

**Islamic Republic of Iran  
Department of Environment**

**The Project on Development and  
Implementation of a Master Plan for  
Environmental Conservation and  
Management of Southern Coastal Areas of  
the I.R. Iran (Case Study Hormozgan)**

**Final Report**

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**Japan International Cooperation Agency (JICA)**

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## **GIS Database (DVD-2)**

## List of abbreviations

Abbreviation	English
AEPI	Act of Environmental Protection and Improvement
CEQG	Canadian Environmental Quality Guidelines
CBD	Convention on Biological Diversity
C/P	Counterpart
DOE	Department of Environment
EIA	Environmental Impact Assessment
EBM	Ecosystem Based Management
EBSA	Ecologically or Biologically Significant Areas
GIS	Geographic Information System
HAB	Harmful Algae Bloom
HQ	Headquarter
IBA	Important Bird Areas
ICZM	Integrated Coastal Zone Management
IUCN	International Union for Conservation of Nature
IEA	Important Ecosystem Area
ILUPEC	Infrastructure, Land Use Planning and Environment Committee
IMO	International Maritime Organization
INIOAS	Iranian National Institute for Oceanographic and Atmospheric Sciences
IFO	Iran Fisheries Organization
IPIECA	International Petroleum Industry Environmental Conservation Association
IUT	Isfhan University of Technology
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
MEMAC	Marine Emergency Mutual Aid Centre
MIMT	Ministry of Industries, Mine and Trade
MOJA	Ministry of Agriculture Jihad
MOE	Ministry of Energy
MOHME	Ministry of Health and Medical Education
MOP	Ministry of Petroleum
M/P	Master Plan
MRUD	Ministry of Roads and Urban Development
NBSAP	National Biodiversity Strategies and Action Plan
NDP	National Development Plan
NGO	Non-governmental organization
NOSCP	National Oil Spill Contingency Plan
NWCSAP	National Wetland Conservation Strategy and Action Plan
PBO	Planning and Budget Organization
PDC	Planning and Development Council
PGOSERI	Persian Gulf and Oman Sea Ecological Research Institute
PMO	Port and Maritime Organization
PMU	Project Management Unit
PSSA	Particularly Sensitive Sea Area
RIPI	Research Institute of Petroleum Industry
ROPME	Regional Organization for the Protection of Marine Environment
SCE	Supreme Council of Environment
SEA	Strategic Environmental Assessment
SEZ	Special Economic Zone
UNESCO	United Nations Educational, Scientific and Cultural Organization
WG	Working Group
WGC	Working Group Committee



# **1. BACKGROUND**

## **1.1 Background of the Project**

The Persian Gulf and Gulf of Oman, located in the southern coast of Iran is an area renowned for oil and gas industries, but it is also an area with important natural ecosystems such as mangroves, tidal flats, coral reefs and seagrass beds, which are the habitats of various marine life and birds. However, the coastal environment has been affected by anthropogenic activities leading for example to marine pollution, increase in water temperature and salinity, red tide, mass mortality of marine life, biodiversity decline and habitat destruction.

Under such circumstances, the Government of the I.R. Iran requested the Japanese Government to provide technical assistance for the development of a master plan for coastal conservation and management of the southern coastal area of Iran. After a series of discussions between Japan International Cooperation Agency (JICA) and Department of Environment (DOE) and relevant organizations, both parties agreed through signing of Record of Discussion (R/D) in March 2017 to implement the project titled “The Project on Development and Implementation of Master Plan for Environmental Conservation and Management of Southern Coastal Area of the I.R. Iran (Case Study Hormozgan) (hereinafter referred to as “the Project”)”.

## **1.2 Goals and outputs of the Project**

The main goals to be attained upon the completion of the Project are as follows:

- To develop a mechanism for the formulation and implementation of the Master Plan for Environmental Conservation and Management of Southern Coastal Areas of the I.R. Iran (hereinafter referred to as “M/P”).
- To enhance the capacity of DOE and other stakeholders required for the formulation and implementation of the M/P.

These goals are expected to be achieved through attaining the following Project outputs:

- Output 1: Development of a mechanism for stakeholder involvement in formulation and implementation of the M/P.
- Output 2: Formulation of the M/P including its implementation plan and monitoring and evaluation plans.
- Output 3: Sharing of knowledge and experience gained during the Project with other three southern coastal provinces of the. I.R. Iran and other stakeholders such as Regional Organization for the Protection of Marine Environment (ROPME) member states.
- Output 4: Recommendation of measures to improve existing environmental regulatory and policy framework.

### **1.3 Implementation organizations of the Project**

DOE is the main implementation body of the Project. In addition, the Deputy Governor and Planning and Budget Organization (PBO) of Hormozgan Province took part as the implementation body of the Project.

### **1.4 Project period**

The Project commenced in September 2017 and was implemented over a three-year period.

