



Yemen LNG Company

Balhaf Headland Marine Area Biodiversity Action Plan

Operations Phase

Draft 18 May 2015



Balhaf Headland with Yemen LNG plant (Sep 2014)

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Yemen LNG Biodiversity Actions for the Operations Phase

- BA1 - Implement adaptive management for marine conservation in and around Balhaf
- BA2 - Implement a robust marine biodiversity monitoring programme
- BA3 - Increase awareness and understanding of marine biodiversity conservation in Yemen
- BA4 - Support marine biodiversity conservation actions in Yemen
- BA5 - Minimise the impact of operations and shipping on marine biodiversity
- BA6 - Engage strategically in coastal zone management in the Balhaf area
- BA7 - Support sustainable use of marine resources by the local fishing communities
- BA8 - Support continued improvement in the livelihoods of the local fishing communities

Executive Summary

The purpose of this Biodiversity Action Plan (BAP) is to set out the strategic framework plan for biodiversity action through the operations phase of Yemen LNG at the Balhaf Headland. To assure investors and stakeholders that the plan is biodiversity responsible, it has been developed in accordance with the Verified Conservation Areas (VCA) Standard which encourages the use of best practice approaches for biodiversity conservation including the International Finance Corporation's Performance Standard 6. In so doing, Yemen LNG is one of the first companies to commit to a new industry standard for verified conservation.

The importance of this plan beyond the company is that it demonstrates that the private sector, working with governments, NGOs, science and community partners, has a significant role to play in the conservation of biodiversity. Like many other industrial sectors, the oil and gas industry faces the challenge of understanding what biodiversity conservation means in practical terms and how its day-to-day activities can be organized and managed to maximize the protection and enhancement of biodiversity.



Implementing a conservation area management plan compliant with the VCA Standard can lead to many positive outcomes such as a sustained commitment to conserving a marine habitat with coral reefs and other aquatic species and the promotion of environmental-friendly fishing practices within the local community. It also provides opportunities for engaging the local scientific community in monitoring the conservation efforts and in supporting the country's efforts to enhance marine conservation in support of the Aichi Targets under the Convention on Biological Diversity of which the Government of Yemen is a signatory.

This plan builds on significant work undertaken during the construction phase of the Yemen LNG facility at Balhaf and provides the framework within which the company can develop a three-year rolling work plan of specific biodiversity actions. The proposed rolling work plan should enable the company to keep these actions focused and updated leading to an adapted management system for continual improvement.

This VCA-compliant BAP plan provides the framework within which the company can not only implement a three-year rolling plan, but also report on conservation performance annually as required to be listed on the VCA Registry. This regular process of reporting and feedback will result in an ongoing adapted management system which ensures best practice in conserving the marine biodiversity in and around the Balhaf Headland.

1. Introduction to the Plan

The Yemen LNG Company operates a modern liquefied natural gas facility on the south coast of Yemen and aims to do in full compliance with international standards to best conserve biodiversity. The company’s aim is to achieve internationally-recognized environmental performance in biodiversity conservation during all phases - design, construction, operations, closure, and decommissioning. This framework plan sets out this intent for the operations phase of the project. It is structured to meet both the needs of a framework biodiversity action plan as well as to enable the area to be registered as a Verified Conservation Area (VCA).

The facility at the centre of this project is a highly automated LNG Plant facility on the Balhaf Headland area on the coast of Shabwah Governorate in southern Yemen. The facility is approximately 130 kilometres west of Mukalla and 400 kilometres east of Aden (48.1802° E 13.9854° N) as shown in Figure 1. It covers 2,100 hectares of land and approximately 1,800 hectares of surrounding sea. As the sea component is an off-limits to local fishers, it acts as a de facto fully protected marine reserve.

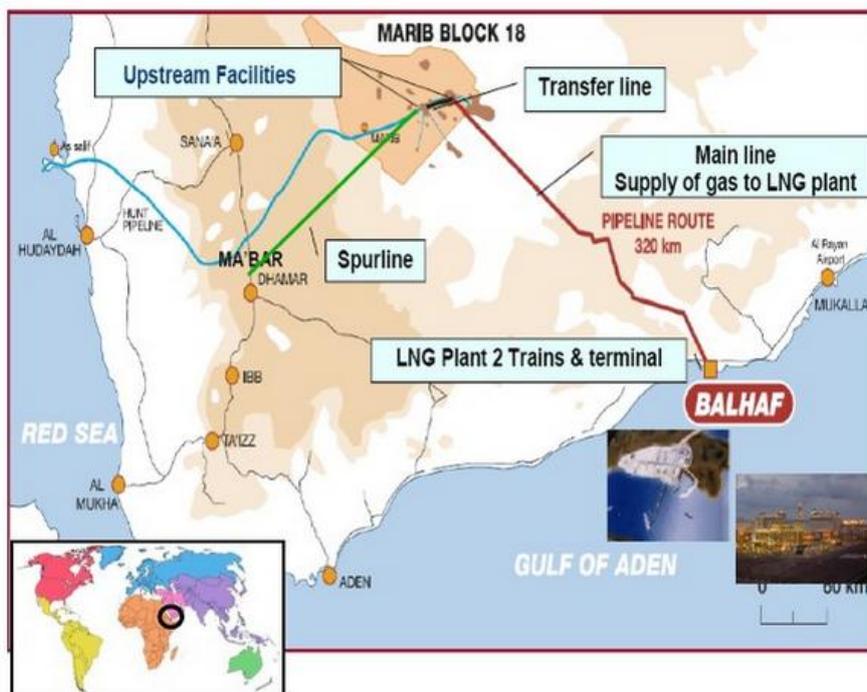


Figure 1. General location of Balhaf LNG plant in Yemen

The Company’s environmental and social policy states: “Yemen LNG’s environmental and social philosophy is founded on human development and the protection of biodiversity.” The core thinking behind the Company’s commitment is that biodiversity is a basic sign of the health of the environment. In its Health Safety and Environment (HSE) Policy, Yemen LNG is committed to conducting its business in a manner, which makes health, safety and environmental consideration a priority in its planning and operating activities.

