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Situation Analysis of the Water Quality of Ha Long Bay, Quang Ninh Province, Vietnam

A social study from tourism businesses' perspectives



INTERNATIONAL UNION FOR CONSERVATION OF NATURE





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March, 2015

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Le Tuan Anh, PhD

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List of Acronyms

AMDI	Asian Management and Development Institute
DoCST	Department of Culture, Sport and Tourism
DoNRE	Department of Natural Resources and Environment
DoT	Department of Transportation
ESRT	Environmentally and Socially Responsible Tourism
HLB	Ha Long Bay
HLBMD	Ha Long Bay Management Department
HLCBA	Ha Long-Cat Ba Alliance
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
MoCST	Ministry of Culture, Sport and Tourism
PPP	Public Private Partnership
QNPPC	Quang Ninh Provincial People 's Committee
QNTA	Quang Ninh Tourism Association
TAB	Tourism Advisory Board
USAID	United States Agency for International Development
WHS	World Heritage Site

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Executive summary

This report presents the findings of a situation analysis on the water quality of Ha Long Bay (HLB) from the perspective of tourism businesses working in the area. It was conducted for the Ha Long-Cat Ba Alliance (HLCBA) in Vietnam; a three year (2014-2017) U.S. Agency for International Development (USAID) funded project, implemented in partnership by the International Union for Conservation of Nature (IUCN) and the Asian Management and Development Institute (AMDI), in cooperation with local NGOs and the Ha Long Bay Management Department (HLBMD). The project aims to build a partnership between government, business, and community leaders that will catalyse action to preserve and protect Ha Long Bay and the Cat Ba Archipelago.

The research and data collection for this analysis employed a mixed method of qualitative and quantitative studies. The qualitative study consists of desk review, meetings with project staff and stakeholders in Ha Noi, fieldwork of unstructured interviews with relevant stakeholders at provincial level and a pilot survey in July 2014. The results obtained from the qualitative study were used to improve the quality of the five-day questionnaire survey that commenced in December 2014 after the official endorsement of the project by Quang Ninh Provincial People's Committee (QNPPC).

The study surveyed 208 tourism informants consisting of: 49 accommodation managers, 16 restaurant owners, 29 boat/cruise owners and 114 captains with emphasis on: 1) perception on water quality, 2) the environmental impacts from tourism activities, and 3) the relationship between public and private sectors.

The following are key findings from the study:

- Over 50% of the respondents confirmed that water quality is better compared with 5 years ago whereas approximately 30% said it is worse. 18% of the total respondents thought the water quality is unchanged over the past 5 years.
- With regard to current water quality, the majority (63%) of respondents said that they have observed some pollution in the water recently whereas 30.8% said the current water quality in the bay is good.
- 'Residents on floating villages' (43%), 'coal mining' (38%), 'tourist activities on islands/caves' (35%), 'on-shore hotels and restaurants' (27%) and 'on-shore residents' (27%) were perceived as the primary sources of water pollution in HLB.
- The most frequently-observed evidence of water pollution is rubbish (63.5%) floating on the water followed by changes in water color (33.7%). Foul-smelling and oily water was observed by the survey team at harbors and along the Bai Chay coastal area.
- Although water/oil separators have been installed on the majority of cruise boats, the survey team's observations and communication with captains indicated that many of the machines are used only during inspections by the Department of Transportation.
- Current waste treatment capacity accommodates for only 40% of total waste produced in Ha Long city.
- In the absence of on-shore waste-water collection and treatment, liquid waste (bilge water, sewage, grey water) from the cruise boats is discharged directly into the bay.
- Survey results found that boat owners, hotel managers and restaurant owners have a good opinion of the relationship between enterprises and local authorities (public-private partnerships). Of the total respondents, 10% rated this relationship as excellent, 49% good and 38% neutral.

- The majority of tourism businesses expressed interest in engaging in the Ha Long-Cat Ba Alliance to improve the environment in the bay; with 77% of respondents stating they were somewhat likely to engage and 12% expressing a strong willingness.
- Within these three groups, boat owners are the most willing (93%), followed by restaurant owners (87%) and hotel managers (86%).
- Major factors hindering the participation of tourism enterprises in the Alliance include: concern about investment (expressed by 52% of the total respondents), resource constraints (44%) and time constraints (36%).

2. Introduction

I expected much more from Ha Long Bay. I was not aware that the litter was such an issue. Our cruise ship stopped to allow for swimming and kayaking but the water was so disgusting I did not feel it was sanitary to get in. The litter came in waves; we hit a particularly bad litter pile at the time of the swim. One person did get in the water and came out regretting it. We overheard most of the other passengers asking the crew how they were supposed to swim in that. It was cool seeing all of the islands and the views minus the litter were amazing. But how do you minus the litter? Kind of hard to take it out of an experience that you paid thousands of dollars to obtain. (TripAdvisor Review, March 2015).

The Ha Long Bay Natural World Heritage Site (WHS) is under threat from high levels of pollution. Industry and tourism growth in the area have led to water contamination and solid waste accumulation; causing not only damage to the ecosystem, but also affecting visitor experience in an area highly reliant upon tourism (as reflected in TripAdvisor comments). From 2005 to 2014, the number of international visitors in the bay more than doubled from 1.4 million to approximately 2.6 million (DoCST, 2014). Although concerns about tourism have been raised (IUCN 2014; JICA 2013; Vietnamplus 2012), there have been no detailed investigations into and classifications of the main contributors to wastewater: cruise operators, accommodation providers, and on-shore restaurants. Furthermore, a comprehensive analysis of different types of waste – solid waste and liquid waste – and their impacts on water quality in HLB is missing from current evidence.

The HLCBA, a 3-year USAID funded project (April 2014 to March 2017), aims to fill these gaps and strengthen cooperation between the government and tourism sector. Jointly managed and implemented by IUCN and MCD, in cooperation with local partners (AMDI, GreenID and other local NGOs), the Alliance aims to build a partnership between government, business and community leaders that will catalyse action to preserve and protect Ha Long Bay and the Cat Ba Archipelago.

By creating a forum for discussion and the creation of public and private participation, the Alliance will trigger the change in thinking that is necessary and build the political will to improve the situation in the area. This action is urgent, as the rapid deterioration of water quality will eventually lead to a decline in the number of visitors and hence a loss in revenue (Sustainable Cruise Operations in Ha Long Bay, 2014). This could not only threaten the development of HLB and Cat Ba Archipelago, but also harm Vietnam's international status in the long-term (IUCN 2014).

Focusing on water contamination in the bay, this situation analysis investigates the social, political and economic factors influencing environmental pollution in the area. The analysis will become an important reference in the ongoing design and implementation of the HLCBA project.

Implemented from 8 July 2014 to 31 January 2015, the situation analysis employed a combination of desk research, on-site visits and interviews (24 July-1 August, 2014) and questionnaire surveys (8-12 December, 2014). The main deliverables were (i) the examination of perceptions of the current status of water quality, (ii) the identification of key stakeholders and their management of water quality, (iii) the inspection of tourism businesses and its resulting impacts on water quality, and (iv) the exploration of the relationship between public and private sectors.

3. Ha Long Bay and Cat Ba Archipelago overview

Ha Long Bay is located in Quang Ninh province in Northeast Vietnam, 160 km east of Hanoi. With a total area of 1,553km², the bay contains 1,600 islands, 90% of which are monolithic limestone karsts. The WHS covers 434km² and is surrounded by a buffer zone. The site

includes 775 islands, 411 of which are name-accredited. HLB was first inscribed as a natural property on the World Heritage List in 1994 for its exceptional beauty (criterion vii). This was extended in 2000 to include recognition as an outstanding example of the earth's geology and geomorphology (criterion viii).

Although these outstanding values have been a research topic for numerous geologists (Tran, Tran, Waltham, Li & Lai, 2004), scientists are increasingly concerned about the reduction of land cover (Hens et al., 2000), pollution (Swennen, Ho & Van Damme, 2009) and protection of the natural environment (Duc & Guinea, 2014).

The Cat Ba Archipelago sits to the south-east of Ha Long Bay in the neighboring Hai Phong Province. Consisting of 366 limestone islands over 262 km², the area is known for its rugged limestone mountains, tropical forests, coral reefs and pristine beaches. A National Park situated on Cat Ba Island, the largest in the archipelago, supports high biodiversity and protects a wide variety of marine and terrestrial ecosystems. The park is home to 2,026 species of flora and fauna, many endemic and rare. The most significant being the globally important Golden headed langur (*Trachypithecus poliocephalus*), restricted in range to Cat Ba Island and found nowhere else in the world. The Hawksbill turtle (*Eretmochelys imbricata*) which is found in the Cat Ba region is listed in the IUCN Red Book. The seahorse (*Hippocampus* spp.) is also rare and threatened (UNESCO, 2004).

In 2004, Cat Ba Archipelago was officially recognized as a World Biosphere Reserve by UNESCO for its internationally important value of limestone karst geomorphology. The area is one of the best examples in the world of a sea-flooded fengcong (clusters of conical peaks) and fenglin (isolate tower features) karst landscape (UNESCO, 2004).

3.1 Relevant projects

The problem of pollution in HLB and Cat Ba is not a recent one. The following is a summary of **relevant projects** in the area.

- In 2004, the United Nations Volunteers supported a project to clean the bay. A variety of groups of youth volunteers contributed to educating the local population about environmental issues and provided assistance to locals on preservation techniques (United Nations, 2004). This small-scale project did not have a long-lasting impact.
- In 2008 the Quang Ninh Provincial People's Committee (QNPPC) approved a series of investment priority projects focusing on capacity building, education, scientific surveys and the restoration of coral reefs
- A QNPPC institutional strengthening project was carried out in 2009 by the country offices of UNESCO and the IUCN with the support of the World Heritage Fund.
- From 2011 – 2016 JICA the Japanese International cooperation agency (JICA) implemented the project *Biofuels in the HLB Area*. Focusing on biodiesel plants and their extraction, the project attempted to support tourism boats and improve the environmental impact of coal mining sites by introducing biofuel plants. A pilot study introduced biofuel engines in cruise boats but found prohibitive costs and limited efficiency.
- In 2013 JICA released results from a detailed study of water pollution in HLB. Quarterly samples taken from pollution hotspots found that tourism and population growth, local industry development and changes in land use are contributing to increasing wastewater pollution. The study attributed the increasing pollution to a lack of cooperation and coordination among key stakeholders, poorly-enforced tourism regulations, and deficient policies on environmental protection and clean water management (JICA 2013).

- In 2013, IUCN conducted an extensive situation analysis on a variety of factors negatively affecting the environment in HLB. The study found that although pollution from surrounding industry was declining, growth in population and tourism is contributing to increased pollution (IUCN 2014).
- The European Union (EU) recently funded a four year project (2011-2015) to build the capacity of tourism businesses and local administrators in adopting an environmentally sustainable and responsible tourism (ESRT) approach in HLB.

Although efforts have been made, recent projects have struggled to have a significant long-term impact or take a sustainable approach in improving the HLB environment. These projects are short-term oriented, most lasting only a few years, and therefore fail to bring long-term benefits to the area. In addition, they identify main contributors to pollution, but provide neither in-depth investigations nor quantitative analysis.

In attempt to tackle previous limitations, the establishment of the HLCBA adopts a sustainable long-term approach by creating an Alliance of stakeholders that will continue after the USAID sponsored project has ended. It is expected that the establishment and implementation this type of body will unite and motivate local stakeholders to put strategies in place for the continued protection of this area.

3.2 Tourism development

Tourism to HLB has boomed over the past 20 years, affecting (in addition to industrial development, population growth, aquaculture and fishing) the natural value of the site (IUCN, 2013; JICA, 2013). The area is a major national, regional and international tourist destination (65% of visitors are foreign) and core visitor activities include cave visits, sightseeing, swimming, hiking, kayaking and appreciation of nature and culture. The rapid increase in visitor numbers (Figure 1) and associated tourist activities have impacted negatively on the natural environment and visitor experience.

