make climate change understandable and less overwhelming (McKnight, 2010). In climate change information campaign, books, oral stories, films, and cartoons of flagships convey dynamic aspects of climate change threats and what people can do about them. Further, the emotional responses key to developing non-human charisma are often based not on static images or abstract ideas, but on experiences of behavior and interaction (Adrian 2005 and Servais 2005). The flagships will not dynamically “illustrate” the technical issues they represent; they tell but do not show. Narratives can bring to life how coral reef degradation alters the flagships’ behaviors and life histories.

Finally, monitoring the impacts of a flagship after its promotion is vital (Bride et al. 2008). Effectiveness can be appraised in terms of revenue generated through ecotourism, changes in levels of awareness and attitudes toward the species or issue, or willingness to take conservation actions. Heuristic frameworks that examine which exposures to a flagship species lead to the formation of conservation

intentions (Smith and Sutton, 2008; Barua et al. 2010) could be deployed to evaluate and improve a flagship's performance.

## **2.2.2 Endangered and Unique Species**

Thorough research on endangered and unique species in coral reef areas in southern China is lacking. On Chinese Biodiversity Information System (<http://cbis.brim.ac.cn/>), the page can't open correctly on endangered species. Known endangered and unique coral species include *Ptychodera flava*, *Glossobalanus morteensi*, *Pinctada maxima* and *Haliotis ovina* (Zhou et al., 2002).

More research is needed to identify both endangered and unique coral species and other species inhabiting the coral reef areas in southeast coast of China.

## **3. How CCCC Will Do It -- Approaches**

### **3.1 Local community - Pride Campaign**

#### **3.1.1 Procedure**

Rare is an NGO that aims to conserve imperiled species and ecosystems around the world and inspires people to care about and protect nature. There is a pride campaign procedure that Rare is using in the projects they are sponsoring (<http://www.rareconservation.org>), which can be applied by CCCC.

- Knowledge: identify what knowledge is needed to increase awareness of the issue and shift the attitudes towards coral reef conservation. In this case, the knowledge is that the coral reefs are under great threat due to destructive fishing activities and non-ecofriendly tourism development. And if the reefs are

gone, the livelihood of the locals will be affected as a result of the decreasing fish population.

- Attitude: find out local communities' attitudes towards coral reef conservation efforts. According to the survey made by research group of *Coral Reefs and Their Biodiversity in Sanya*, the local communities are worried about their livelihoods, but at the same time, they are also willing to learn more about the coral reefs and why they are important.
- Interpersonal communication: after understanding the attitudes, find leaders and other influential people in the local communities, and communicate with them. Get to know the difficulties in existing coral reef conservation efforts and convince them the importance of coral reef ecosystems. Host lectures and workshops in the communities.
- Barrier removal: Once the difficulties in conservation efforts have been identified, try to solve them individually. For instance, reinforce monitoring and enforcement, form unions for local tourism workers and add knowledge of coral reef conservation to elementary education.
- Threat reduction: Reduce activities damaging the coral reefs, including overfishing, destructive fishing, direct taking of coral reefs, etc.
- Conservation result: examine the recovery rate of reefs or reduced rate on damaging coral reefs.

### **3.1.2 Information Carriers**

Make posters with the designed symbol of the flag species and pretty coral reef photos and post them in local restaurants, hotels, hostels, diving shops, travel

agencies and if possible, schools. Make videos to play on local buses, taxis and if possible, local cable channels. Make stickers and t-shirts of the flag species and distribute them at beaches and other famous tourism attractions. Make campaign slogans.

Collaborate with local dive shops and travel agencies to raise awareness of coral conservation among the tourists and minimize the impact on coral reefs brought by improper diving activities.

Collaborate with Blue Ribbon Ocean Conservation Society to organize lectures, seminars and workshops on coral reef conservation at local schools, libraries and cafes.

