

4-5 Tourism

1 Introduction

Tourism is a major industry in Okinawa. According to income statistics for Okinawa residents, the largest proportion of income from outside the prefecture is the local grant tax at 52.7%, with tourism income coming in second at 17.1%. Third and fourth are military income (7.8%) and petrochemical production (6.0%; Okinawa Prefecture Tourism Division 2000). Tourism is clearly very important for the regional economy of Okinawa, and coral reefs are one of the region's most important tourism resources. However, tourism-related activities are causing major disturbances to the coral reefs. Recently, certain procedures aimed at limiting the damaging impact of tourism on coral reefs have been implemented. For example, dive shops and fishermen in Zamami Village have restricted their activities on certain damaged reefs (Taniguchi 2003), and some tourist agents, such as the Iriomote Eco-tourism Association (established in 1996), follow self-imposed restrictions on activities. However, many users and stakeholders do not participate in conservation efforts, and there is no enforcement. It must be said, therefore, that sustainable coral reef tourism is still in its developing stages in Japan.

In terms of the number of participants, the 'Yabiji Landing Tour' in the Miyako Islands is probably the largest coral reef tour activity in Japan. We present this tour as a case study for the actual state of sustainable-use tourism in Japanese coral reef environments.

2 Outline of Yabiji Reef and the Landing Tour

The Miyako Islands are located in the middle of the Ryukyu chain. Yabiji Reef consists of ~100 table and platform reefs, within an area of ~10 km × 6.5 km north-south and east-west, respectively (Fig. 1). The area has been utilized by fishermen since at least 1350 AD (there are quite few written records of old Miyako culture),

Kenji Kajiwara, Hisashi Matsumoto

despite the fact that it is ~6 km off the northern coast of Ikema Island. Historically, more than 140 named reefs and features have been recognized. This indicates that fishermen viewed Yabiji Reef as a diversified environment, not as a homogeneous fishing area. The main, traditional methods employed were line fishing, shellfish gathering, and dive-in fishing. Today, other activities such as game fishing, leisure diving, and boat tourism also take place in the area. By far the largest scale event is the landing tour, which is co-sponsored by the local tourism association. Two shipment services run the necessary

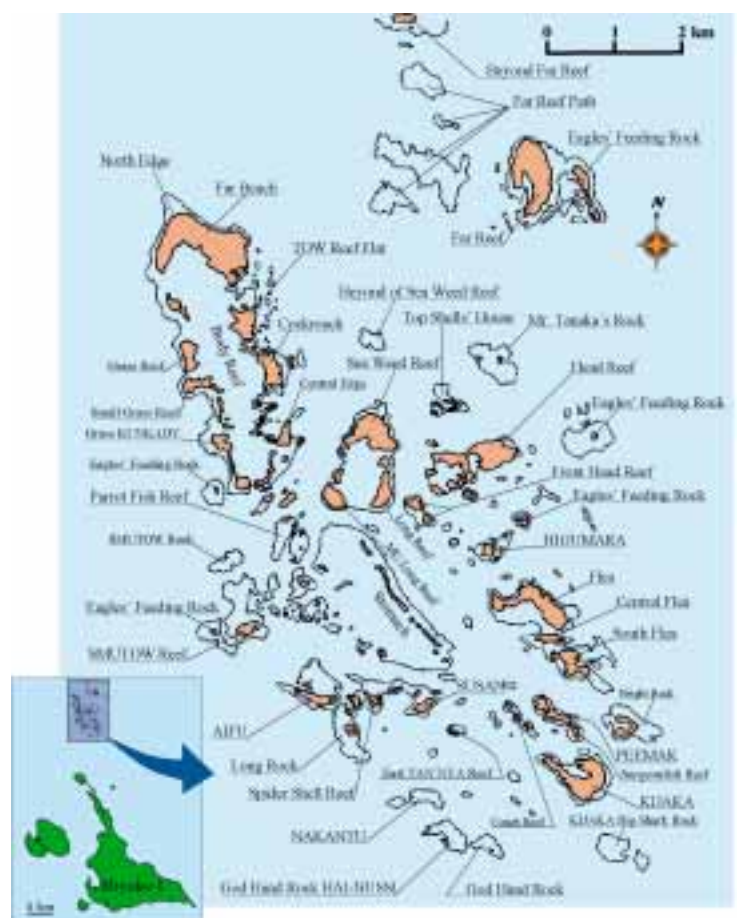


Fig. 1. Map of Yabiji Reef. The reef names are translated literally from old dialect. Words written in capital letters are those whose original meaning is unclear.