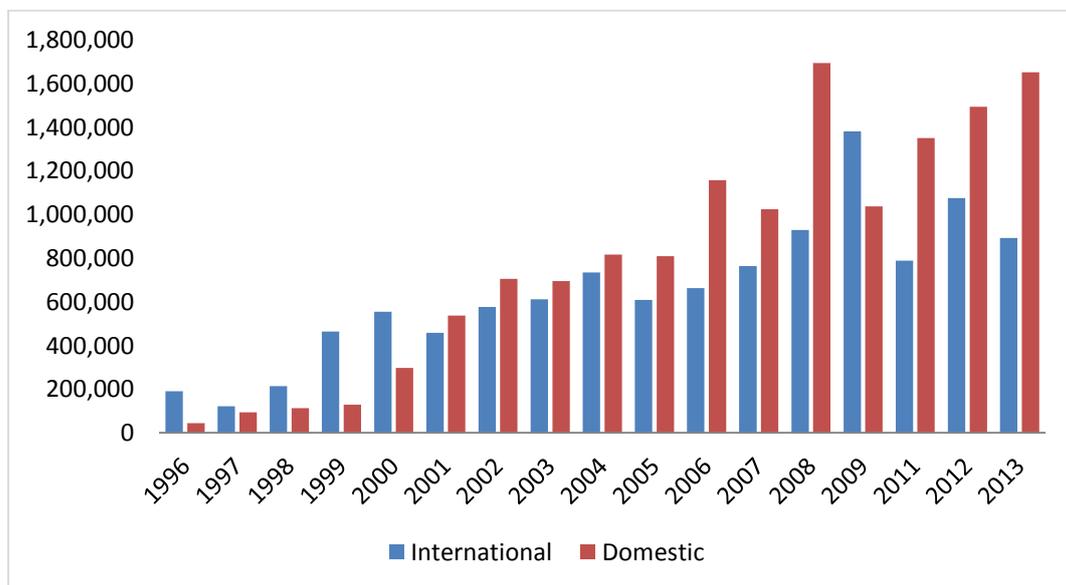


Figure 1. Number of Tourist Arrivals to Ha Long Bay (1996-2013)

Sources: HLBMD (2009, 2013, and 2014)

In 2009, the UNESCO Committee expressed its serious concern that the property remained under pressure from tourism development, and in 2011 it encouraged Vietnamese authorities to consider options for better management of visitors (IUCN, 2013).

The comprehensive Management Plan for Ha Long Bay 2010-2015 (written in 2010) acknowledged the following shortcomings: i) overcrowding at some sites; ii) excessive waste production from tour boats; iii) inadequate facilities and limited use of modern technology; iv) lack of properly trained tour guides; v) absence of specific regulations on new tourism developments such as mountain climbing, diving and cultural tourism; and vi) inadequate eco-tourism opportunities.

According to JICA's (2013) survey, inappropriate activities and poor tourist behavior is leading to increasing litter, destruction and graffiti in caves and the general degradation of biodiversity. Moreover, the study found that with the average visitation of up to 5,500 tourists per day to Thien Cung and Dau Go caves during the peak month of July 2008 (HLBMD, 2009) is causing an increase in CO₂ which is damaging the stalactites and stalagmites.

The number of cruise boats has increased 1.6 times from 329 (2006) to 527 (2013), of which overnight boats currently account for 30% (167 boats) (IUCN, 2013). On average, a tourist produces approximately 0.5 kg of solid waste (trash) and 100 liters of wastewater per trip. Per boat, 50-100kg of trash and food waste is produced daily (JICA, 2013). Many boats, however, do not have equipment for collection and treatment of liquid waste. Solid waste such as crab shell, rotten fruit, vegetables and even syringes are discarded directly into the sea. Oil pollution from boat engines contribute to the visible pollution of the water's surface.

The operation of boats stirs sediment on the sea bottom, making the water turbid and affecting marine species. This is particularly apparent in areas where boats anchor on coral reefs and sea grass beds.

The poor environmental state of HLB is not only observed by researchers, but also by one important stakeholder group that brings economic growth to the area – tourists. In a national survey of major tourist destinations conducted for ESRT (2014), the preliminary findings indicated that out of the five destinations (Sa Pa, Hue, Da Nang and Hoi An), HLB was rated lowest. When surveying visitors, the study found that 17% of international and 15% of national respondents expressed serious concern about the environmental quality. Moreover, in comparison to other destinations in Vietnam, tourists stay the shortest period of time (1.4 nights) and spend less money.

Visitors to HLB frequently comment negatively on the environment (via TripAdvisor and tourism company feedback) and there are concerns that poorly regulated tourism activities and polluted water is resulting in poor visitor experiences (Bui & Le, 2014).

The travel review website TripAdvisor was studied extensively in this situation analysis as the tourist reviews posted online are highly influential in the decisions potential visitors make when planning a holiday. A 2013 independent PhoCusWright study of Custom Survey Research Engagement found that 44% of travelers usually or always research TripAdvisor reviews before selecting an attraction and 53% of travelers will not commit to bookings until they read a review (PhoCusWright, 2013).

At time of analysis (16 July 2014), there were 2,373 reviews of HLB on TripAdvisor. A total of 51 users classified the attraction as 'terrible' (2.15%) while 80 classified their experience as poor (3.37%). Of the reviews which classified the bay as 'terrible' (including other reasons such as scams, food poisoning and poor service), 24 reviews (47%) were posted in the last year. Even though the percentage numbers are small, it was found that visitors who ranked their experience as 'very good' or 'excellent' often complained about water pollution (TripAdvisor, 2014).

While TripAdvisor reviews provide useful information, it should be noted that the majority of tourists submit online reviews only when they have had a strong reaction – whether that be positive or negative. The increasing comments regarding the environment, however, does indicate that tourists are becoming more aware of pollution issues and would like to see local government and tourist operators address the issue.

A 2013 Europe-based Tourist Satisfaction survey conducted by the European Union found that natural features are one of the major reasons why European travelers return to a destination (44%). The survey also concluded that 95% of tourists enjoy natural features (Flash Eurobarometer, 2013).

Although focused on European travelers, it is highly likely that similar results would be found in North America and Australia. Given the high number of western visitors to HLB, there is the likelihood that deteriorating water quality levels could lead to declining visitors in the area. If no measures are taken to improve water quality and environmental standards in the HLB region, tourists may choose other, less polluted, destinations in Vietnam.

3.3 Policies and regulations

In 2014, QNPPC approved the *Quang Ninh Tourism Master Plan to 2020 With a Vision to 2030* (including 56 projects), as well as the *Quang Ninh Environment Plan* (including 92 projects) and the *Ha Long Environment Plan to 2020 With a Vision to 2030* (including 42 projects). These three plans provide orientation for the development of tourism and environment in HLB. Effectively managing pollution, however, remains a consistent challenge for HLB and the surrounding area. A policy and regulation review shows that there are regulations in place, but that implementation of policies is considered not effective. Although environmental regulations for cruise boat operations and hotel accommodation do exist, lack of enforcement and collaboration from affected people (e.g. captain) means they are essentially not fully implemented. In part this can be attributed to lack of procedure (guidance on monitoring, controlling, and evaluation); ineffective coordination; limited infrastructure (no liquid waste collection points and treatment); limited capacity; and ineffective methods.

3.4 Public and private partnerships in tourism

Although a relatively new concept in Vietnam, public-private partnerships (PPP) in tourism have yielded some initial success. In 2012, the ESRT supported the establishment of a Tourism Advisory Board (TAB), a group that plays an important and influential role of the board from the Vietnam National Administration of Tourism (VNAT).

TAB comprises of 20 key private and public stakeholders from the tourism industry – representing hotels, travel agencies, transportation, tourism associations, training institutions, representatives from the Vietnam Chamber of Commerce and Industry and EuroCham, as well as high ranking officials from the public sector. This preliminary forum for fostering PPP provides an open and ongoing dialogue to promote and lobby for the development of trade, commerce and investment in Vietnam's tourism industry (ESRT, 2012).

In 2013, the International Labor Organization (ILO) implemented a community level PPP initiative in Quang Nam Province (central Vietnam). The project engaged local communities and tourism businesses in the development of an effective local tourism environment. The project found that developing skills training programs for the local residents was crucial, along with cooperation between all parties in the training process. Support in local product development and branding and investment in infrastructure was also highlighted as an important element in the success of the campaign (ILO, 2014).

Partnerships between the government and private sector can vary from full cooperation in certain projects, to a more flexible informal cooperation. What is essential for HLB and Cat

Ba, however, is that communication, cooperation and investment in environmental management is made more effective and efficient. As former U.S. Ambassador David Shear said at the launch of HLCBA on March 15, 2014 – “I envision a broad public-private partnership of political actors, innovative businesses, and local organizations, working together to address the economic, environmental, and political challenges of preserving Ha Long Bay” (USAID, 2014).

4. Situation analysis

4.1 Objectives and scope

The main objective of this study is to develop a situation analysis of the environmental impacts from tourism businesses operating in the HLB area. Although the study does look at on-shore businesses (accommodation and restaurants), the focus is on the cruise boats. HLB and Cat Ba were visited as part of the field work to examine the local institutional environment, relevant stakeholders and the tourism businesses' perspectives on water quality, environmental impacts, and PPP. The situation analysis covers the following sections:

- **Current status of water quality:** the current status and local perceptions of the water quality.
- **Key stakeholders and management of water quality:** the key stakeholders and management of water quality and tourism businesses.
- **Environmental impacts of tourism:** the effect cruise boat businesses have on water quality.
- **Public-private relationship:** the perception of tourism businesses on the relationship between public and private sectors and their willingness to engage in the Alliance initiatives.

4.2 Methods and data collection

Research and data collection employed a mixed method approach of qualitative and quantitative studies.

The qualitative study consists of desktop research, meetings with project staff and stakeholders in Ha Noi, a pilot survey and fieldwork study (24 July-1 August, 2014) of unstructured interviews with relevant stakeholders at provincial level, such as: DoCST, DoNRE, cruise/boat clubs.

The qualitative data, derived from secondary sources, includes provincial and national archival records, such as: tourism statistics; socio-economic reports; the tourism master plan (to 2020); environment plan (to 2020); relevant project reports (e.g. UNESCO, IUCN, ESRT, JICA); HLBMD technical reports; and the review of tourist comments on TripAdvisor (to 16 July 2014). Qualitative study results were then used to improve the quality of the quantitative study that commenced in December 2014 after the official endorsement of the project by QNPPC.

A tourism businesses survey was undertaken to examine perceptions on water quality, environmental impacts on water quality, and public-private relationship. A three page questionnaire for each target group (see Annexes 2-4), consisting of four major sections, was developed.

The first section collected general information about each respondent. The second sought perception on water quality. The third section examined the environmental impacts of hotels, restaurants and cruise boats on water quality. Waste production, energy and water

consumption, as well as measures applied to save water and energy at each property were examined.

Questions included in the fourth section addressed public and private partnerships. This explored current relationships, willingness to engage in the Alliance, factors hindering involvement in the Alliance and contribution toward water quality improvement. The answers were rated on a Likert scale.

The survey was conducted from 8-12 December, 2014 with a team of four survey staff. Interviewees were drawn from the list of tourism businesses provided by DoCST and in consultation with HLBMD. Boat captain questionnaires were distributed via cruise boat managers for self-completion. Surveyors then contacted captains to collect the complete questionnaire. In total, 208 complete questionnaires consisting from 49 accommodation managers, 16 restaurant owners, 29 cruise boat managers and 114 captains were collected and analyzed.

The preliminary findings were presented and discussed at the project launch workshop on 20 January, 2015 to provide key stakeholders with a clear and concise understanding of the current situation. The feedback on major findings and recommendations was considered for the final report.

4.3 Current status of water quality

4.3.1 Current status of water quality

Water monitoring between 2004 and 2014 by HLBMD and DoNRE has recorded a decreasing trend in water quality and found a significant increase and concentration of some pollutants throughout HLB. Most parameters, however, are still within the allowed limits according to Vietnam standards for coastal water quality (QCVN 10:2008/BTNMT).