The area surrounding the Balhaf LNG terminal site is remote and contains no existing industrial infrastructure. However, this area has a large natural marine biological

abundance and plays a role in the regional fishing industry, which is one of the most important economic activities in the region. This fishery is based on intact and well-functioning ecosystems. Hence, biodiversity protection is important for local livelihoods.

In 1996, the Government of Yemen ratified the Convention on Biological Diversity (CBD) and in so doing committed the country committed to significantly reduce the rate of biodiversity loss and to prepare and implement a National Biodiversity Strategy and Action Plan (NBSAP). Yemen's NBSAP, was published in January 2005 and formed a policy basis for the Company's initial Biodiversity Action Plan (BAP) of 2008. At the national level, the Company supports the government's biodiversity commitments.

In 2010, the Parties to the CBD adopted a Strategic Plan for Biodiversity with a set of targets known as the Aichi Targets. These provide the basis for updating of Yemen's NBSAP. Target 11 is particularly noteworthy because it sets out targets for conservation areas for which the company makes a contribution through its conservation management of the Balhaf marine area.

Accordingly, the purpose of this plan is to set out Yemen LNG's framework objectives and actions to conserve the marine biodiversity at Balhaf during the operation phase. It is building on work undertaken under the original BAP which focused mostly on the construction phase and it addresses the challenges and opportunities of ensuring that marine biodiversity is conserved throughout the long operations phase of the project. Importantly, as biodiversity conservation is not only a biological issue but also a socioeconomic one of increasing importance, biodiversity-related issues in the seascape surrounding the Balhaf marine area are also considered.

Yemen LNG has also committed for their biodiversity efforts to meet a new international industry standard of a Verified Conservation Area (VCA).¹ A well-defined and publicly-available conservation management plan required for VCA registration provides transparency and accountability on what actions are being undertaken, why they are being undertaken, by whom, when, and how. The present plan has accordingly been structured to also meet this goal and is therefore VCA compliant in structure, content and outlook.

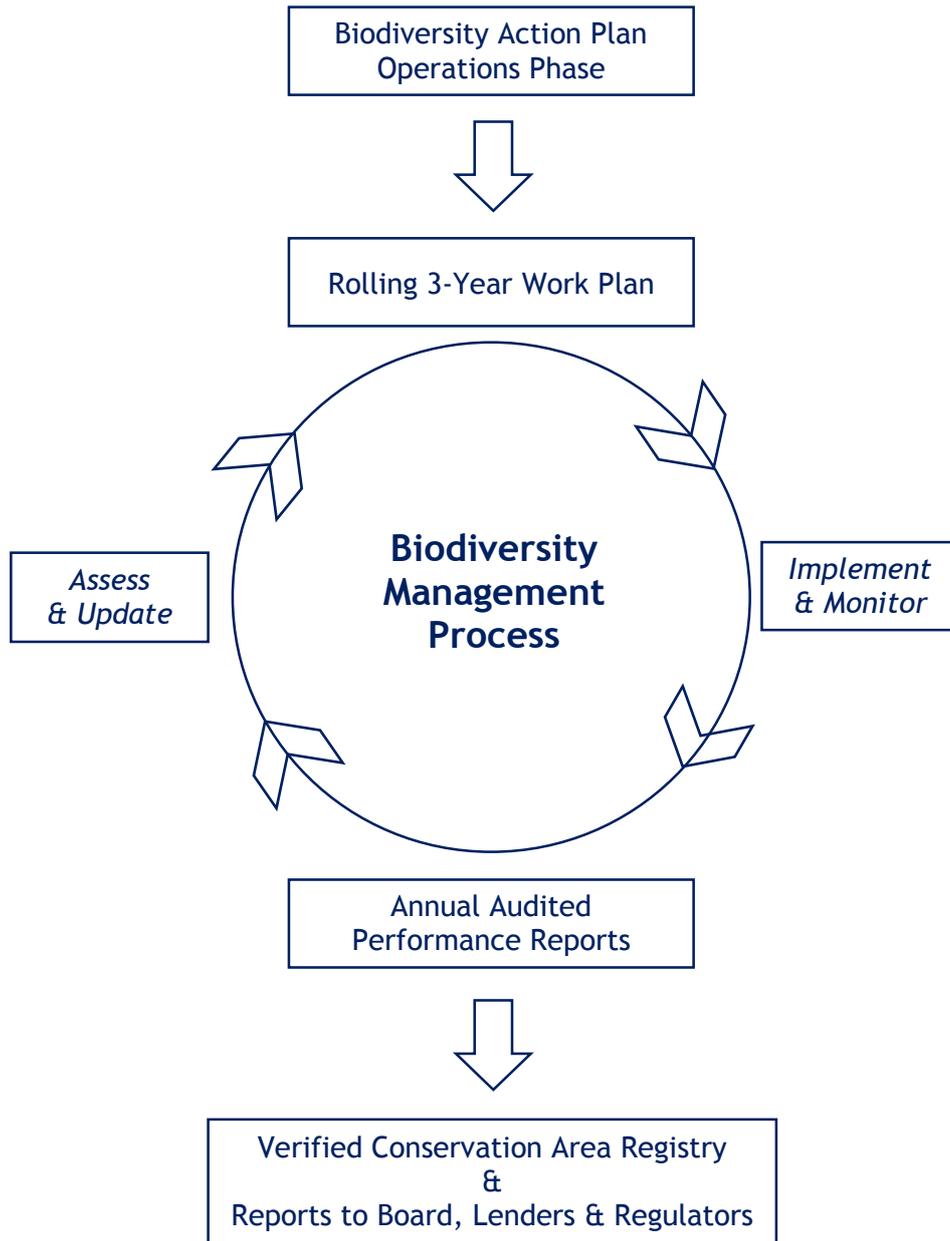
In so doing, this plan is also aligned with the 2012 Environmental and Social Performance Standards of the International Finance Corporation (IFC) and, in particular with Performance Standard 6 on biodiversity conservation. It builds on the original Environmental and Social Impact Assessment (ESIA) study for the project. The original BAP for the Construction Phase, from which this document draws, was based on guidance by IPIECA, an industry association focused on environmental and social responsibility.² The dual approach taken by this plan, responding to BAP and VCA standards, is in line with the country's NBSAP, as well as Yemen LNG's Environment and Social Management Plan.