Photo. 1. The landing tour at Yabiji Reef.

Tours are arranged individually by two ferry services. ~150-500 people per ferry land on the reef during the lowest spring tides in April. This event is conducted once a year for two/three days.

ferry boat services for 2,000-3,000 tourists, who land on Yabiji Reef during the lowest parts of the spring tide for about three days in April (Photo. 1). The landing tour was first performed in 1983 and has grown to be one of the main tourism events of the Miyako Islands, as other tourism resources such as subtropical forests or rivers are lacking. However, there is concern about possible disturbance to the coral reef ecosystem through physical damage (trampling of live corals) and a lack of constraints or rules governing marine organism collection.

Legal requirements for reef preservation during the landing tour are inadequate. Although Yabiji Reef is neither a marine park zone nor a marine protected area, the Nature Conservation Bureau, Ministry of the Environment (2002a) has designated the area as one of the 500 Important Wetlands in Japan, in recognition of the abundance of corals on the reef. Regrettably, this does not imply any legal restriction with respect to use or conservation. In effect, the Fishery Regulations of Okinawa Prefecture constitute the only controls on tourist activity during the landing tour. These regulations forbid the taking of reef-building corals; in addition, the need for the preservation of important fishery resources is also explicitly stated. There is, however, no statement referring to the destruction of corals and, in any case, what rules there are, are only rarely observed in practice. Local fisheries cooperatives charge landing tour participants a fee (the reason for this fee is not clear), and the limitations, if any, to collecting are not apparent. In addition, it is difficult to explain the regulations to the large numbers of tour participants (~500 people per ferry), or to enforce them, once they are

walking around freely on a huge reef site.

Since 1998, the city of Hirara has investigated these issues in a conservation study of the landing tour. The project aims to promote sustainable tourism through conservation of reef ecosystems and fishery resources. The necessary steps are: 1) to clarify the current status of reefs in the area and at the actual tour location; 2) to evaluate the negative impacts of the landing tour; and 3) based on these results, to make proposals for changes to the landing tour procedure. Legal regulation is not possible, because one of the shipment services has its base outside Hirara and, under Japanese law, the city has no authority to control activities on the sea. In any case the distance between Yabiji Reef and land means that practical monitoring would be difficult. The project's findings and progress are described below.

3 Reef status

Prior to this study, there were few reports on the status of the Yabiji coral reefs. Anticipated negative impacts of the landing tour on the reefs were: 1) trampling of live corals and collection of reef organisms on the reef flats; 2) coral destruction on the reef edge by ferry landing gear; and 3) coral destruction on the reef slope caused by ferry anchors. The largest negative impact of these was expected to be that of the tourists themselves as they walked on, and collected from, the reef flats. Coral distribution on the reef flat and reef edge areas was surveyed from 1998-2000.

Line transects (200 m; 400 m at one point) running from reef flat to reef edge were surveyed at 27 stations on Yabiji Reef. Observations of coral fauna and status were carried out carefully, but it was assumed that damage caused by people or ferries could be easily identified. In addition, research into coral growth rates was carried out using four experimental stations on the reef. At each station, 4-m² quadrats were established at 1 m depth (reef edge) and at 3 m depth (reef slope). The reef slope at one station was not 3 m deep, so the total number of quadrats was seven. Coral growth rates were estimated from the changes in coral coverage within quadrats. Quadrats at 1 m depth were exposed to air during the lowest spring tides, and were potentially landed on or trodden on during the landing tours. At 3 m depth, however, exposure never occurred, and since water temperatures were more stable and light exposure sufficient, it was assumed that this would be a more suitable environment for coral

growth. The results of these surveys are outlined below.

- (1) One hundred and seventy-four species of hermatypic corals (of 37 genera and 13 families) were observed at reef flat and reef edge habitats on Yabiji Reef. Branching *Acropora* dominated coverage at most stations, although the majority of colonies were small, with large colonies occurring only rarely.
- (2) Coral coverage and community composition differed greatly between stations, but in general, coral coverage was high on reef edges and decreased towards the inner reef flat, where carbonate and/or rubble habitats were found instead.
- (3) Obvious human-induced disturbance to coral colonies (e.g., due to trampling during the landing tour) were not observed.
- (4) Coral coverage was less than 20% at the most of the stations where tourists could easily land.
- (5) The coral communities of Yabiji Reef could be divided into five areas: north, south, east, west, and central (see '6-1-6 Miyako Archipelago' for details).
- (6) In shallow reef flat areas, the growth and death rates of corals were approximately equivalent, even where it was considered to be free from human disturbance (Fig. 2).