Table 1. Environmental monitoring parameters of Ha Long Bay (2004-2014)

Year	pH	Fe (mg/l)	Mineral oil and grease (ppm)	DO (mg/l)	Amoni (mg/l)	COD (mg/l)	Zn (ppm)	TSS (ppm)
2004	7-8.3		0.07	7.3			0.01	16.1
2007	6.9-8.2		0.011	7.0			0.0095	20.05
2010	7-8.3		0.036	7.1			0.021	33.67
2011	7-8.2	0.093	0.018	7.8	0.095		0.037	35.08
2012	7-8.2	0.08	0.01	7.5	0.15		0.035	30
2013	7.9	0.13	0.042	7.87	0.23		0.04	22.85
Q2/2014	7.82	0.17	0.05	7.72	0.23	6.73	0.05	27.92
Q3/2014	7.80	0.10	0.36	7.73	0.18	5.98	0.04	31.04
QCVN 10: 2008 (Vietnam standard)	6.5-8.5	0.1	0.2	>4	0.1	3	2	50

Source: DoNRE and HLBMD, 2012, 2013, and 2014

The result of water monitoring in April 2013 indicated polluted areas along the coastline, for example, Bai Chay harbor, Thanh Nien Sewer, behind Ha Long market (HLBMD, 2013). The situation became worse as some parameters, including iron (Fe), mineral oils and grease, ammonia and chemical oxygen demand (COD), rose up to 3 times higher than the allowed QCVN benchmark (see Table 1). Results showed that most contaminated areas are located in highly populated residential and tourist areas along the coastline, tourist harbors and an industrial coal mining site. This is partly because of the fact that current waste treatment

capacity accommodates for only 40% of total waste produced in Ha Long City (DoNRE, 2014).

4.3.2 Perception on water quality

To evaluate the perception of boat owners, captains, hotel managers, and restaurant owners on water quality, the survey collected information on: impressions of the water quality change over the past 5 years, observation of current water quality, physical evidence of pollution, polluted areas, sources of pollution, influence of water quality on tourist experience, responsibility of water quality protection and involvement in environmental protection initiatives.

4.3.2.1 Impression of the water quality over the past 5 years

The survey evaluated the perception of boat owners, captains, hotel managers and restaurant owners on water quality over the past five years. Figure 2 shows that the majority (52%) of the respondents confirmed that water quality is better compared to 5 years ago. However, 30% said it is worse and 18% found it unchanged. Survey results also show that among the four groups, captains and boat owners share similar views about the change of water quality. Hotel managers and restaurant owners seem to disagree with this position, with a much higher percentage of hotel managers thinking the water quality is worse and a larger proportion of restaurant owners saying it is unchanged.

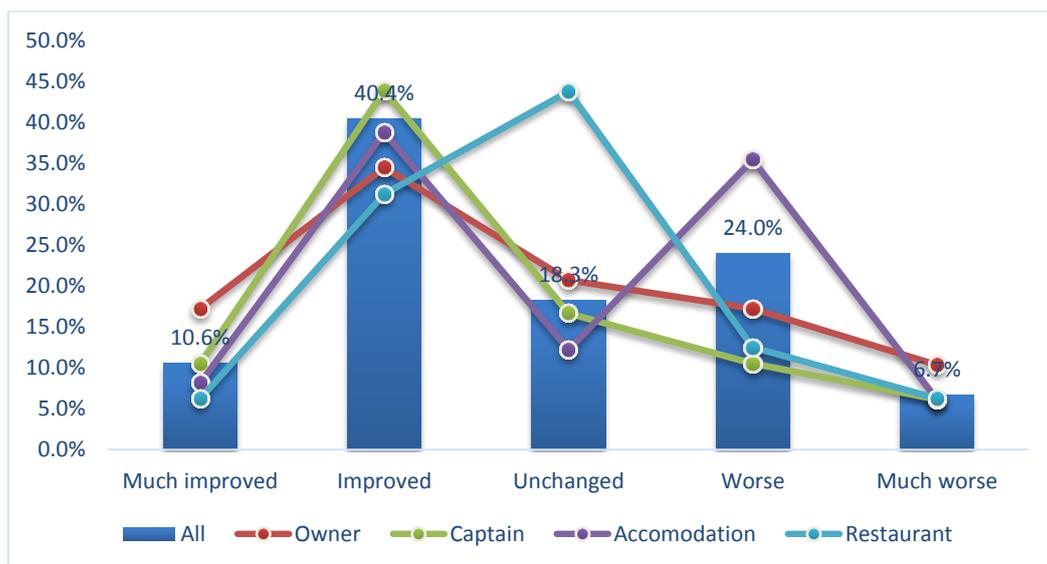


Figure 2. Impression of water quality over the past 5 years

4.3.2.2 Observation of current water quality

With regard to the current water quality, the majority of respondents (63%) reported observing pollution in the water recently, while 30.8% said the current water quality in HLB is good. Only a few respondents found the water either heavily polluted (5.8%) or very good (0.5%).

Figure 3 also shows a consistent trend across the four groups of respondents. Among the four groups, only some difference can be observed in the captains; the group containing the most respondents who perceive some pollution.

Conversations with tour operators indicated that water pollution prohibits some tourists from swimming at designated anchoring locations. Local authorities explained that tourists are not allowed to swim at undesigned (and therefore perhaps cleaner) sites for safety reasons.

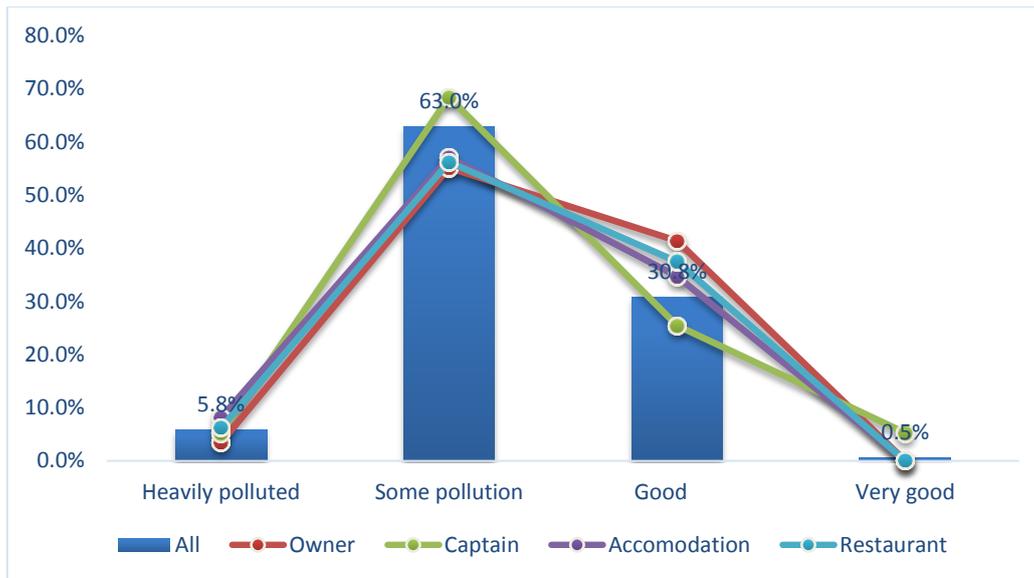


Figure 3. Observation of current water quality

4.3.2.3 Evidence of water pollution

The survey asked those respondents who observed water contamination, the most common evidence of pollution they found (change of color, dead fish, floating rubbish, or unpleasant smell). Survey results show that the most frequently-observed evidence of water pollution is rubbish (63.5%) floating on the water and a change in water color (33.7%). Only 14.4% of the people surveyed observed unpleasant smell and 5.3% saw dead fish as signs of pollution.

Among the four groups of respondents, similar shares of boat owners, captains and hotel managers observed floating rubbish (62%, 68% and 61% respectively) and change of water color (34%, 37% and 33% respectively). Much smaller shares of restaurant owners, however, observed floating rubbish (44%) and change of water color (13%). Another point worth noting is relatively high percentages of hotel managers and restaurant owners (29% and 31% respectively) who have noticed an unpleasant smell as a sign of pollution in the bay.

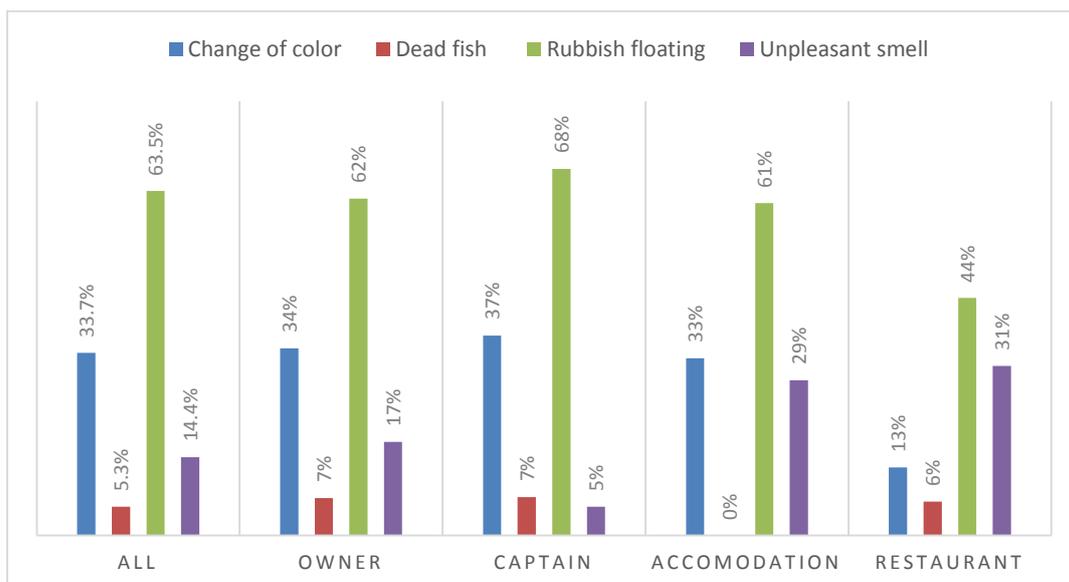


Figure 4. Evidence of water pollution (% observed)

4.3.2.4 The most polluted areas

In identifying polluted areas, the survey asked respondents to name and point on the map where they believed to be the three most polluted locations. According to the survey result, Bai Chay coastal area was identified by 21% of the total respondents, followed by Bai Chay harbor with 14%, Thien Cung – Dau Go caves (7%) and Amazing cave (7%). These areas are marked on the map by red circles in Figure 5 below.

Table 2. Polluted areas based on opinions of respondents.

Area	Percentage
Bai Chay coastal area	21%
Bai Chay harbor	14%
Thien Cung - Dau Go caves	7%
Amazing cave	7%
Three caves	5%
Fishing village	5%
Titop	4%
Luon cave	3%
Cai Lan Industrial Area	2%
Doan harbor	2%
Other areas	30%



Figure 5. Most polluted areas

4.3.2.5 Main sources of pollution

Results from the pollution survey reveal that, according to respondents, ‘residents on floating villages’ (43%), ‘coal mining’ (38%), and ‘tourist activities on islands/caves’ (35%) were the three primary types of contamination in HLB. ‘Fishing activities’ and ‘tourist boats and cruises’ were selected by a smaller share of respondents (13% and 22% respectively).