¹ For more information on the VCA Standard, see <http://v-c-a.org/register>.

² For more information, see <http://www.ipieca.org/focus-area/biodiversity>.

A Framework for Biodiversity Action

The implementation of this plan through a continuous cycle of rolling three-years work plans, monitoring, reporting, feedback to senior management, and adaptation is presented in the following graphic. This plan is a framework to support the delivery of the conservation of Yemeni marine biodiversity over the next several decades.



2. Overview of the Balhaf Headlands marine area

The section provides an overview of the area’s characteristics and its management team.

2.1 Area characteristics

Essential facts			
Name	Balhaf Headland	Country	Yemen
Size	1,816 hectares	Province	Shabwah
Ecoregion	Tropical coral	Location	13.976768 , 48.176799

The Balhaf cape headland is the first promontory into the Gulf of Aden along the south coast of Yemen in the 400 km from Aden. It represents the start of a rocky shore environment that runs eastwards from Balhaf cape past Bir Ali 100 km to Burum. The Balhaf headland is the point of change from the 400 km of sandy beach running back westwards to Aden. Thus, Balhaf consists of a sandy coastline in the eastern part. The rocky area further west is formed by basaltic flows caused by volcanic activity. Some inactive old volcanoes and caldera can be found along the coastline.

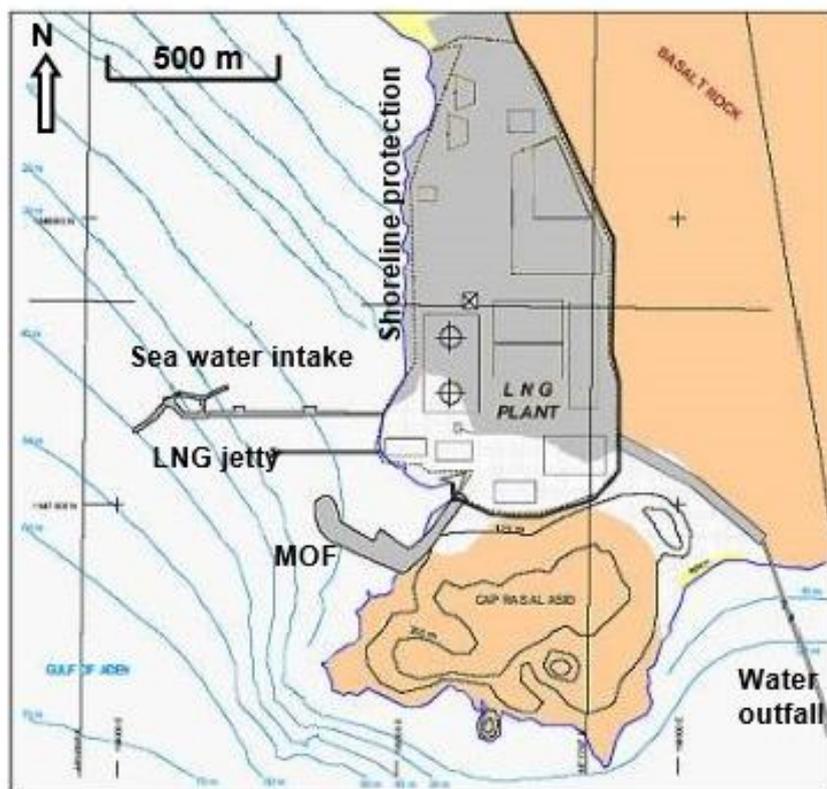


Figure 2 General layout of the Yemen LNG plant at Balhaf

The Balhaf Cape Headland is the location of the Yemen LNG plant. The Yemen LNG Company was created in 1995 following a call for tenders in Yemen with the objective

of valorising Yemeni gas reserves discovered on Block 18. Yemen LNG has allowed Yemen to become a major player in the growing world gas market. Following an open tender process, a Gas Development Agreement (GDA) was signed between the State of Yemen and YLNG on September 21st, 1995. This GDA sets out the general framework governing the development of the Yemen LNG project. The GDA was ratified by Parliament and enforced by a presidential decree. The original duration of the development phase was extended several times with Ministerial approval in accordance with the terms of the GDA.

The Balhaf LNG plant consists of the following facilities:

- The LNG Plant including Trains 1 and 2;
- LNG storage tanks;
- Jetty for LNG Carriers loading and shipping;
- Material Offloading Facility (MOF) for tug boat mooring;
- Sea water intake pipe;
- Water outfall pipe;
- Shoreline protection;
- and
- Offices, warehouses, housing, canteen and recreational facilities for staff.

The area surrounding the Balhaf LNG Terminal site is remote and contained no existing industrial infrastructure. However, Balhaf presents an important location for coral diversity estimated at 80 species, belonging mainly to 9 coral families. According to the Yemen NBSAP, it represents 81% of the total recorded number of Yemeni coral species. Although all coral species are regarded as sensitive and endangered, these species are to be considered of special value and sensitivity for the Balhaf area. *Porites* are the dominant genus followed by *Stylophora*.

Of the 80 corals species reported from Balhaf there are 4 species of particular importance within the frame of the regional and Indo-Pacific coral biogeography and their presence in Balhaf is considered as a highlight of the area (see Figure 5 below). Such species are regarded as sensitive and endangered by global environmental changes and human activities. All hard coral species have been included in the Convention on International Trade in Endangered Species (CITES) signed by 169 countries and joined by Yemen on 8/3/1997. Corals of Balhaf are surviving because of the particular upwelling and ocean current phenomena influencing the area.