4 Investigation of the actual landing site

On-site visits during the landing tours, each year from 1998, and surveys targeting the tourists, were undertaken over the period 1999-2002. The results are outlined below.

- (1) Most of the tourists were on a package tour conducted by a tour agency. Most were in their 50s or 60s (73.6%), and 72.4% were women (1999 questionnaire survey: 163 responses out of ca. 1,500 landing tour participants).
- (2) Very few of the tourists knew anything about corals or coral reef ecosystems. In many cases, they could not distinguish live corals from dead ones, or from carbonates. This was also the case for local residents (according to interviews during on-site visits).
- (3) Only 8.6% of tourists wished to collect shellfish, corals or other organisms. 86.1% wanted to see the natural landscape and to learn about coral reef ecosystems (1999 questionnaire survey).
- (4) Many tourists had a strong interest in coral reef conservation or protection, and some expressed reserva-

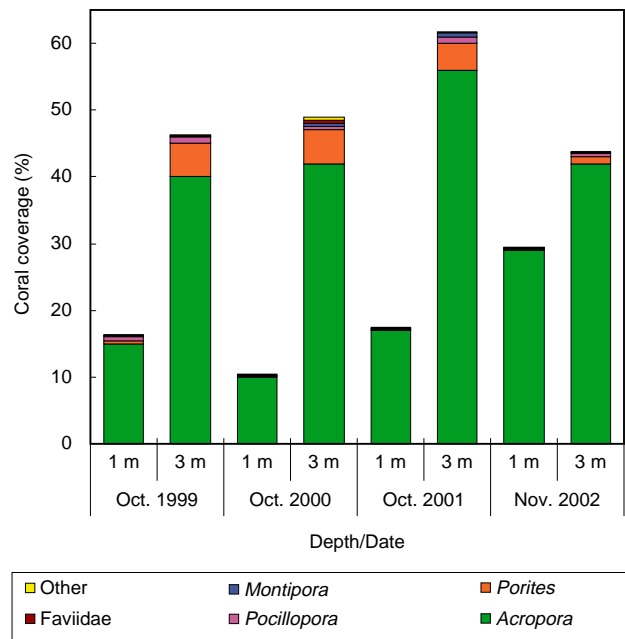


Fig. 2. Coral coverage monitoring at Kanamara ('Head Reef') on Yabiji Reef. 4-m² quadrats were set at reef edge (1 m depth) and at reef slope (3 m depth).

tions in this regard about the landing tour in which they were participating.

- (5) The economic contribution of the landing tour to the Miyako region was estimated to be 89,000 yen per tourist (1999 questionnaire survey). This constitutes a considerable amount.

5 Trial introduction of coral reef guides

Following the research results, it was considered desirable to reduce the anthropogenic disturbances to the reef flat as much as possible because, under natural conditions, rates of coral growth and death were almost balanced. Coral distribution on Yabiji Reef was found to be not uniform, and there were many places with low coverage (below 20%). By positioning landing points away from healthy high coverage areas, and educating tourists to avoid live corals, excessive trampling and damage to reef flat areas might be avoided.

Many tourists visiting Yabiji Reef were expecting to see a natural landscape and to learn about coral reef ecosystems. However, most people lacked any preliminary knowledge about corals or reefs, and no guides were available to instruct them. It seemed that people often

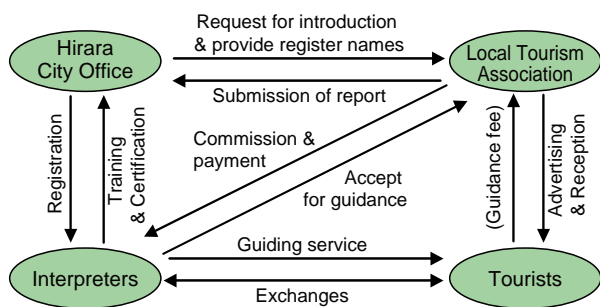


Fig. 3. Diagram of relationship of parties involved in a reef guiding system during the landing tour on Yabiji Reef. The service fee was not charged in the test introduction.