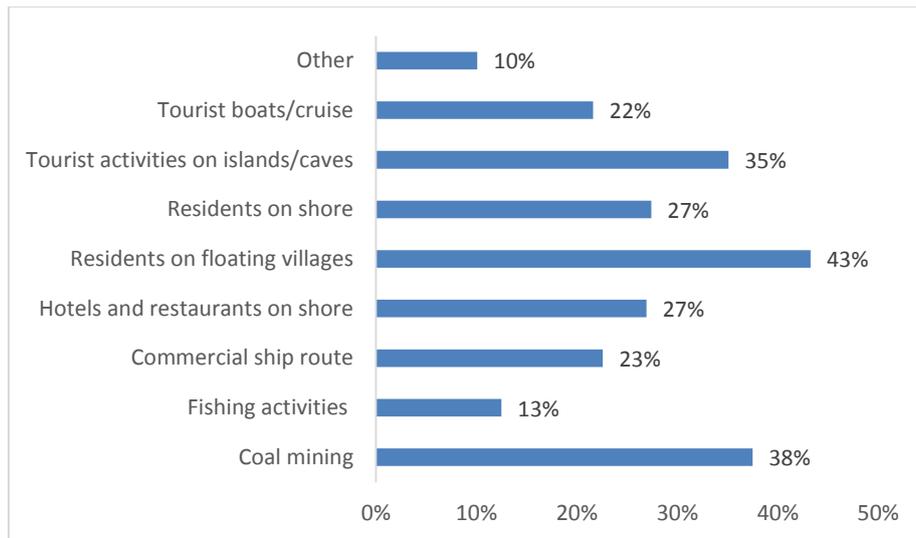


Figure 6. Main sources of pollution

The survey also revealed that ‘residents on shore’ and ‘hotels and restaurants on shore’ were both identified by 27% of the total respondents as the main sources of pollution. Figure 7 shows that the top three sources of pollution according to boat owners are ‘hotels and restaurants on shores’, ‘coal mining’, and ‘residents on shore’. Meanwhile, most captains chose ‘residents on floating villages’, ‘coal mining’ and ‘tourist activities on islands/caves’ as factors that cause most pollution to the bay. For hotel managers, the main sources of pollution include ‘tourist activities on islands/caves’ and ‘tourist boats/cruise’ while ‘residents on shores’ and ‘residents on floating villages’ are the top sources of pollution for restaurant owners.

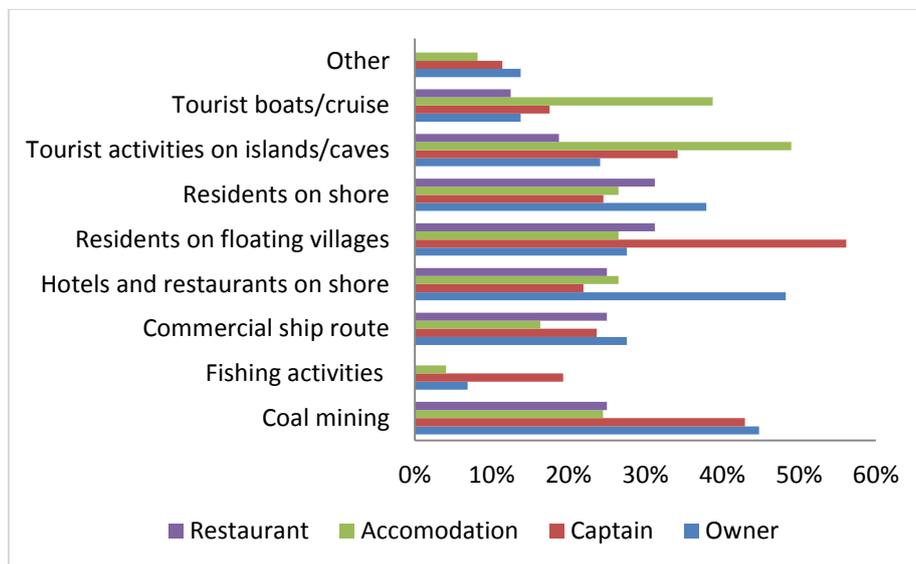


Figure 7. Main sources of pollution by respondent groups

4.3.2.6 Influence of water quality on tourist experience

Nearly all respondents (99%) agree that water quality in the bay plays a very important role in the region’s tourism – with 66% saying it is very important and 33% important. It can also be observed from Figure 8 that there is agreement among the four groups of respondents on the role of water quality on HLB tourism.

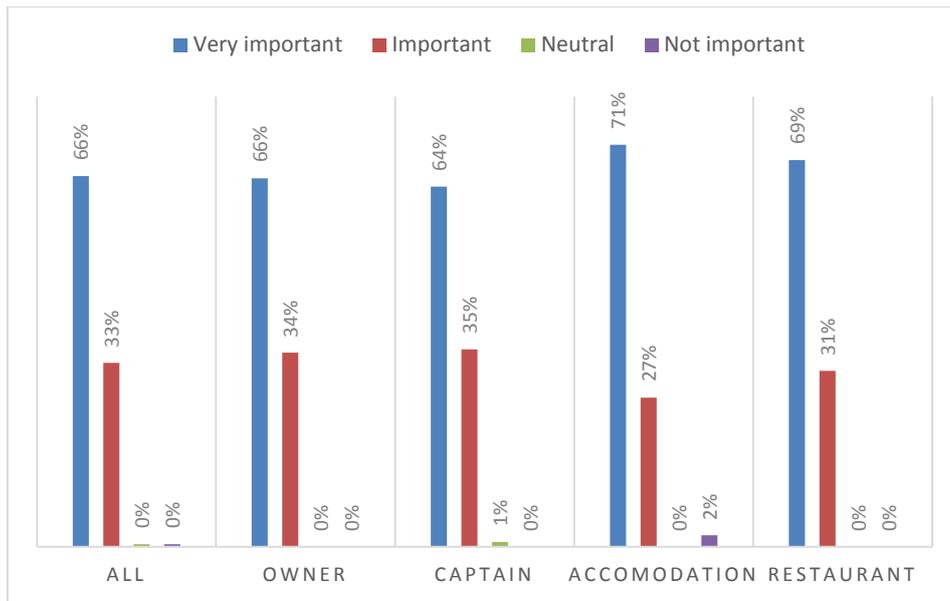


Figure 8. Impact of water quality on Ha Long Bay tourism

4.3.2.7 Responsibility on water protection

According to the survey result, 57% of all respondents said that everyone should be responsible for water protection in the bay while 34% claimed that water protection is the responsibility only of provincial and local authorities. The claim that only provincial and local authorities should be responsible came from 43% of the hotel managers, 38% of the restaurant owners, 31% of captains and 31% of boat owners. It is also worth noting that 7% of boat owners said it is the responsibility of only hotels and restaurants on shore, 7% of captains said it is tourists' responsibility, and 6% of restaurant owners said it is boat owners'.

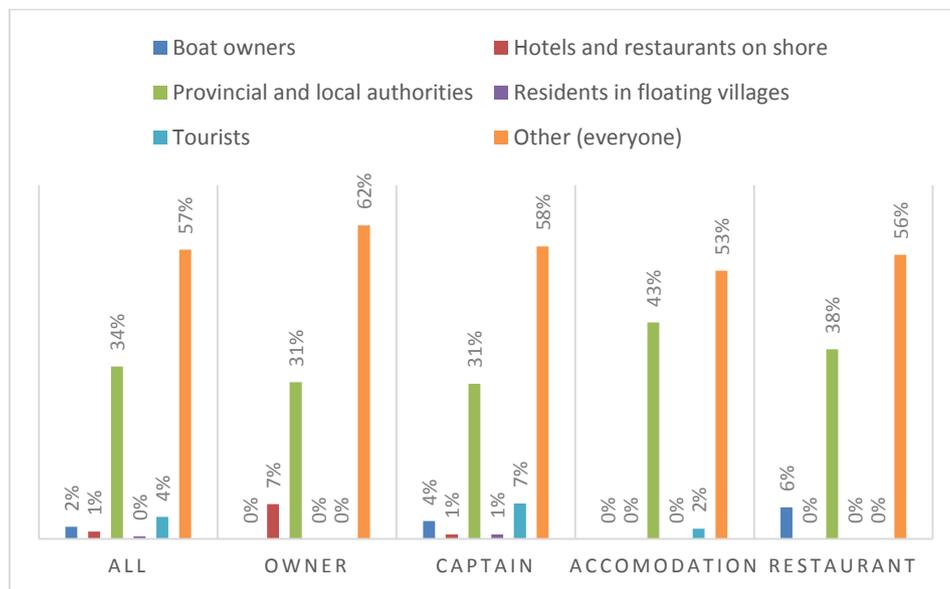


Figure 9. Responsibility of water protection

4.3.2.8 Involvement in environmental protection

In regards to environmental protection, boat and restaurant owners and hotel managers were asked about their enterprise's participation in the improvement of water quality in the bay. The majority (61%) confirmed that their companies participated in certain activities to improve the water quality. This share is the highest in boat owner group with 79% confirming

their participation, followed by restaurants with 69%. In contrast, only 47% of hotel managers took part in environmental protection as reported by the survey. Environmental activities by boats and hotels include: assisting with the JICA project (2010-2012); conducting environment monitoring; collecting rubbish with tourists; participating in the 'for a Green Ha Long' initiative in 2011 (Halongbay, 2011); installing oil separators; awareness raising; water saving methods in hotels; and waste collection at the coastal swimming area.

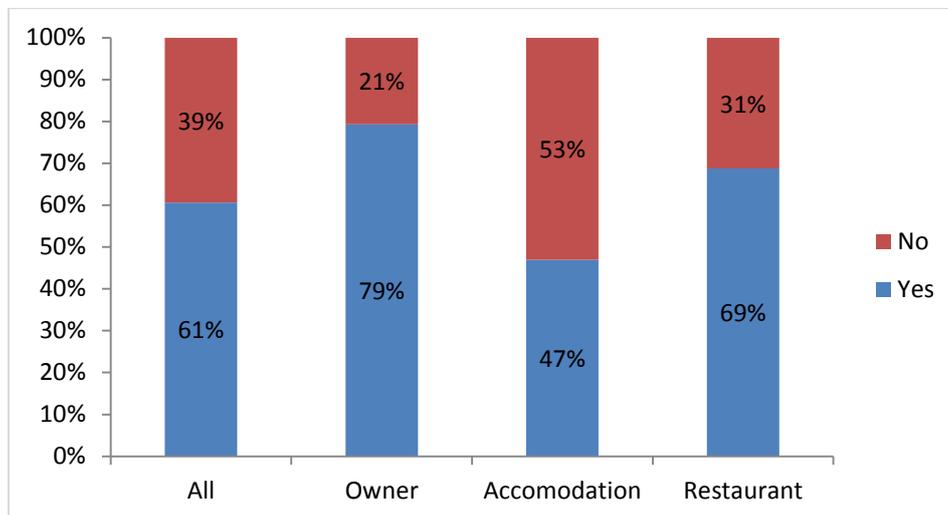


Figure 10. Involvement in environmental protection

4.4 Key stakeholders and management of water quality

4.4.1 Management of water quality

There are two key organizations responsible for the management of the natural environment and water quality in the bay: the Ha Long Bay Management Department (HLBMD) and the Quang Ninh Department of Natural Resources and Environment (DoNRE).

Department of Natural Resources and Environment (DoNRE) in Quang Ninh

DoNRE is responsible for the overall state management of the province and includes three specialized agencies in charge of environmental conservation in HLB. These are Department of Environmental Protection, Department of Sea and Islands, and Centre for Environmental Monitoring. It is noted that DoNRE collaborates with the HLBMD to monitor water quality quarterly.

Ha Long Bay Management Department (HLBMD)

HLBMD was established in 1995, after the property was inscribed on the World Heritage List. Its primary function is to support the Quang Ninh PPC in management, protection and promotion of the property's *Outstanding Universal Value* – they are responsible only for the WHS and not the entire bay. Therefore, as the environmental effects of population rise and development activities become increasingly apparent, the HLBMD is unable to work to control those pollution sources originating from outside the bay.

The HLBMD is administratively managed by QNPPC and directed by the Ministry of Culture, Sport and Tourism (MoCST) and the National Commission for UNESCO in Viet Nam. With 14 divisions and 388 staff, the HLBMD (in 2013) has an operating budget of VND 47.5 billion or USD 2.15 million (IUCN, 2013). Nine of the 14 divisions are involved in daily management and protection of the environment and natural resources, including water quality of the bay, in which the Environmental Management Division is the focal point. A deputy director of the HLBMD is appointed to be in charge of environmental issues.

Staff located at each of the five heritage management centers are responsible for garbage collection at tourist destinations and environmental protection in the residential areas on the bay. The department is well equipped to test and monitor water quality quarterly.