2.2 Area Management

The Balhaf Headland is managed and protected by Yemen LNG through a Biodiversity Action Plan. Key contacts are as follows:

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3. Baseline condition assessment

This section provides an overview of the baseline conditions based on several monitoring missions by Creoccean and IUCN over the last several years. It aims to provide an understanding of the current status of marine biodiversity. However, with the challenging political situation and its impacts on both the society and the environment, it will be important to monitor the status of biodiversity carefully throughout the operations phase of the project.

3.1 Baseline condition determination

The monitoring work undertaken by Yemen LNG and its consultants provides a set of baseline conditions against which biodiversity conservation, monitoring and evaluation can be achieved. This work include a number of specific studies, regular monitoring and assessment missions, and independent evaluations undertaken by an IUCN Panel from 2009-2011.

A key part of this work was to undertake initial baseline studies prior to the LNG plant construction. An initial baseline study was undertaken in 1997, and when the project was re-launched in 2005, a second baseline was undertaken in September 2005. The latter study centred on an update of the 1997 baseline, and especially on an evaluation of the biological richness and the ecological status of the coral and fish communities of the study area. It consisted of two parts - a desktop bibliographical study and a field evaluation of the marine chemical and biological characteristics of the area. The baseline study highlighted the presence of highly sensitive corals and fish-abundant zone.

Later on during the construction phase, a full (or an extensive) monitoring plan was developed and implemented for the coral communities present in the area. This work formed a core focus of the initial Balhaf Marine Biodiversity Monitoring Programme, and its primary aims were to mitigate and thereby minimize the environmental impacts from the plant construction activities. See Figure 3.

The findings of this extensive monitoring work were presented in a comprehensive synthesis report published by Creoccean in 2010. In 2012 and three years after the start of the plant becoming operational, Creoccean was requested to perform further coral monitoring work to assess the coral community health status during the operational phase. The main goal of this work was to assess changes in the health status of coral communities around Balhaf area 2009.

Alongside these activities, in early 2009, IUCN finalized a partnership with the Yemen LNG Company Ltd (Yemen LNG) to design and manage an independent review process of their marine biodiversity action plan. This approach was modelled in part on Decision 258 of the Governing Council of the UN Compensation Commission for the independent review of the implementation of the environmental restoration projects following damages inflicted by the 1990 Iraqi aggression in Kuwait. The panel provides an independent review monitoring programme that includes expertise in fisheries, coral reefs, marine ecosystem restoration, marine protected areas, oil and gas pollution, and impact assessment.



Figure 3. Coral monitoring sites

3.2 Habitats, species and ecosystems

In terms of habitats, the area meets the IFC definition of a ‘natural habitat’. The Balhaf site is characterised by the presence of a unique diversity and abundance of coral species within the regional and Indo-Pacific coral biogeography. The coral community in Balhaf is made up of a mix of species from the northwest Indian Ocean, Red Sea, Gulf of Aden, the Arabian Sea and Persian Gulf. See Figure 4.

What makes the Balhaf corals of particular scientific value compared to other populations in the region is how they experience and cope with great fluctuations in seawater temperature as a result of monsoon events. Weather at Balhaf is dominated by two monsoon events - the summer southwest monsoon between June and September and the winter northeast monsoon between December and March. The transition period is characterized by variable winds.

The Balhaf area is located at the westernmost boundary of the upwelling influence area, and is characterized by a relative small surface of hard bottoms and a short length of the coast, approximately 10 km of shoreline. During the four summer months, west blowing winds create a coastal upwelling in the north of the Gulf of Aden, leading to an ascent of cold and nutrient-rich deep sea waters.

The Balhaf Headland area can be divided in three main zones, and each one, even if they form a functional unit, presents some different characteristics:

- The east: High exposure to the swell perpendicular to the shoreline leading to good water exchange and no or limited sedimentation of particles. Water is clear (low turbidity), which allows corals to extend into deeper water, down to between 12 and 14m. The rich coral community supports a diverse ecosystem of

invertebrates and fish. This zone is situated quite far from the plant construction area. The only major infrastructure is the cooling water outfall pipe, which ends 685m from the coast at 20m depth. No impact have been observed from the cooling water.

- The west: Low exposure to the swell because of protection by the cape which causes relatively high natural turbidity and fine particle sedimentation. This limits the development of the coral communities to a maximum depth of about 8m. Although the coral surface is less wide in this area, in some places, corals present a high size and complexity which represents attractive environment for reef fish (including commercial) for feeding, reproduction and grow-up. This area was more directly impacted by the marine construction activities.
- The south: Presents the most important coral diversity of Balhaf due to the offshore disposition of the area as well as to both current influences from the west and from the south. This area is a reference area to estimate the background quality of the water and to follow the health of the coral communities. Overall coral cover range is similar to the other three areas - between 30% in the north west at station point F to 80% in the east at station point A. See Figure 3.