### **3.2 General public in China -- Viral marketing**

Spread our photos, posters, slogans, videos and symbols of flagship species on social media popular in China: Renren (Chinese version of Facebook), Weibo (Chinese version of Twitter) and Youku (Chinese version of Youtube) by having influential celebrity advertising and the use of seeding companies. When making posters and videos, follow the rules of viral marketing and make them interesting and worth sharing.

The second viral marketing aspect would be to promote diving in China. We could work with travel agencies, dive shops and clubs to build a platform online for divers and diving fans to communicate. Currently, diving is not a popular activity in China and most divers dive in other parts of Southeast Asia. By promoting diving in

China, more people can see the real coral reefs themselves in China and have the motivation to save them.

### **3.3 Conservation science community in English-speaking countries**

#### **3.3.1 Translation of Research Papers**

Most of the research on coral reefs in China has been conducted by researchers in the South China Sea Institution of Oceanology, Chinese Academy of Sciences and the results have been published in Chinese science journals and newspapers in Chinese. There's a language barrier between Chinese researchers and the international coral conservation community, especially English speaking countries Australia and the US, which contain 2/3 of the coral reef conservation areas of the world (Wilkinson, 2004).

CCCC aims to provide a path to reach the international coral reef conservation community by translating Chinese research papers on coral reefs in the South China Sea into English and help the researchers submit future articles to international science journals in English.

More attention from outside the nation may create a pressure to the Chinese government to do a better job on coral reef conservation.

#### **3.3.2 Conferences and Workshops**

Another approach to garner the attention from the international coral reef conservation community is to hold coral conservation conferences and workshops in China, with translators. However, this may happen in a later stage when CCCC has gained a certain level of scale and prestige.

#### 4. Our Team

**Bowen Cao** -- Co-founder/President

Master of Advanced Studies, Marine Biodiversity and Conservation  
Scripps Institution of Oceanography, University of California, San Diego  
[caobowen@163.com](mailto:caobowen@163.com)

**Bibo Lan** – Co-founder/Vice President

Bachelor of Arts, Philosophy  
University of California, San Diego  
[bibo0607@me.com](mailto:bibo0607@me.com)

**Ting Sun** – Technician

Bachelor of Arts, Sociology  
Zhejiang University  
Journalist of Southern Metropolis Daily, China  
[saisun@163.com](mailto:saisun@163.com)

**Xiaotong Zhao** – Administration

Bachelor of Arts, Business Administration  
University of Southern California  
[joyce900130@gmail.com](mailto:joyce900130@gmail.com)

**Junyi Xiao** – Finance

Master of Science, Operations Research  
Columbia University  
[jx2194@columbia.edu](mailto:jx2194@columbia.edu)

**Nianou Wang** – Design

Master of Engineering, Industrial Design  
Zhejiang University  
[desperado831@gmail.com](mailto:desperado831@gmail.com)

**Yihan Liu** – Public Relations  
Master of Arts, Public Policy  
Michigan State University  
[yihanliu1022@gmail.com](mailto:yihanliu1022@gmail.com)

## References:

Adrian, P (2005). Loving Leviathan: The discourse of whale watching in Australian ecotourism. In *Animals in Person: Cultural Perspectives on Human-Animal Intimacies*, ed. J. Knight. Oxford: BERG.

Barua M, Root-Bernstein M, Ladle R and Jepson P, Defining Flagship Uses is Critical for Flagship Selection: A Critique of the IUCN Climate Change Flagship Fleet (2010), *AMBIO* (2011) 40:431–435 DOI 10.1007/s13280-010-0116-2.

Bride, I, Griffiths R, Melendez-Herrada A, and McKay J (2008). Flying an amphibian flagship: conservation of the Axolotl *Ambystoma mexicanum* through nature tourism at Lake Xochimilco, Mexico. *International Zoo Yearbook* 42: 116–124.

Burke L, Selig E, Spalding M. *Reefs at Risk in Southeast Asia* (2002). Washington DC: World Resources Institute, 2002: 1-21.