4.4.2 Management of tourism businesses

Quang Ninh Department of Culture Sports and Tourism (DoCST)

DoCST is a specialized agency of the Quang Ninh PPC which functions to advise and assist the PPC in implementing the state management and promotion of culture, sports and tourism – including hotels, restaurants and cruise boats. DoCST works closely with tourism businesses to support them in their development.

According to DoCST, as of July 2014 the total number of registered tourist boats was 527 – consisting of 360 day boats and 167 overnight boats. A total of 197 tourist boat companies are registered to operate in HLB – 45 of which own overnight cruise boats with a total capacity of 1,824 rooms or 3,735 beds. The day 360 excursion boats are owned by 162 companies (10 of which also operate overnight cruise boats).

Although there are 197 companies operating on the bay, half (80 boats with a capacity of 855 rooms and 1,808 beds) are owned by the 12 biggest companies. The largest – Bai Tho Tourist Transportation Co., Ltd. – owns 12 overnight boats. In addition to the boats, there are 69 hotels (rated 1 to 4 stars) with the total capacity of 2,017 rooms and 24 restaurants along the coast.

Although there is a Ha Long Tourist Cruise Boat sub-association under Quang Ninh Tourism Association (QNTA) and a Tourist Cruise Club led by Indochina Junk, neither operates regularly.

4.5 Environmental impacts of cruise boats

The environmental impacts of cruise boats operating in the bay is evaluated based on the following criteria: (1) Average volume of solid waste produced per night, (2) Measures used to reduce solid waste production, (3) Average water consumption per night, (4) Usage of water saving devices/practices, (5) Average bilge water (mixture of water and oil/waste from engines) production per night, (6) Management of bilge water, (7) Installed bilge water separator and its functioning, (8) Average black water (sewage) production per day-only trip, (9) Management of black water, and (10) Management of grey (bathrooms and kitchen) water.

4.5.1 Solid waste (trash) management

According to the survey, each cruise boat operating in HLB on average produces 11.3 kg of solid waste per boat per night. The most frequently-used method to reduce solid waste production by cruise boats is the use of 'waste segregation bins' with 91% of cruise boats having them installed. 'Selling or donating left-over food' is also applied by 59% of total cruise boats surveyed, followed by 'replacing individual with bulk dispensers' (39%) and 'replacing single with multiple-use bottles' (37%). The least popular method is 'recycling paper, cooking oil etc.' with only 19% of the cruise boats doing this in their daily operations.

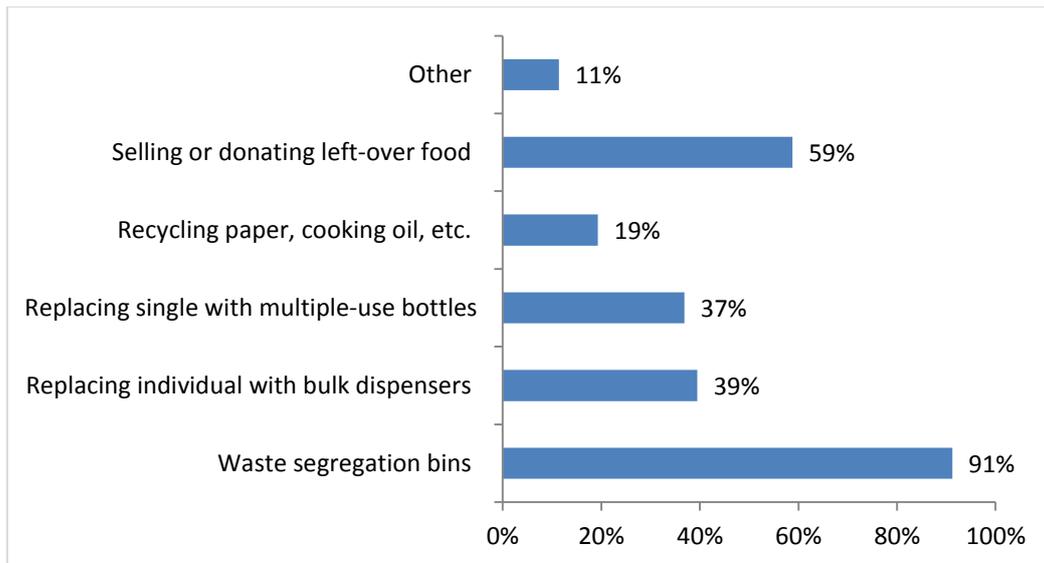


Figure 11. Measures used to reduce solid waste production

4.5.2 Water consumption and reduction

Average water consumption by each cruise boat is 6.4 m³ per night. Among methods used to reduce water consumption, 'double flush toilets' is the most common (79% of boats). Other methods applied by cruise boats include 'flow restrictors in showers' (41%), 'auto detect in sink/urinals' (33%), and 'low flow taps in sinks' (17%). 'Waterless urinals' (4%) and 'linen and towel re-use cards' (7%) are the least popular methods as most boats change sheets daily given the majority of tourists only stay for one night.

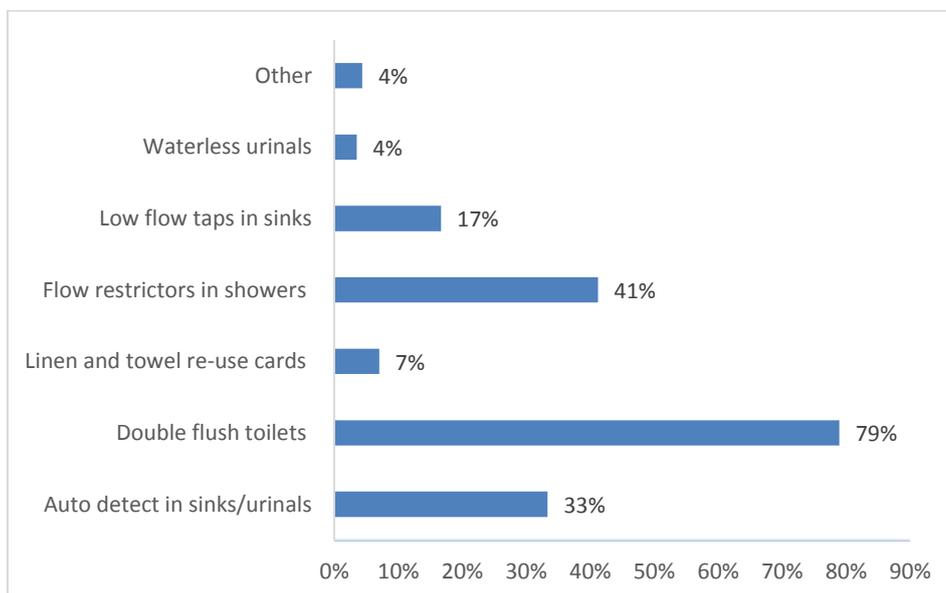


Figure 12. Methods used to reduce water consumption

4.5.3 Bilge water production and management

The amount of bilge water produced by each cruise boat (from engine cooling and mechanical purposes) averages 1.05 m³ per trip. As reported by the boat captains surveyed, 75% of cruise boats separate oil from water before discharging the water into the bay; while 19% return bilge water to shore after the trip. 3% of cruise boats dump bilge water into the bay without any treatment (Figure 13).

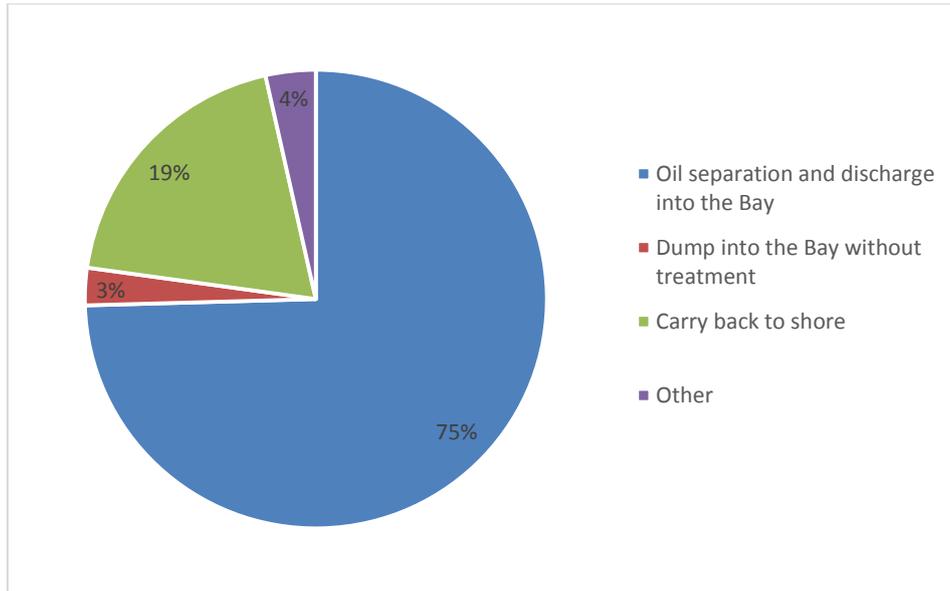


Figure 13. Oiled water treatment methods

Figure 14 shows the survey results on bilge water separator devices used by cruise boats. Among 114 cruise boats surveyed, 82% have bilge water separators. The remaining 18% stated that they do not require separators as their cruise boats are made of metal. This response is questionable, however, as the boat construction material has no effect on the production of bilge water. Of the boats that have separators installed, 34% confirmed that the equipment works very effectively and 48% said it operates effectively.

Although all captains agreed that the separators were at least somewhat effective, survey team’s observations and communication with captains indicated that most oil separators were not turned on. In many boats, the separators are used only during inspections by the Department of Transportation. Thus, despite the majority of captains in the survey claiming to treat bilge water before discharge, these later observations, feedback and conversations suggest that, unless there is an inspection, the majority of bilge water is discharged directly into the bay.

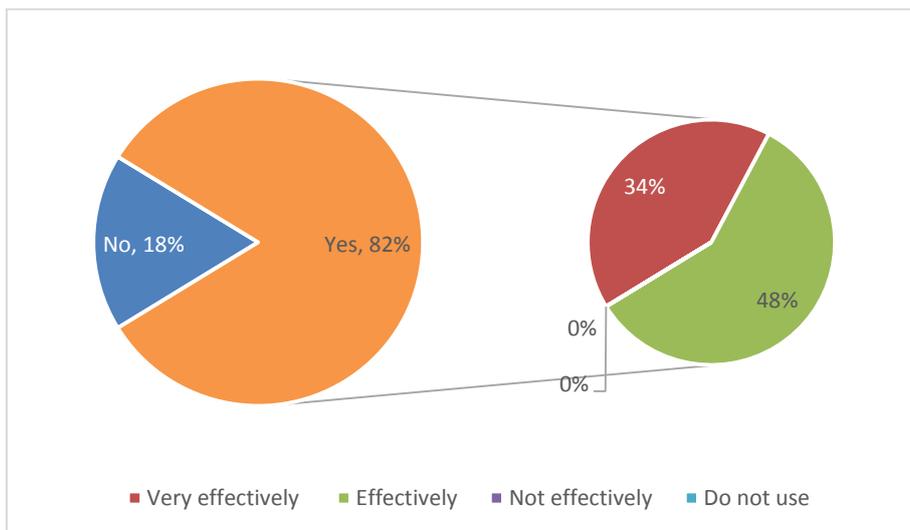


Figure 14. Bilge water separator effectiveness

4.5.4 Black water production and management

The average amount of black water (sewage) production by each day-boat is 12.2 m³ per trip. Figure 15 shows that 46% of the boats surveyed have installed a clarifier/filter only, 27% have installed a sewage separator only, and 24% have both. The remainder (3%) do not use any onboard equipment and either use other methods to treat black water or do not treat it at all.