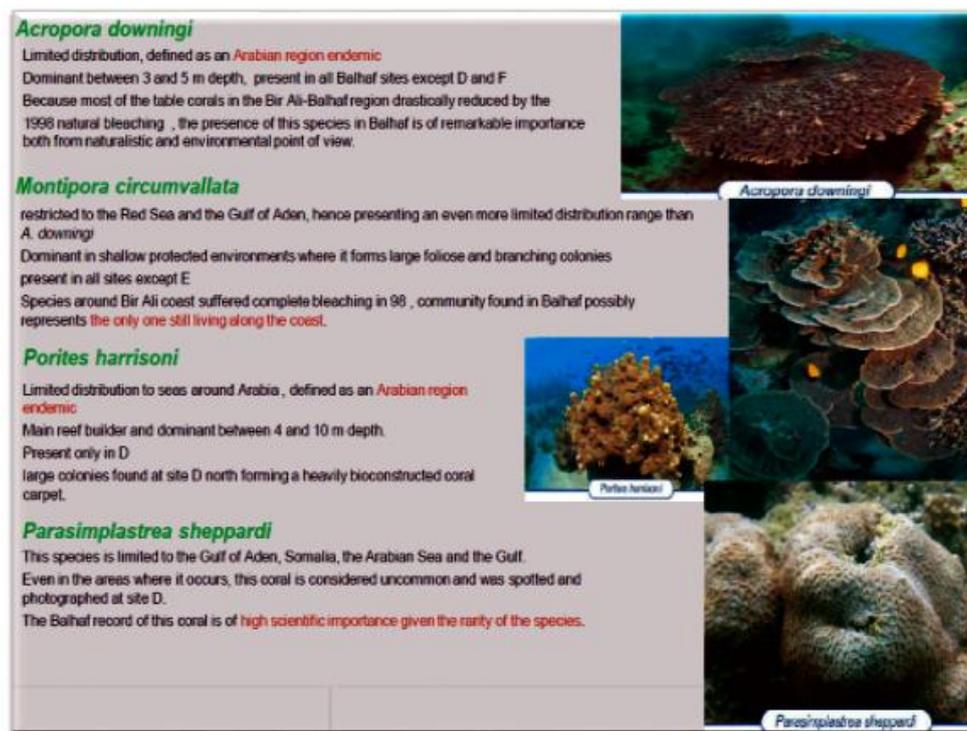


Figure 4. Sensitive species of corals found at Balhaf

Due to monsoonal upwelling, the seawater can reach low temperatures around 16 to 19°C, which is up to 10°C colder than the optimal average temperatures for coral growth (25 to 30°C). Due to this upwelling, corals experience important seasonal temperature and turbidity variations (alternating conditions of hot clear/cold turbid water). This regular change may limit the development of some coral species. Indeed, the coral diversity of the Gulf of Aden is lower than the one observed in other

surrounding the Middle East seas as the Red sea (Figure 5). The Gulf of Aden coral biodiversity (117 species) is roughly half of the Socotra Archipelago (253). Within this region the Balhaf-Bir Ali area is the one characterized by the highest number of coral species with 105 species out of 117 found in the Gulf of Aden.



Figure 5. Coral diversity in the region

The 1997 baseline recorded 197 invertebrate species in the Balhaf area, belonging to 9 phyla, as molluscs and crustaceans. These values correspond to a high faunal richness, particularly for sediment which is composed mainly by sand particles and whose granulometric structure is relatively homogenous throughout the zone. Diversity seemed to be higher the west of the cape, while the benthic fauna abundance was higher east of the cape. All these features constitute important ecological and economical values for the local Balhaf area and for Yemen.

The coral reefs of the Balhaf area support a diverse community of reef fishes. The 2005 study reported 148 fish species, belonging to 43 families. Considering the limited sample area (approximately 1600 m²), the Balhaf area can be considered as having uniquely high fish diversity in comparison with results obtained in other nearby regions (e.g. Bir Ali - 7500 m², 195 species, Socotra - 20000 m², 211 species). Moreover, according to several studies, it seems that the Balhaf area presents similar fish abundance to other coral reef area such as Moorea (French Polynesia), Hawaii or the Great Barrier Reef (Australia).

During the construction phase a key issue of concern was the possible contamination of the marine environment or the physical destruction of the habitats. A study was undertaken in 1997 to investigate the concentrations of metal elements and hydrocarbons in sediments. The results showed that the concentrations corresponded to values normally recorded in uncontaminated environments. Hence the contamination level of the Balhaf area in 1997 was very low. Even so the baseline showed tar balls and other signs of oil contamination on the shoreline, especially on the eastern coast of the cape, on the beach and intertidal rocks. This contamination corresponded to recent isolated deposits and several large older deposits (2 to 3 cm thick, covering an area of 5 to 10 square meter). The pollution was attributed to chronic pollution provoked from tanker traffic and associated de-ballasting.

Corals are sensitive to environmental changes. Dramatic alterations have been observed in coral reefs around the tropics due to increasing temperature, increasing

concentrations of particles in the water, and diseases. In 1998 coral reefs around the world were seriously affected by the elevated water temperatures as a result of an extreme ENSO event (El Niño-Southern Oscillation). Elevated seawater temperatures induce bleaching in corals and bleaching events have become regular events during the last decades due to climate change. In 1998 as well as in 2010 the water temperatures in the northern Indian Ocean increased 3 to 5 degrees above normal. Such temperatures result in bleaching and death among several of the more common species of corals. Indeed, the presence of dead corals and a partial change of the coral species composition have been observed in the Balhaf area. Most of the living *Acropora* colonies observed in 1997, on the east bay and west side of the cape, disappeared as a result of the major ENSO in 1998. The calcareous skeleton of these corals were gradually colonized by other coral species, or by coralline algae, as observed in 2005. Despite this mortality phenomenon, the two baselines concluded that coral communities in Balhaf area are in a very good health state, a conclusion supported by the lack of coral disease observation.

3.3 Current status of habitats, species and ecosystems

The Yemen LNG strategy for marine biodiversity has been to avoid impacts by designing and redesigning facilities (e.g. the outtake pipe and the MOF). If impacts are unavoidable, mitigation measures are taken to mitigate any possible harm or damage, whether to populations, wildlife or the environment. Secondly, ensuring the residual impacts are negligible, or moderate at most, by applying the ALARP (as low as reasonably possible) principle, for example, by the use of silt curtains to protect the coral areas during construction. Thirdly, to provide proper compensation (offset measures) to meet international standards where harm cannot be fully redressed (loss of fishing area, coral transplantation from construction areas) as well as establishing a positive and enduring legacy in Yemen for the benefit of future generations. In this regard, the company committed to invest in the social development of its neighbours in a sustainable way that would benefit the communities and the company in the long term.

The effectiveness of the above approach has been tested by implementing a comprehensive multi-level monitoring program which has been implemented since construction time. See Figure 3. This approach has included seawater quality monitoring as well as qualitative and quantitative monitoring of coral reefs and fish communities.

Based on the recent Yemen LNG monitoring results of the marine biodiversity in Balhaf, and as confirmed by the latest IUCN mission in October 2014, the present situation in Balhaf can be summarized as 'no major change in community composition since 2012 monitoring'. The IUCN mission observed an increase in recruitment in almost all sites, but alongside this there was also a mass mortality of large *Stylophora* in all sites including the reference point C (which is far from the effect of operation). This is most likely related to the 2010 coral bleaching event due to regional rise in water temperature. There was also an increase in sediment deposits particularly in area D. Area F was observed to have the lowest coral cover, diversity, and recovery.