Photo. 2. A reef guide explains certain reef organisms to the tourists during the landing tour at Yabiji Reef. Many citizens who were interested in reef conservation and sustainable use participated in the reef guide system.

Table 1. Lecture subjects of the volunteer reef guide training program for the Yabiji Reef landing tour, held January-March 2003. Each class was two hours long, and they ran every weekend; the classes covered coral reef-related subjects such as natural science, folk culture, fishery, tourism and history. The subject material was designed to be understood by ordinary people, without basic knowledge of these topics.

Class	Content
Explanatory meeting	Explanation of the project's policy of Hirara City
Indoor lecture 1	Biology of corals and of ecosystem of coral reefs
Indoor lecture 2	Geologic and anthropic history of Yabiji Reef
Indoor lecture 3	Coral reef associated ecosystems (including mangroves forests, sea grass beds, and tidal flats)
Indoor lecture 4	Marine organisms in shallow coral reef areas
Indoor lecture 5	Coral reef and regional human activities - local folk history and fishery regulations in Yabiji Reef
Indoor lecture 6	Case examples of conservation measures in Yabiji Reef and future perspectives
Fieldwork trainings 1-4	1) Identification of major organisms and their habitat and ecology in intertidal zone 2) Contrast of the large scale reef and micro-scale reef organisms 3) Demonstrative guiding practice
Evaluation meeting	Evaluation, presentation and opinion exchanges of the guidance

stepped on corals unknowingly, or only noticed after breaking the colonies, as the majority of the tourists here could not distinguish live corals from dead corals, or from carbonates. In response to this, the city of Hirara, with the cooperation of citizens and the local tourism association, carried out a trial introduction of a 'Coral Reef Guide System' in 2001-2003 (Fig. 3). Reef guides would provide information about the reef and reef organisms to tourists, and would try to shift attention toward issues of reef conservation. It was expected that the reef guides would be effective in producing a more sustainable form of tourism for Yabiji Reef. Citizens of Hirara responded to advertisements for volunteers to be trained as reef guides. The training program was limited to the fundamentals of conservation philosophy, reef ecosystems, traditional knowledge, fishery regulations, and associated aspects (Table 1). Trained participants started working as reef guides on the next landing tour. Within three years, seventy-three people had finished the lecture course and performed interpretation activities during the landing tour (223

guides have participated in a total of 11 days' landings; Photo. 2). Although quantitative evaluation has not been undertaken, the guide system is thought to be effective with respect to reef conservation. The scheme has also been good for tourism promotion, since it improves tour quality and has a positive effect on tourists. When the reef guide explains to the tourists about corals and associated marine organisms, they become aware of their potential impact and try to avoid stepping on corals. The reef guides also appeal to them to refrain from collecting reef organisms. Most of the tourists understand the conservation intention and respond favorably. Guiding activities also work as a line of communication between local residents and tourists, something that is appreciated by many tourists. This trial introduction shows that the presence of guides can contribute to conservation of the reef, and that higher quality tours are possible with the full-scale implementation of a guiding system. Increasing general consciousness about the need for conservation, together with the fact that most tourists want to experience an