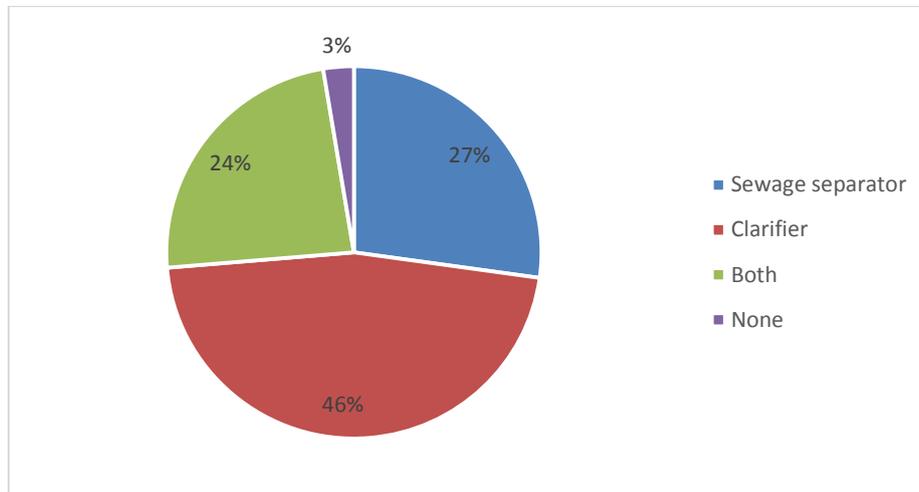


Figure 15. Sewage equipment

The survey result presented in Figure 16 shows that 'separation and discharge into the bay' is the most popular method used by cruise boats to treat sewage (77%), – while 20% carried the sewage back to shore for treatment/discharge.

Despite survey results, however, survey team's observation and communication with captains indicated that black water must be discharged in the bay, as there is no collection point at the harbors or on shore. Therefore, the 20% that claimed to carry sewerage back to shore is questionable. While only 3% of the cruise boats stated that they discharge the sewage directly into the bay without any treatment, in reality this number is likely to be higher.

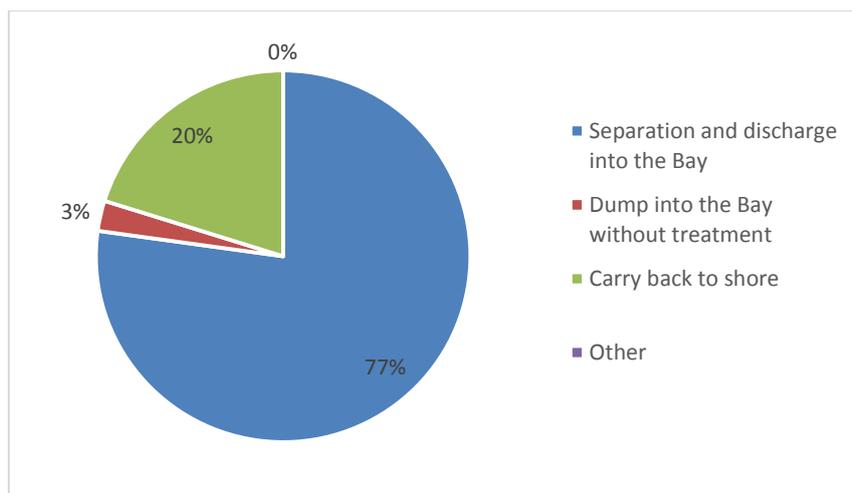


Figure 16. Sewage treatment

4.5.5 Management of grey water

Figure 17 shows that 79% captains stated that grey water (from bathrooms and kitchens, containing traces of dirt, food, grease, hair and cleaning products) was treated and

discharged into the bay. 10% of boats carry grey water back to shore while 9% dump directly into the bay.

In reality, however, grey water treatment systems are very expensive and there are no onshore collection points. As such, survey team's observations and further communication with captains indicated that in the large majority of cases grey water is discharged directly into the bay.

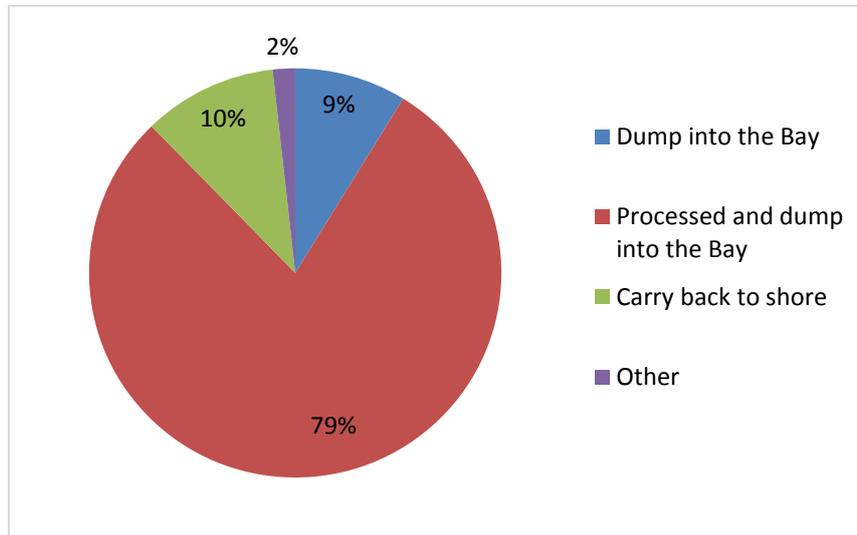


Figure 17. Management of grey water

4.6 Relationship between public and private sectors

This section analyzes; cooperation and relationships between the public and private sectors; willingness to engage in the Alliance; factors hindering involvement in the Alliance; and contribution toward water quality improvement.

4.6.1 Current public-private relationship

Overall, survey results found that boat owners, hotel managers, and restaurant owners have a good opinion of the relationship between enterprises and local authorities. 10% of the total respondents think this relationship is excellent, 49% good, and 38% neutral. Only 3% of all respondents felt that the public-private relationship is either bad or terrible.

Among the three groups, restaurant owners were the most positive about their relationship with local authorities and 75% expressed it as either good or excellent. The majority of hotel owners felt similar (61%), whereas only 45% of boat owners felt there was a good relationship. It is noted that Quang Ninh had made efforts to improve the relationship between local government and enterprises. Four quarterly meetings and dialogues were held in the 'Together with Enterprises Year' of 2014.

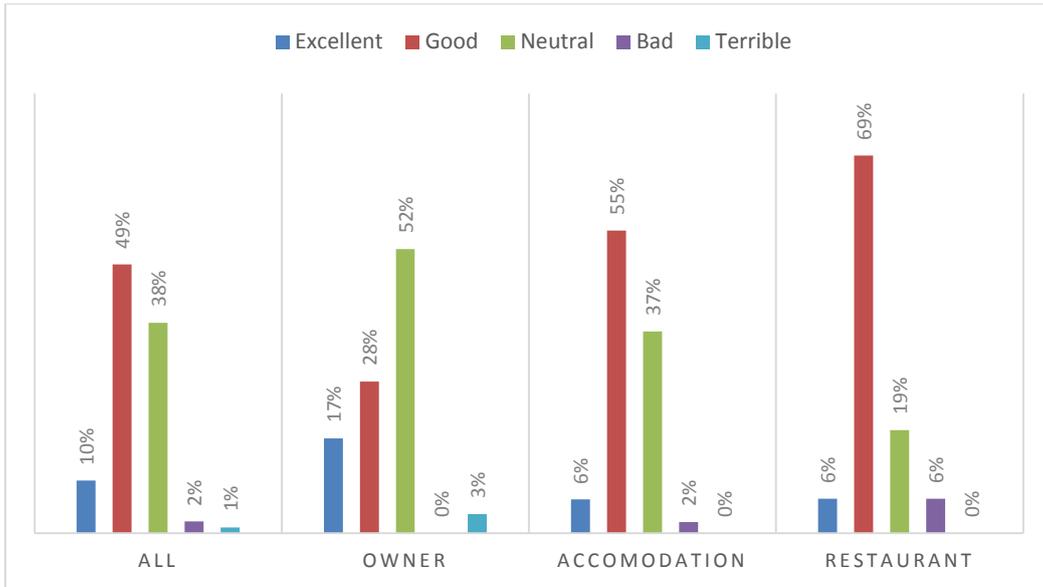


Figure 18. Current public-private relationship

4.6.2 Willingness to engage in the Alliance

Figure 19 shows that most boat owners, hotel managers and restaurant owners are willing to participate in an Alliance that brings together government authorities and tourism enterprises to improve the environment in HLB. 77% of all respondents said they would be somewhat likely to engage in the Alliance, 12% expressed strong willingness, while the remaining 11% were either indifferent or unlikely to participate. Among the three groups, boat owners were the most willing to engage in the HLCBA (93%), followed by restaurant owners (87%) and hotel managers (86%).

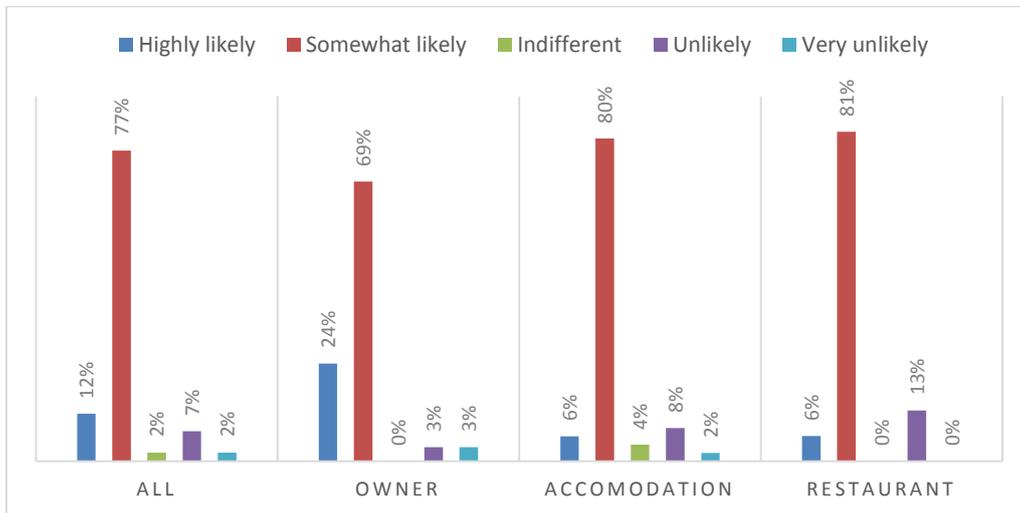


Figure 19. Willingness to engage in the Alliance

4.6.3 Possible hindering factors

As illustrated in Figure 20, the major hindrances to tourism company participation in the HLCBA are as follows: concerned about investment (52% of the total respondents), resource constraints (44%), and time constraints (36%). Prior negative experiences with PPP activities could potentially prevent 15% of respondents from engaging in the Alliance. This share is the highest among restaurant owners (25%) and the lowest among hotel managers (10%).

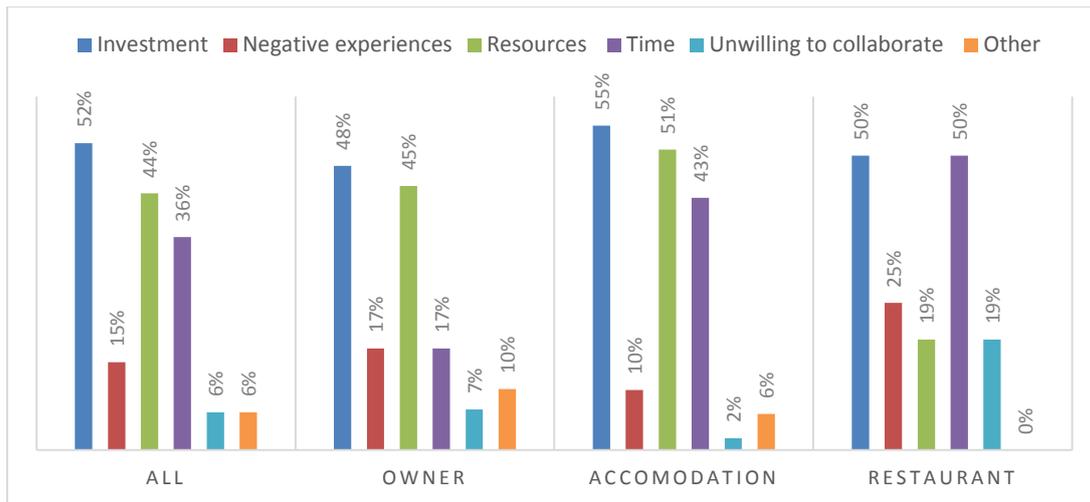


Figure 20. Possible hindering factors

4.6.4 Contribution toward water quality improvement

Figure 20 shows that the majority of tourism enterprises (89%) are willing to contribute to the improvement of water quality in HLB by encouraging their employees to participate in environmental protection activities – there is very little difference between the three groups.