3.4 Legally protected areas

Other than the actions by Yemen LNG, no formal protected areas are present within the plant area, or within the area of influence of the company at Balhaf. The Balhaf area is at the western edge of a proposed large marine protected area in the Bir Ali-Burum sector of the coast and is itself classified by the Environmental Protection Agency as a 'General Use Zone.' However, should a marine protected area be established in the area, then conservation management efforts of the company will play a supporting role.

3.5 Threats from invasive species

The risk of invasive species from incoming ships remains a possibility which needs to be systematically monitored and managed.

3.6 Ecosystem services

The healthy and rich coral habitats are one of the two main pillars of the productivity at Balhaf. The second is the seasonal upwelling from the south west monsoon. Together they establish a link between the coral and the fish communities. The hard coral skeletons have created a complex three-dimensional structural relief which can enable the larvae of invertebrates (including corals) and vertebrates (including fish) to settle, provide refuge for species in their larval, juvenile and adult stages, provide nursery areas for many species, and provide food and feeding habitat for many organisms, including commercially important fish. For this feature, the Balhaf area presents a particular economic interest, supplying an important quantity of fishes to the local fishermen.

Given the plant operations have to by necessity exclude any fishers on the grounds of safety and security, the marine area immediately around the facility is in effect a de facto marine reserve. This area accordingly acts as a rare haven in the wider region to protect habitats and species, such as the corals and associated fish communities.

To fully understand the area's role as a fish nursery, a baseline was carried out during the construction phase in 2006. The aim was to evaluate the importance of the waters around the Balhaf area in terms of its function as a nursery and source of commercial fish productivity. The study analysed the link between reef-building corals and fish populations and showed a direct relationship between coral health and fish abundance and diversity.

On a well-functioning coral reef, corals, algae and plankton supplies the food chains which support the fish communities. The Balhaf coral communities in the de facto marine reserve are in effect a source for commercially important fish, enhancing the fisheries in surrounding waters. The study underlined exceptional coastal fish diversity and an important abundance at Balhaf, with a total of 326 species recorded so far in the wider area, belonging to 65 families.

4. Conservation Impact Assessment

The potential impacts on nature within the Balhaf marine conservation area, in the context of the broader surrounding landscape, have been assessed from two main angles - stakeholder consultation and a SWOT analysis. The current impact assessment also builds on the Environmental and Social Impact Assessment (ESIA) which was undertaken before the project was developed.

4.1 Stakeholder Consultation

Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts. With regard to the Balhaf, key stakeholders include the communities living on the coastal zone directly adjacent to the plant who rely on nearshore marine fish as part of their diets and for local trade. As in other areas along the Yemen coast, permanent and transient fishermen who used to operate in the Balhaf security zone use a mixture of gear and craft, targeting multiple species groups and markets.

The area has traditionally been of seasonal importance, providing a sheltered landing space to fishermen targeting fish stocks seeking food enhanced by monsoon induced upwelling of nutrient rich waters around the Balhaf headland. These fishermen are and will remain the nearest and permanent neighbours of Yemen LNG's Balhaf plant for the foreseeable future.

The introduction of the Yemen LNG security exclusion zone at the Balhaf site has affected traditional fishing and landings, notably during the SE monsoon season. Yemen LNG defined five areas where its establishment would impact existing fisheries:

- loss of the Balhaf landing site;
- loss of income from fishing;
- loss of baitfish;
- increased costs to land fish at Bir Ali; and
- the potential loss of biomass if the marine environment at Balhaf is compromised by construction or operations.

The first visit to Balhaf by the IUCN Panel in November 2009 provided an opportunity to meet the local stakeholders. This coincided with the preparations for the official opening of the Balhaf plant by the President of the Republic, and the loading of the first LNG tanker. Although Yemen LNG management and staff made every effort to facilitate the needs of the evaluation team, security considerations limited the fishery programme evaluator to a brief visit to Al Ayn Bay beaches and Bir Ali, but prevented more in-depth inquiries at these and other locations outside the perimeter fence. The evaluator benefited particularly, however, from the findings and experience of Yemen LNG management and staff, the experience of Yemeni consultant coordinator of the fisheries programme, and from reports of the fisheries consultants, covering their activities since 2005.

Subsequently the IUCN Panel made further visits to the local communities around the plant. They also met with government officials in Sana'a and organised a workshop

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with the official government monitoring committee to understand their needs and concerns in the context of the BAP.

More recently broad consultation was undertaken during a visit to Balhaf by the IUCN in the form of a 3-day training workshop. This took place in October 2014 and participants included company staff, contractors, government officials and university professors. The topics covered included:



- International frameworks for biodiversity action;
- Global marine biodiversity threats & responses;
- Tools & approaches for marine biodiversity management;
- Introduction to the VCA approach;
- Baseline assessment & monitoring; and
- Elements of YLNG's marine biodiversity management plan.

Several training modules presented technical topics such ecosystem-based management, coral reef resilience, marine protected areas, and marine environmental monitoring. The company presented an update on the current status of marine biodiversity at Balhaf including a presentation of the Creocan mission in September 2012 which looked at the status of the corals both at Balhaf and further down the coast. There was a session as well on Verified Conservation Areas and the process underway to list Balhaf on the VCA Registry.

4.2 Conservation SWOT analysis

Set against an understanding of the baseline conditions at Balhaf, a 'SWOT' analysis seeks to identify the Strengths, Weaknesses, Opportunities, and Threats for the project. To do this the area's internal strengths and weaknesses are explored, as well as the external opportunities and threats to maintaining and enhancing the conservation performance.