Burke L, Reytar K, Spalding M, and Perry A, (2011), *Reefs at Risk Revisited*, World Resources Institute, 2011:2-21.

Cesar H. *Economic analysis of Indonesian coral reefs* (1996). Washington DC: World Bank, 1996: 1-50.

Cesar H, Burke L, Pet-Soede L (2003), *The Economics of Worldwide Coral Reef Degradation*, Cesar Environmental Economics Consulting, February 2003.

Hollenbeck C, Peters C and Zinkhan G (2008). Retail spectacles and brand meaning: Insights from a brand museum case study. *Journal of Retailing* 84(3): 334–353  
Howard T (2005-06-23). "USAToday: Viral advertising spreads through marketing plans". *USA Today*. Retrieved 2013-05-10. June 23, 2005, 2005

Huang H, Lian J, Wang H, Chen Y (2007), *Coral Reefs and Their Biodiversity in Xuwen*, Ocean Press, 2007 Jul.



Hughes T, Huang H, Young M (2012), The wicked problem of China's disappearing coral reefs. *Conservation Biology*. 2013 Apr;27(2):261-9. doi: 10.1111/j.1523-1739.2012.01957.x. Epub 2012 Nov 9.

Lan Z and Chen G (2006), Destruction and conservation countermeasures of coral reef in South China Sea, *Ecology and Environment*, 2006, 15(2): 430-434

Lian J, Huang H, Huang L, Wang D (2010), *Coral Reefs and Their Biodiversity in Sanya*, Ocean Press, 2010 Aug.

Mason N, Mouillot D, Lee W and Wilson J (2005). Functional richness, functional evenness and functional divergence: Primary components of functional diversity. *Oikos* 111(1): 112–118.

McKnight D (2010). Overcoming ‘ ‘ecophobia’’: Fostering environmental empathy through narrative in children’s science literature. *Frontiers in Ecology and Environment* 8(6):e10–e15

Penazola L (1999). Just doing it: A visual ethnographic study of spectacular consumption behavior at Nike Town. *Consumption Markets and Culture* 2(4): 337–465.

Peoples Republic of China State Council Order No. 250 (1998). *Regulations for Registration and Management of Social Organizations*.

Qiu W (2013), *The Sanya Coral Reef National Marine Nature Reserve, China: A governance analysis*, *Marine Policy*, Vol.41, p50-60, 2013 Sep

Servais V (2005). Enchanting dolphins: An analysis of human-dolphin encounters. In *Animals in person: Cultural perspectives on human-animal intimacies*, ed. J. Knight. Oxford: BERG.

Smith A and Sutton S (2008). The role of a flagship species in the formation of conservation intentions. *Human Dimensions of Wildlife* 13: 127–140.

Spalding M and Grenfell A (1997), New Estimates of Global and Regional Coral Reef Areas. *Coral Reefs* 16 (4): 225. doi:10.1007/s003380050078

Talaue-Mcmanus L. *Transboundary Diagnostic Analysis for the South China Sea* (2000). Bangkok: UNEP Press, 2000: 21-72.

UNEP. Coral Reef in the South China Sea (2004). Bangkok: UNEP Press, 2004: 1-18.

Wang L and Zhao H. The general characteristics of the coral reef ecosystem (2001). Chinese Journal of Ecology, 2001, 20(6): 41-45.

Wilkinson C, (2004), Status of Coral Reefs of the World: 2004. Australian Institute of Marine Science. Australia. 2004, 557.

Zhao M, Yu K, Zhang Q, Shi Q, and Price G (2012), Long-term Decline of a Fringing Coral Reef in the Northern South China Sea. Journal of Coastal Research: Volume 28, Issue 5: pp. 1088 – 1099.

Zhou Q, Chen B and Yang S (2002), The Biodiversity of Four Typical Zones in the South-east Ocean of China. [http://www.brim.ac.cn/book/book236\\_666.pdf](http://www.brim.ac.cn/book/book236_666.pdf).