30% of interviewees responded positively to participating in environmental certification programs – with the largest share (50%) being restaurant owners. 16% of respondents were willing to donate to an Environmental Protection Fund or Fee initiative. They expected that this source of funding, if established, could help improve the environment and water quality of HLB. Again, a higher share of 25% was observed from restaurant owners.

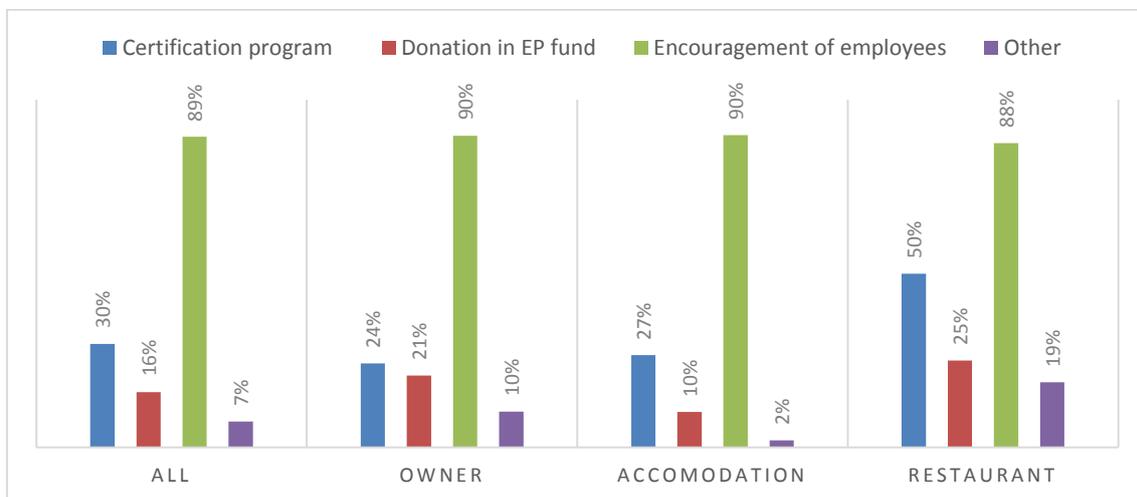


Figure 21. Contribution toward water quality improvement

5. Summary of key findings

- The majority (52%) of respondents confirmed that water quality has improved over the past five years, while around 30% said it is worse and 18% found it unchanged.
- The majority (63%) of respondents have observed some pollution in the water recently while 30.8% said the current water quality in the bay is good.

- 'Residents on floating villages' (43%), 'coal mining' (38%), and 'tourist activities on islands/caves' (35%), 'on-shore hotels and restaurants' (27%) and 'on-shore residents' (27%) were perceived as the primary sources of water pollution in HLB.
- The most frequently-observed evidence of water pollution is rubbish (63.5%) floating on the water followed by changes in water color (33.7%). The survey team observed smelly and oily water at harbors along the Bai Chay coastal area.
- There are bilge water treatment systems installed on the majority of cruise boats in the bay. Survey team's observations and communication with captains, however, indicated that most are used only during inspections by the Department of Transportation.
- Current waste treatment capacity accommodates for only 40% of total waste produced in Ha Long city.
- There is no on-shore liquid waste collection and treatment for cruise boats. As a result, the liquid waste (bilge, grey and black water) is discharged directly into the bay with or without some level of prior separation.
- Boat owners, hotel managers, and restaurant owners have a relatively good impression of the relationship between enterprises and local authorities. 10% of the total respondents think this relationship is excellent, 49% think it is good while 38% think it is neutral.
- The majority of respondents expressed willingness to engage into the Alliance. 77% of all respondents said they would be somewhat likely to engage in the Alliance, 12% expressed a strong willingness.
- Among the three groups, boat owners are the most willing to engage in the Alliance (93%), followed by restaurant owners (87%) and hotel managers (86%).
- The major hindering factors to the participation of tourism enterprises in the Alliance include: investment concerns (52%), resource constraints (44%), and time constraints (36%).

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7. Annexes

7.1 Annex 1. Data collection activities and timelines

Location	Date	Activities
Meetings/consultation with project staff, tour operators, travel club, relevant projects/ organization in Ha Noi	16 - 21 July 2014	<p><i>Meetings/Consultations:</i></p> <ul style="list-style-type: none"> - Jake Brunner, Director of IUCN/ Project Director - Bui Thi Thi Thu Hien, IUCN Project Manager - Dan Constables, IUCN GIS Expert - Alexander Zvinakis, USAID Programme Officer - Katie Jacobs, IUCN Project Communication Officer - Maarten Akkerman, Green ID Researcher - Pham Van Ha, Bhaya Sales and Marketing Director - Armand Cheveux, Bhaya Business Development Manager - Tran Thu Hang, Bhaya Sales Manager - Vu Quoc Tri, Director ESRT program - Nguyen Vu Tiep, JICA Programme Officer - Nguyen Duc Hoa Cuong, Vice Director of Vietnam Academy of Responsible Tourism/ Head of Tourism Department Ha Noi University - Le Anh Tuan, Director of Indochina Voyage - Dang Son, President of Responsible Travel Club President/ Director of Footprint Vietnam Travel
Meetings/consultations with departments, cruise boats, hotels, tourism association, visit sites and conduct pilot survey in Ha Long	24 - 30 July 2014	<p><i>Meetings/Consultations:</i></p> <ul style="list-style-type: none"> - Pham Thuy Duong, Director of HLBMD - Le Lam Tuan, Head of Environmental Management Division - Hoang Danh Son, Vice Director of DoNRE - Ngo Thi Mai Huong, Deputy Head of Tourism Resources Development, DoCST - Nguyen Thi Thao, Deputy Head of Tourism Resources Development, DoCST - Nguyen Thi Bao, Chairperson, Quang Ninh Tourism Association - Pham Tuan Dung, Director of Mithrin Hotel - Doan Van Dung, Director of Indochina Junk
Questionnaire Survey in Ha Long Bay	08 - 12 Dec. 2014	Survey: 49 Hotel manager, 29 Cruise owners, 114 Cruise captains and 16 Restaurants managers
Workshop in Ha Long	20 January 2015	Workshop with IUCN, Ha Long Cat Ba Alliance and key stakeholders

7.2 Annex 2. Questionnaire survey of cruise boat owner

GENERAL INFORMATION

1. Years in operation of boat business: _____
2. Number of employees working in boat related business: _____
3. Number of day-only excursion boats _____
4. Number of overnight cruise boats _____
Less than 10 rooms ____ From 10-20 rooms ____ More than 20 rooms ____
5. Total sales volume in 2013 (in VND)
 Less than 500 million 500 million to 1 billion 1 billion – 5 billion
 5 billion – 10 billion More than 10 billion
6. Total number of guests in 2013 _____
7. Do you anticipate that the number of guests in 2014 will
 Increase Remain the same Decrease

[Questions 8 & 9 for overnight cruise boat owners only]

8. Number of rooms: _____
9. Average number of nights per guest in 2013: _____
10. Average % occupancy rate in 2013: _____
11. Please list the three main market countries where your guests come from

PERCEPTION ON WATER QUALITY

12. What is your impression of the water quality of Ha Long Bay over the past 5 years?
 Much improved Improved Unchanged Worse Much worse
13. What is your observation of current water quality of Ha Long Bay?
 Heavily polluted Some pollution Good Very good
Please answer questions 14, 15 & 16 if you responded 'heavily polluted' or 'some pollution' to this question. Otherwise, please proceed directly to question 17.
14. Please describe the physical evidence that you have observed.
(May select more than one option)
 Change of color (e.g. oily, muddy) Dead fish Rubbish floating on water
 Sedimentation Unpleasant smell Other (specify _____)
15. On the attached map, please list and mark (an X or a circle) three most polluted areas on Ha Long Bay
16. In your opinion, what are three main sources of pollution? *[Rate from 1-3]*
 Coal mining (e.g. waste water from mining sites, dust and smoke, land slide into sea)
 Commercial ship route (non-tourism)
 Fishing activities

- Hotels and restaurants on shore
- Residents on floating villages (e.g. human waste, left-over food for fish)
- Residents on shore
- Tourist activities on islands/caves
- Tourist boats/ cruise boats (e.g. oil leakage, grey water discharged into sea)
- Other (specify: _____)

17. How much does the water quality in Ha Long Bay influence the experience of the tourists?

- Very important Important Neutral Not important

18. In your opinion, water quality protection of Ha Long Bay is mainly the responsibility of:

(Please check only one option)

- Boat owners
- Provincial and local authorities
- Tourists
- Hotels and restaurants on shore
- Residents in floating villages
- Other (specify: _____)

19. Has your company involved in any initiatives to improve the water quality?

- Yes -> Please describe below No -> go to Question 20

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PUBLIC PRIVATE PARTNERSHIP

20. How do you rate the current relationship between the public and private sectors in Ha Long Bay?

- Excellent Good Neutral Bad Terrible

21. How likely would you be to engage with a Ha Long Bay Alliance between public and private sectors to improve the Ha Long Bay environmental quality?

- Highly likely Somewhat likely Indifferent Unlikely Very unlikely

22. Would any of the following factors prevent you from becoming involved in an alliance?

(May select more than one option)

- Concern about return on investment
- Resources
- Unwilling to work with other parties
- Negative experiences with PPP in the past
- Time
- Other (specify: _____)

23. How is your willingness to contribute toward water quality improvement activities of Ha Long Bay via?

(May select more than one option)

- Application to an environmental certification program
- Donation in cash from room price for environmental protection fund
- Encouragement of employees to participate into environmental protection activities
- Other (specify: _____)

24. What are your suggestions for improving the water quality of the Bay?

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7.3 Annex 3. Questionnaire survey of captain

GENERAL INFORMATION

1. Year your boat came into operation: _____
2. Number of employees on boat: full-time _____ part-time/casual

3. Type of boat:
 Day-only excursion boat Overnight cruise boat
4. Total number of guests in 2013 _____
[Questions 5, 6 & 7 for overnight cruise boat owners only]
5. Number of rooms: _____
6. Average number of nights per guest in 2013: _____
7. Average % occupancy rate in 2013: _____

PERCEPTION ON WATER QUALITY

8. What is your impression of the water quality of Ha Long Bay over the past 5 years?
 Much improved Improved Unchanged Worse Much worse
9. What is your observation of current water quality of Ha Long Bay?
 Heavily polluted Some pollution Good Very good
Please answer questions 10, 11 & 12 if you responded 'heavily polluted' or 'some pollution' to this question. Otherwise, please proceed directly to question 13.
10. Please describe the physical evidence that you have observed.
(May select more than one option)
 Change of color (e.g. oily, muddy) Dead fish Rubbish floating on water
 Sedimentation Unpleasant smell Other (specify _____)
11. On the attached map, please list and mark (an X or a circle) three most polluted areas on Ha Long Bay
12. In your opinion, what are three main sources of pollution? *[Rate from 1-3]*
 Coal mining (e.g. waste water from mining sites, dust and smoke, land slide into sea)
 Commercial ship route (non-tourism)
 Fishing activities
 Hotels and restaurants on shore
 Residents on floating villages (e.g. human waste, left-over food for fish)
 Residents on shore
 Tourist activities on islands/caves
 Tourist boats/ cruise boats (e.g. oil leakage, grey water discharged into sea)
 Other (specify: _____)
13. How much does the water quality in Ha Long Bay influence the experience of the tourists?
 Very important Important Neutral Not important