For the Balhaf area such an analysis was undertaken with a multi-stakeholder group as part of the training workshop in October 2014 referred to above. This analysis included both an 'inside-the-fence' look at Strengths & Weaknesses (SW) and a broader landscape/seascape discussion of Opportunities & Threats (OT). In this regard, the focus was on area-based conservation in support of broader sustainable biodiversity management in the region. The following points were highlighted in the discussions:

Internal Strengths

- Marine exclusion zone as a de facto Marine Protected Area
- High environmental and social standards
- Management awareness of marine conservation importance
- Capacity to finance conservation
- Social commitment from the company

Internal Weaknesses

- Impacts of the physical operations on the area
- Risk of destroying and damaging the environment
- Impact on livelihoods of fishermen and their increasing vulnerability
- Corporate regulations may not be fit for purpose for marine management and monitoring
- Data collected since start of the project has not been shared or used and to analyse the impacts
- Not allowed to go swimming for security reasons

External Opportunities

- Potential to provide best practice lessons for rest of Yemen
- Opportunity for producing a social and environmental manual on coastal zone management
- Opportunity of the exclusion zone with the support of the military to protect the area from local fishermen and others
- Yemen LNG, as a pioneer for a comprehensive biodiversity plan, can spearhead industry globally
- Good communication between the company and environmental organisations
- Company contributes to corporate zone management of the Yemeni coast
- Low human population allows for a VCA to be set up here
- Company's efforts can contribute to new NBSAP and promoting sustainable development
- Potential for increased cooperation with the MOM Committee which can help to review regulations
- Research opportunities for local universities, e.g. studying fish spill overs from the sites and their value to the local economy
- As one of the best protected areas in the Indian Ocean, opportunities for international researchers as well

External Threats

- Institutional challenges for governance
- Illegal fishing pressures
- Unfortunate accidents and spills
- National security situation is a material threat
- Potential for lack of continued political support for the company's efforts, especially because of the political situation
- Impacts of climate change include coral bleaching, unusual storms, and heat waves
- Reports are in English and not also in Arabic, leading to exclusion of key local stakeholders

4.3 Environmental & Social Impact Assessment

During the early stages of the project the company produced by an in-depth Environmental and Social Impact Assessment (2006) and subsequently an Environment and Social Management Plan (2007) of which the original marine Biodiversity Action Plan (2008) was a component.

The company's "environmental and social philosophy is founded on human development and the protection of biodiversity." Company policy includes the following nine environment and social principles:

1. Understanding the social, economic, institutional, political, cultural and environmental context of Yemen and in particular of the Project Regions, in order to integrate our operations effectively into the local environment.
2. Identifying our stakeholders, engaging and maintaining dialogue with them to build relationships based on trust and mutual respect.
3. Assessing and enhancing the positive impact of our activities, while preventing and mitigating their negative impact on populations, wildlife and the environment for the duration of our operations and beyond.
4. Providing compensation commensurate with loss, where negative impact cannot be fully redressed, and to do so in a legal, transparent and ethical manner.
5. Establishing a positive and enduring legacy for Yemeni society and preserving Yemen's natural environment for the benefit of future generations.
6. Promoting human development in local communities to enable them to independently manage and sustain the community initiatives we support. To do this we will take every opportunity to work with local partners when designing and deploying societal and environmental initiatives.
7. Maximizing the employment of Yemenis, both for YEMEN LNG and for its contractors and providing training and development to improve their skills and capacity.
8. Monitoring the progress of our environmental and social activities against the corresponding action plans, and regularly reporting on this progress to stakeholders.
9. Following recognized regional and international standards in all of our environmental and social activities - as currently laid out in World Bank/IFC guidance.



5. Biodiversity Actions

This plan presents Yemen LNG's strategic approach to conserving and enhancing marine biodiversity at Balhaf throughout the operations phase. Based on this framework for biodiversity action, as set out in Biodiversity Action 1 (BA1) below, a rolling three-year work plan with a specific set of activities and key performance indicators will be established.

This BAP incorporates the themes and priority objectives of the original BAP which was released in 2008 and focused mostly on the construction phases. These are as follows:

Theme 1: Understanding Marine Biodiversity & Identifying Risk

Theme 2: Protection of Marine Biodiversity

Theme 3: Going Further: Awareness, Education, Research and Communication

Objective 1: Adequate anticipation and management of biodiversity risk at the Balhaf site

Objective 2: Ensure the conservation and preservation of marine biodiversity

Objective 3: Promote environment friendly fishing with local communities and economic development

Objective 4: Increase knowledge and awareness of YLNG staff and local communities and share our biodiversity experience with universities, schools and administrations

Yemen LNG Biodiversity Actions for the Operations Phase

BA1 - Implement adaptive management for marine conservation in and around Balhaf

BA2 - Implement a robust marine biodiversity monitoring programme

BA3 - Increase awareness and understanding of marine biodiversity conservation in Yemen

BA4 - Support marine biodiversity conservation actions in Yemen

BA5 - Minimise the impact of operations and shipping on marine biodiversity

BA6 - Engage strategically in coastal zone management in the Balhaf area

BA7 - Support sustainable use of marine resources by the local fishing communities

BA8 - Support continued improvement in the livelihoods of the local fishing communities

Consistent with the IFC approach to biodiversity mitigation and with the IUCN definition of conservation, the biodiversity actions in this plan address these themes and objectives under four strategic approaches - Avoidance, Minimisation, Restoration, and Offset. See Table 1.

IFC Biodiversity Mitigation Strategy	IUCN World Conservation Strategy
Objectives	
Protect and conserve biodiversity, maintain the benefits from ecosystem services & promote the sustainable management of living natural resources	Management of human use of the biosphere to yield the greatest sustainable benefit while maintaining its potential to meet the needs & aspirations of future generations
Conservation actions for habitats, legally protected areas, invasive alien species & ecosystem services	
Avoid negative impacts Minimise negative impacts Restore habitats Offset like-for-like or better	Preservation & maintenance Restoration & enhancement of the natural environment
Conservation actions for primary production of living natural resources	
Implement sustainable management practices to credible standards as demonstrated by independent verification	Sustainable utilisation

Table 1. VCA Framework for Conservation Action

Though the first two approaches - avoidance and minimisation - were the major focus during planning and construction, they continue to provide the foundation for biodiversity action through the operations phase. The emphasis is on maintaining and monitoring the conserved marine habitat as well as supporting conservation efforts in Yemen beyond the Balhaf site.