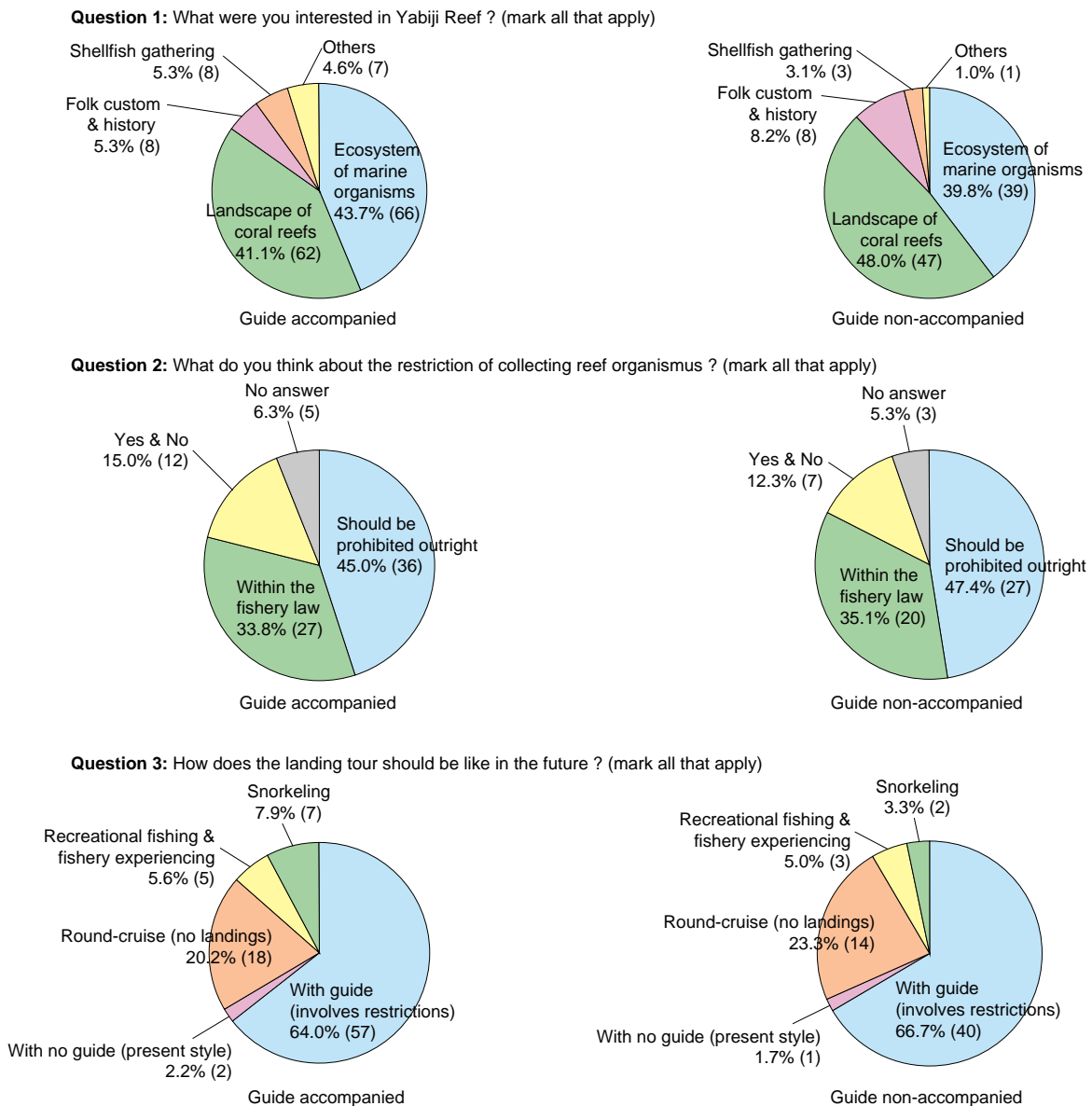


Fig. 4. Results of a guide/no guide questionnaire regarding the landing tour on Yabiji Reef (conducted in April 2002). Eighty tourists from the ferry with the guide responded, while 57 responded from the ferry without a guide.

undisturbed natural environment, bode well for tourism promotion/conservation schemes such as the reef guide system.

To support the validity of this initiative, reef guide test trials were undertaken. Reef guides accompanied one ferry out of two on a trial basis, and all the tourists completed a questionnaire after the landing.

The reef guides were expected to stimulate the tourists' awareness of coral reef conservation issues but, surprisingly, interest levels were little different for the accompanied and non-accompanied ferries (Fig. 4). It was appar-

ent that many tourists were already conscious that certain measures were necessary for the tour itself, and for reef conservation in general. These results suggest that tourists had a higher awareness than expected; therefore, from the tourists' point of view, conservation measures would appear to be both necessary and desirable.

6 Issues that emerged following the trial introduction

In attempting to establish sustainable tourism on coral reefs, alternatives to the present style of tourism (landing

tours) should be put forward so that more people will be able to participate in the conservation framework.

There is another good example of how much value a quality guide service can add to a tour. In 1999 a trial ecotourism tour called the Yabiji Reef Program was run. This day trip was accompanied by a skilled guide and involved half a day spent fishing and half a day spent snorkeling. Tour participants evaluated the trip as being worth 8,000–20,000 yen (15,000 yen was the most frequent answer; Transport Department, Okinawa General Bureau, Okinawa Development Agency 2000). Despite this possible economic incentive, guides have not been included in normal Yabiji Reef Program tours to date. This may be partly due to fact that the trial tour was not based on the usual tour. However, the formal introduction of reef guides to the landing tours should be straightforward, and would convey clear advantages to the tour operators. In addition to the other justifications mentioned above, reef guides receive valuable feedback information from tourists that would otherwise not be accessible to tour agents. Not only are reef guides effective in reef protection, they also improve tour quality.