14. In your opinion, water quality protection of Ha Long Bay is mainly the responsibility of:

(Please check only one option)

- | | |
|---|--|
| <input type="checkbox"/> Boat owners | <input type="checkbox"/> Hotels and restaurants on shore |
| <input type="checkbox"/> Provincial and local authorities | <input type="checkbox"/> Residents in floating villages |
| <input type="checkbox"/> Tourists | <input type="checkbox"/> Other (specify: _____) |

ENVIRONMENTAL IMPACTS OF YOUR BOAT

15. What is your average volume of solid waste produced per day-only trip/night _____ kg

16. What measures does your boat use to reduce solid waste production?

(May select more than one option)

- Introducing waste segregation bins
- Replacing individual sachets of soap, shampoo, etc. with bulk dispensers
- Replacing single-use bottles and containers with multiple-use bottles
- Recycling paper, cardboard, plastic, metal, glass, cooking oil, etc.
- Selling or donating left-over food
- Other (specify: _____)

17. What was your average water consumption per day-only trip/ night in 2013? _____ m3

18. What was your average water consumption per month in 2013? _____ m3

19. Has your boat used the following water saving devices/ practices?

- | | |
|---|---|
| <input type="checkbox"/> Auto detect in sinks/urinals | <input type="checkbox"/> Double flush toilets |
| <input type="checkbox"/> Flow restrictors in showers | <input type="checkbox"/> Linen and towel re-use cards |
| <input type="checkbox"/> Low flow taps in sinks | <input type="checkbox"/> Waterless urinals |
| <input type="checkbox"/> Other (specify: _____) | |

20. What was your average oiled water production per day-only trip or night in 2013? _____ m3

21. How is your oily water managed?

- | | |
|--|--|
| <input type="checkbox"/> Oil separation and discharge into the Bay | <input type="checkbox"/> Dump into the Bay without treatment |
| <input type="checkbox"/> Carry back to shore | <input type="checkbox"/> Other (specify: _____) |

22. Has your boat installed an oily water separator?

- Yes -> go to Question 23 No -> go to Question 24

23. How is your oily water separator working?

- Very effectively Effectively Not effectively Do not use

24. What was your average sewage production per day-only trip or night in 2013? _____ m3

25. Has your boat installed the following sewage equipment?

- Separation Sediment Other (specify: _____)

26. How is your sewage managed?

- | | |
|--|--|
| <input type="checkbox"/> Separation and discharge into the Bay | <input type="checkbox"/> Dump into the Bay without treatment |
| <input type="checkbox"/> Carry back to shore | <input type="checkbox"/> Other (specify: _____) |

27. How is your grey water (i.e. water from sinks, showers, etc.) managed?

- Dump into the Bay
- Carry back to shore
- Processed and dump into the Bay
- Other (specify: _____)

28. What are your suggestions to improve the water quality of the Bay?

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Thank you very much for your time and your invaluable co-operation

7.4 Annex 4. Questionnaire survey of accommodation

GENERAL INFORMATION

1. Years in operation: _____
 2. Number of employees: full-time _____ part-time/casual _____
 3. Types of accommodation
 Resort Hotel Guest House Other (Specify): _____
- Please select one option*
- 5-Star 4-Star 3-Star 2-Star 1-Star Ungraded
4. Total sales volume in 2013 (in VND)
 Less than 500 million 500 million to 1 billion 1 billion – 5 billion
 5 billion – 10 billion More than 10 billion
 5. Total number of guests in 2013: _____
 6. Do you anticipate that the number of guests in 2014 will
 Increase Remain the same Decrease
 7. Number of rooms: _____
 8. Average number of nights per guest in 2013: _____
 9. Average % occupancy rate in 2013: _____
 10. Please list the three main market countries where your guests come from

PERCEPTION ON WATER QUALITY

11. What is your impression of the water quality of Ha Long Bay over the past 5 years?
 Much improved Improved Unchanged Worse Much worse
12. What is your observation of current water quality of Ha Long Bay?
 Heavily polluted Some pollution Good Very good
Please answer questions 13, 14 & 15 if you responded 'heavily polluted' or 'some pollution' to this question. Otherwise, please proceed directly to question 16.
13. Please describe the physical evidence that you have observed.
(May select more than one option)
 Change of color (e.g. oily, muddy) Dead fish Rubbish floating on water
 Sedimentation Unpleasant smell Other (specify _____)
14. On the attached map, please list and mark (an X or a circle) three most polluted areas on Ha Long Bay
15. In your opinion, what are three main sources of pollution? [Rate from 1-3]
 Coal mining (e.g. waste water from mining sites, dust and smoke, land slide into sea)
 Commercial ship route (non-tourism)
 Fishing activities
 Hotels and restaurants on shore
 Residents on floating villages (e.g. human waste, left-over food for fish)
 Residents on shore

- Tourist activities on islands/caves
- Tourist boats/ cruise boats (e.g. oil leakage, grey water discharged into sea)
- Other (specify: _____)

16. How much does the water quality in Ha Long Bay influence the experience of the tourists?

- Very important Important Neutral Not important

17. In your opinion, water quality protection of Ha Long Bay is mainly the responsibility of:

(Please check only one option)

- Boat owners
- Provincial and local authorities
- Tourists
- Hotels and restaurants on shore
- Residents in floating villages
- Other (specify: _____)

18. Has your company involved in any initiatives to improve the water quality?

- Yes -> *Please describe below* No -> *go to Question 19*

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ENVIRONMENTAL IMPACTS OF YOUR ACCOMMODATION

19. What is your average volume of solid waste produced per month _____ m³/ kg/ tons

20. What measures does your establishment use to reduce solid waste production?

(May select more than one option)

- Composting kitchen and biodegradable waste
- Introducing waste segregation bins
- Replacing individual sachets of soap, shampoo, etc. with bulk dispensers
- Replacing single-use bottles and containers with multiple-use bottles
- Recycling paper, cardboard, plastic, metal, glass, cooking oil, etc.
- Selling or donating left-over food
- Other (specify: _____)

21. What was your average water consumption per month in 2013? _____ m³

22. Has your establishment used the following water saving devices/ practices?

- Auto detect in sinks/urinals
- Flow restrictors in showers
- Low flow taps in bathroom sinks
- Other (specify: _____)
- Double flush toilets
- Linen and towel re-use cards
- Waterless urinals

23. What was your average sewage production per month in 2013 _____ m³

24. How is your sewage water managed?

- Dumped untreated into the drainage
- Processed and dumped into the drainage
- Other (specify: _____)

PUBLIC PRIVATE PARTNERSHIP

25. How do you rate the current relationship between the public and private sectors in Ha Long Bay?

- Excellent
- Good
- Neutral
- Bad
- Terrible

26. How likely would you be to engage with a Ha Long Bay Alliance between public and private sectors to improve the Ha Long Bay environmental quality?

- Highly likely
- Somewhat likely
- Indifferent
- Unlikely
- Very unlikely

27. Would any of the following factors prevent you from becoming involved in an alliance?

(May select more than one option)

- Concern about return on investment
- Negative experiences with PPP in the past
- Resources
- Time
- Unwilling to work with other parties
- Other (specify: _____)

28. How is your willingness to contribute toward water quality improvement activities of Ha Long Bay via?

(May select more than one option)

- Application to an environmental certification program
- Donation in cash from room price for environmental protection fund
- Encouragement of employees to participate into environmental protection activities
- Other (specify: _____)

29. What are your suggestions for improving the water quality of the Bay?

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Thank you very much for your time and your invaluable co-operation

7.5 Annex 5. Questionnaire survey of restaurant

GENERAL INFORMATION

1. Years in operation: _____
2. Number of employees: full-time _____ part-time/casual _____
3. Number of seats: _____
4. Total sales volume in 2013 (in VND)
 - Less than 500 million
 - 500 million to 1 billion
 - 1 billion – 5 billion
 - 5 billion – 10 billion
 - More than 10 billion
5. Average number of guests per month in 2013: _____
6. Do you anticipate that the number of guests in 2014 will
 - Increase
 - Remain the same
 - Decrease
7. Please list the three main market countries where your guests come from

PERCEPTION ON WATER QUALITY

8. What is your impression of the water quality of Ha Long Bay over the past 5 years?
 - Much improved
 - Improved
 - Unchanged
 - Worse
 - Much worse
9. What is your observation of current water quality of Ha Long Bay?
 - Heavily polluted
 - Some pollution
 - Good
 - Very good

Please answer questions 10, 11 & 12 if you responded 'heavily polluted' or 'some pollution' to this question. Otherwise, please proceed directly to question 13.
10. Please describe the physical evidence that you have observed.
(May select more than one option)
 - Change of color (e.g. oily, muddy)
 - Dead fish
 - Rubbish floating on water
 - Sedimentation
 - Unpleasant smell
 - Other (specify _____)
11. On the attached map, please list and mark (an X or a circle) three most polluted areas on Ha Long Bay
12. In your opinion, what are three main sources of pollution? [Rate from 1-3]
 - Coal mining (e.g. waste water from mining sites, dust and smoke, land slide into sea)
 - Commercial ship route (non-tourism)
 - Fishing activities
 - Hotels and restaurants on shore
 - Residents on floating villages (e.g. human waste, left-over food for fish)
 - Residents on shore
 - Tourist activities on islands/caves
 - Tourist boats/ cruise boats (e.g. oil leakage, grey water discharged into sea)
 - Other (specify: _____)
13. How much does the water quality in Ha Long Bay influence the experience of the tourists?
 - Very important
 - Important
 - Neutral
 - Not important

14. In your opinion, water quality protection of Ha Long Bay is mainly the responsibility of:

(Please check only one option)

- Boat owners
- Provincial and local authorities
- Tourists
- Hotels and restaurants on shore
- Residents in floating villages
- Other (specify: _____)

15. Has your company involved in any initiatives to improve the water quality?

- Yes -> Please describe below
- No -> go to Question 16

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.....

ENVIRONMENTAL IMPACTS OF YOUR RESTAURANT

16. What is your average volume of solid waste produced per month _____ m³/ kg/ tons

17. What measures does your establishment use to reduce solid waste production?

(May select more than one option)

- Composting kitchen and biodegradable waste
- Introducing waste segregation bins
- Replacing individual sachets of soap, shampoo, etc. with bulk dispensers
- Replacing single-use bottles and containers with multiple-use bottles
- Recycling paper, cardboard, plastic, metal, glass, cooking oil, etc.
- Selling or donating left-over food
- Other (specify: _____)

18. What was your average water consumption per month in 2013? _____ m³

19. Has your establishment used the following water saving devices/ practices?

- Auto detect in sinks/urinals
- Flow restrictors in showers
- Low flow taps in bathroom sinks
- Other (specify: _____)
- Double flush toilets
- Linen and towel re-use cards
- Waterless urinals

20. What was your average sewage production per month in 2013 _____ m³

21. How is your sewage water managed?

- Dumped untreated into the drainage
- Processed and dumped into the drainage
- Other (specify: _____)

PUBLIC PRIVATE PARTNERSHIP

22. How do you rate the current relationship between the public and private sectors in Ha Long Bay?

- Excellent
- Good
- Neutral
- Bad
- Terrible

23. How likely would you be to engage with a Ha Long Bay Alliance between public and private sectors to improve the Ha Long Bay environmental quality?

- Highly likely
- Somewhat likely
- Indifferent
- Unlikely
- Very unlikely

24. Would any of the following factors prevent you from becoming involved in an alliance?

(May select more than one option)

- Concern about return on investment
- Resources
- Unwilling to work with other parties
- Negative experiences with PPP in the past
- Time
- Other (specify: _____)

25. How is your willingness to contribute toward water quality improvement activities of Ha Long Bay via?

(May select more than one option)

- Application to an environmental certification program
- Donation in cash from room price for environmental protection fund
- Encouragement of employees to participate into environmental protection activities
- Other (specify: _____)

26. What are your suggestions for improving the water quality of the Bay?

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Thank you very much for your time and your invaluable co-operation



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