Restoration actions include the monitoring of ‘natural restoration’ such as the new corals growing on the industrial underwater infrastructure. Also, though a biodiversity offset was not needed to ensure a net positive impact on biodiversity, there are social offset/compensation actions in response to the loss of access to the area for local fishermen. In this respect, the company is committed to supporting sustainable fisheries in the marine areas surrounding the Balhaf Headland and to sustainable coastal zone management.

5.1 Avoidance actions

During the construction phase, the avoidance actions focused on avoiding impacts on critical marine habitat. For example, the outtake pipe was positioned so that the warmed waters would not impact on the shoreline reefs. During the operations phase, the avoidance actions include continued management and monitoring within the Balhaf marine area, support to marine conservation in the coastal areas neighbouring Balhaf, and broader support to conservation efforts globally.

BA1 - Implement adaptive management for marine conservation in and around Balhaf

Key components include the following:

- Preparation and implementation of a three-year rolling work plan of specific and focused activities with key performance indicators
- Annual reporting on the BAP including reporting required by the government, the lenders and an audited performance report to maintain VCA registration
- Development of a BAP for the decommissioning phase

BA2 - Implement a robust marine biodiversity monitoring programme

Key components include the following:

- An onsite and staffed programme with increasing use of trained Yemeni marine scientists over time
- Maintaining a centralized marine monitoring data system incorporating the work done to date by Creocan, IUCN and others
- Updating the Environment Baseline Survey on a regular basis including a comprehensive assessment of fish communities and stocks
- Monitoring all the actions in the Operations BAP
- Including both qualitative and quantitative monitoring of the marine habitat and marine species including monitoring potential impacts of industrial operations such as outtake pipe, external threats such as ballast water releases, and naturally occurring phenomena such as coral bleaching
- Coral health monitoring both at Balhaf and at reference sites outside Balhaf
- Organic and inorganic nutrient and heavy metal monitoring in Balhaf
- Inclusion of the Government Environmental Monitoring Committee in the programme
- Third party auditing

BA3 - Increase awareness and understanding of marine biodiversity conservation in Yemen

Key components include the following:

- Publish monitoring results in annual audited conservation performance reports on the company website and the VCA Registry
- Develop internal marine biodiversity awareness programmes for staff
- Support external marine biodiversity awareness programmes in schools and universities and share company's experience with marine conservation
- Support the publication of presentation of scientific books and papers on the company's marine conservation management programme and marine biodiversity in Yemen
- Celebrate the World Environmental Day (WED) on the 5 June of each year.

BA4 - Support marine biodiversity conservation actions in Yemen

Key components include the following:

- Support for the Yemeni Coastal Zone Management Project sponsored by the Environmental Protection Agency

5.2 Minimisation actions

During the construction phase, a number of actions were undertaken to minimise the impacts on marine biodiversity. These included using slit curtains to protect the corals and redesigning the MO. During the operations phase, the company will continue to minimise the impacts of its operations and outside pressures on the marine area.

BA5 - Minimise the impact of operations and shipping on marine biodiversity

By always using Best Available Technology (BAT) and proactively overseeing all operations with environmental aspects as a prime objective.

Key components include the following:

- Identifying and mitigating potential impacts from built infrastructure
- Identifying and mitigating potential impacts from waste and runoffs
- Ensuring that marine conservation is integrated into harbour management
- Ensuring that ships abide by international standards regarding ballast water discharge

BA6 - Engage strategically in coastal zone management in the Balhaf area

Key components include the following:

- Participating in local efforts to manage the coast areas sustainably
- Supporting government efforts to stop illegal fishing within the Balhaf marine exclusion zone
- Engaging with key stakeholders to enhance the capacity for effective coastal zone management in the Balhaf area

5.3 Restoration actions

During the construction phase, significant restoration actions were implemented such as the reinstatement of the natural shoreline near the outtake pipe. During the operations phases, a natural restoration of corals is taking place on the underway built infrastructure - notably on the MOF and the outtake pipe. The natural restoration will be monitored as set out in BA2 above.

As the Balhaf marine area is protected, no additional restoration plans are envisioned. However, should the need for restoration actions arise, these will be included into the rolling-three year plan as set out in BA1 above.

Regarding possible support for restoration activities outside of Balhaf, these will be address in support to local coastal zone management as set out in BA6 above.

5.4 Offset actions

During the construction phase, the company succeeded in ensuring a net positive impact on marine biodiversity through its avoidance, minimisation and restoration measures. This positive impact is expected to continue during the operations phase with the actions outline in this framework plan. Thus, the project does not require a biodiversity offset.

However, the establishment of the LNG production and shipping operations at the Balhaf Headland resulted in a loss of access to this marine area by the local fishing industry. Thus the company has agreed to provide ongoing support to the local fishing communities as a way to compensate or offset this loss.

As this support relates closing to supporting the sustainable management of the local coastal areas, it is included in this framework action plan.

BA7 - Support sustainable use of marine resources by the local fishing communities

Key components include activities such as the following:

- Construct a new office in Bir Ali for Ministry of Fish Wealth and the Fishery Cooperatives Union
- Support for the development of environmentally sound fishing techniques
- Capacity building for fisheries and institutional strengthening of related stakeholders to promote resource management and services.
- Support for the local production and deployment of Fish Aggregation Devices (Fads)

BA8 - Support continued improvement in the livelihoods of the local fishing communities

Key components include activities such the following:

- Construct a fish auction at Ein Bamabaed village
- Construct workshops in Bir Ali and Ergah villages for boat and boat engine repair
- Procure 2 heavy duty trailers with spare parts for boat hauling at Jela'ah
- Explore potential economic activities for developing a number of community small businesses on credit with partner banks
- Implement a 2 years advanced training program for 12 fishermen high school graduate at the Marine Institute in Aden in fibre glass small and large boat and boat engine repair
- Train community women to improve local and traditional fish handling method - i.e. preparing smoked and salted fish
- Construct an environmental-friendly solid waste landfill for the village of Bir Ali