However, shortfalls in the numbers of voluntary staff and in their training levels were recognized as being limiting factors for the system. Because the system depended on volunteers, whose scheduling with tour dates was not always possible, the guide:tourist ratio was only 1:10–1:20. Raising the volunteers' level of environmental knowledge within a limited lecture/training program was not an easy task, and some reef guides could not perform the required role. Moreover, it also became clear that the guiding system alone was not sufficient to promote reef conservation. The largest issues were:

- (1) There are insufficient legal grounds for marine organism preservation.
- (2) The main focus of the landing tour differs among the travel agencies; some tours are for gathering shellfish, while others are for observation of the reef landscape and ecosystems. This leads to big differences in awareness and intent among tourists.
- (3) From the tour fee of 8,000 yen per person (as of April 2003), 2,100 yen is charged by three fisheries cooperatives (each cooperative receives 700 yen). It is not clear whether this fee is compensation to the cooperatives for collection of reef organisms; the collection of this fee, therefore, undermines the guides' request that tourists not collect anything.

- (4) The present tour style cannot avoid the obvious destruction of corals on the reef edge by the landing gear of the ferries.

7 Building of consensus towards regulatory guidelines

As previously mentioned, city-level government agencies have almost no legal grounds for the authorization or enforcement of measures relating to reef conservation. Given this situation, the most effective management strategy would be to introduce reef use guidelines, based on stakeholder consensus.

The stakeholders include two shipment services, travel agencies, local tourism associations, three fisheries cooperatives, governmental agencies, and local residents who regard Yabiji Reef as their communal property. It seems that there are considerable gaps between the stakeholders, not only with respect to interest in, or awareness of, the need for reef conservation, but also with regard to the level of understanding and/or view of reef ecosystems and the regional economy.

An open symposium, aimed at building up common recognition of the issues associated with the landing tour, was held in July 2003. More than 100 people participated in the symposium. Over a four-hour period, the keynote report of the city of Hirara's investigations, a panel discussion, and a plenary open discussion were conducted (Photo. 3). Although this symposium did not reach a concrete conclusion or proposal, it was agreed that a subsequent public roundtable conference would be organized, with the objective of formulating guidelines for sustainable tourism on Yabiji Reef.

8 Perspectives

Of the many sticking points that occur in discussing reef conservation and the landing tour, the bottleneck, with respect to establishing a conservation framework, is most likely to be a lack of understanding of coral reef ecosystems. This ignorance applies to most of the tourists, tourist agents, local residents, and administrative officials. Since environmental conservation groups and economic promotion groups tend to lapse into confrontational modes of contact, emotional and unconsidered pro and con discussions, based on imprecise information and mis-



Photo. 3. Symposium on tourism use of Yabiji Reef.

The landing tour was recognized as a subject of importance to the local community, and not simply as an issue for the tourism industry.

apprehension, often occurred around 1998, when the city of Hirara started the Yabiji Reef Project. However, during the symposium there were almost no confrontational discussions. Instead constructive opinions were put forward as to how conservation and exploitation could coexist. The atmosphere of constructive debate was thought to be owing to practical recommendations stemming from the volunteer reef guides' hands-on experiences, and from the fact that the city of Hirara had been openly announcing the research results through publications and lectures. It must be said, however, that the landing tour was a relatively easy subject through which to generate discussion about coral reef conservation. Yabiji Reef has a symbolic existence for people in the Miyako Islands, thereby making it easy to attract people's interest, and the small time-window of the landing tour – two or three days, once a year – meant that there were no subsistence stakeholders to add pressure to the discussions. The Yabiji Reef landing tour is a topical issue in reef conservation. Establishment of a conservation framework here will serve as a good example and reference point for all other coral reef conservation issues in Japan.

Another beneficial aspect of the guiding scheme involved the social education of the volunteer citizens. It seems that ordinary local residents have a rapidly fading relationship with the ocean; many of them cannot distinguish live corals from dead ones. Appreciation of public properties such as coral reefs by the residents in these areas is essential if future generations are to inherit natural, culturally important environments.