## 2. ACTIVITIES OF OUTPUT 1

**Output 1: Development of a mechanism for stakeholder involvement in formulation and implementation of the M/P.**

### 2.1 Establishment of organizational structure for M/P formulation

Under the leadership of DOE, the M/P was formulated by establishing four organizational units, namely, Project Management Unit (PMU), Joint Coordination Committee (JCC), Working Group (WG) and Working Group Committee (WGC). PMU acted as the main implementation/management unit, which under the leadership of Deputy of Marine Environment and Wetland of DOE Headquarter (HQ)<sup>1</sup>, consisted of leading members and experts of DOE, Deputy Governor of Hormozgan, PBO Hormozgan and JICA Project Team. JCC acted as the coordination unit, consisting of representatives from relevant organizations and JICA Iran Office. Five WGs were established to discuss technical issues of the M/P, which consisted of the following groups:

- WG1: Marine Pollution
- WG2: Habitat and Biodiversity
- WG3: Risk Assessment and Management
- WG4: Spatial Planning
- WG5: Laws and Regulations

The WGs consisted of various stakeholders from Hormozgan, such as government organizations, NGOs, universities and research institutes. WG meetings were convened at key stages of the M/P formulation, and was held in total eight times. WGC consisted of representatives from each WG, which were held after the WG meetings to share and discuss outputs of each WG and cross-cutting issues. Table 2.1.1 shows the main responsibilities and members of each organizational units. Figure 2.1.1 shows the organizational framework of the M/P formulation.

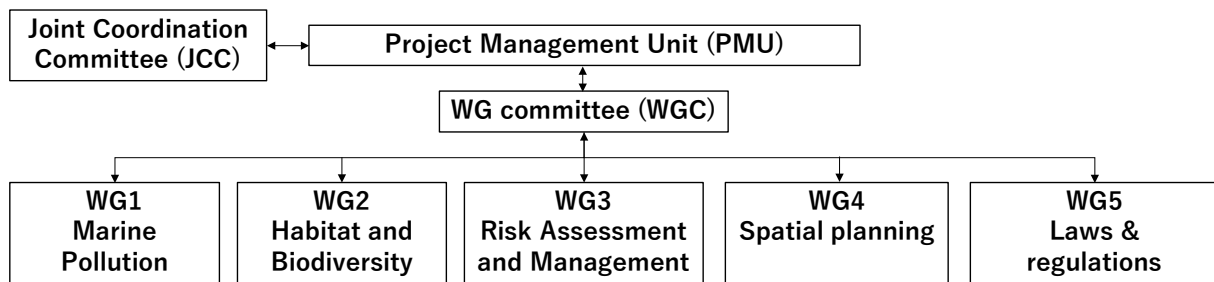
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<sup>1</sup> Deputy of Marine Environment and Wetland was formed in 2019 after the Wetland Bureau was incorporated into Deputy of Marine Environment.

**Table 2.1.1 Main responsibilities and members of each organizational units**

Organization	Main responsibilities	Members
PMU	<ul style="list-style-type: none"> <li>Implementation, management and approval of Project activities.</li> <li>Coordination with other relevant organizations.</li> </ul>	<ul style="list-style-type: none"> <li>Project Director (Deputy of Marine Environment, DOE HQ)</li> <li>Deputy Project Director (Director General of the Coasts and Coastal Wetlands Office, DOE HQ)</li> <li>Provincial Project Manager (Director General of DoE Hormozgan)</li> <li>Experts of DOE HQ and Hormozgan</li> <li>Deputy Governor of Hormozgan</li> <li>PBO Hormozgan</li> <li>JICA Project Team</li> </ul>
JCC	<ul style="list-style-type: none"> <li>Facilitate coordination with relevant authorities in Tehran and Hormozgan.</li> <li>Review of progress of Project activities.</li> <li>Review and exchange views on major Project issues and recommend corrective measures.</li> </ul>	<ul style="list-style-type: none"> <li>Chairperson: Deputy of Marine Environment</li> <li>Representatives of PMU and WGs</li> <li>Deputy Governor of Hormozgan</li> <li>Representatives of PBO</li> <li>Representatives of JICA Iran Office / JICA Project Team</li> </ul>
WG	<ul style="list-style-type: none"> <li>Collect and collate required data and information.</li> <li>Discussion and provide solution on technical issues.</li> <li>Plan and implement required studies and research.</li> </ul>	<ul style="list-style-type: none"> <li>DOE experts, universities, research institutes, local government, NGOs etc.</li> </ul>
WGC	<ul style="list-style-type: none"> <li>Exchange of information between WGs</li> <li>Monitoring of progress</li> <li>Discussion of issues especially cross-cutting activities</li> </ul>	<ul style="list-style-type: none"> <li>Representatives of each WG.</li> </ul>

Source: JICA Project Team



Source: JICA Project Team

**Figure 2.1.1 Organizational framework of M/P formulation**

## 2.2 Establishment of organizational structure for M/P implementation

Refer to Chapter 3.14.

### **3. ACTIVITIES OF OUTPUT 2**

**Output 2: Formulation of the M/P including its implementation plan and monitoring and evaluation plans.**

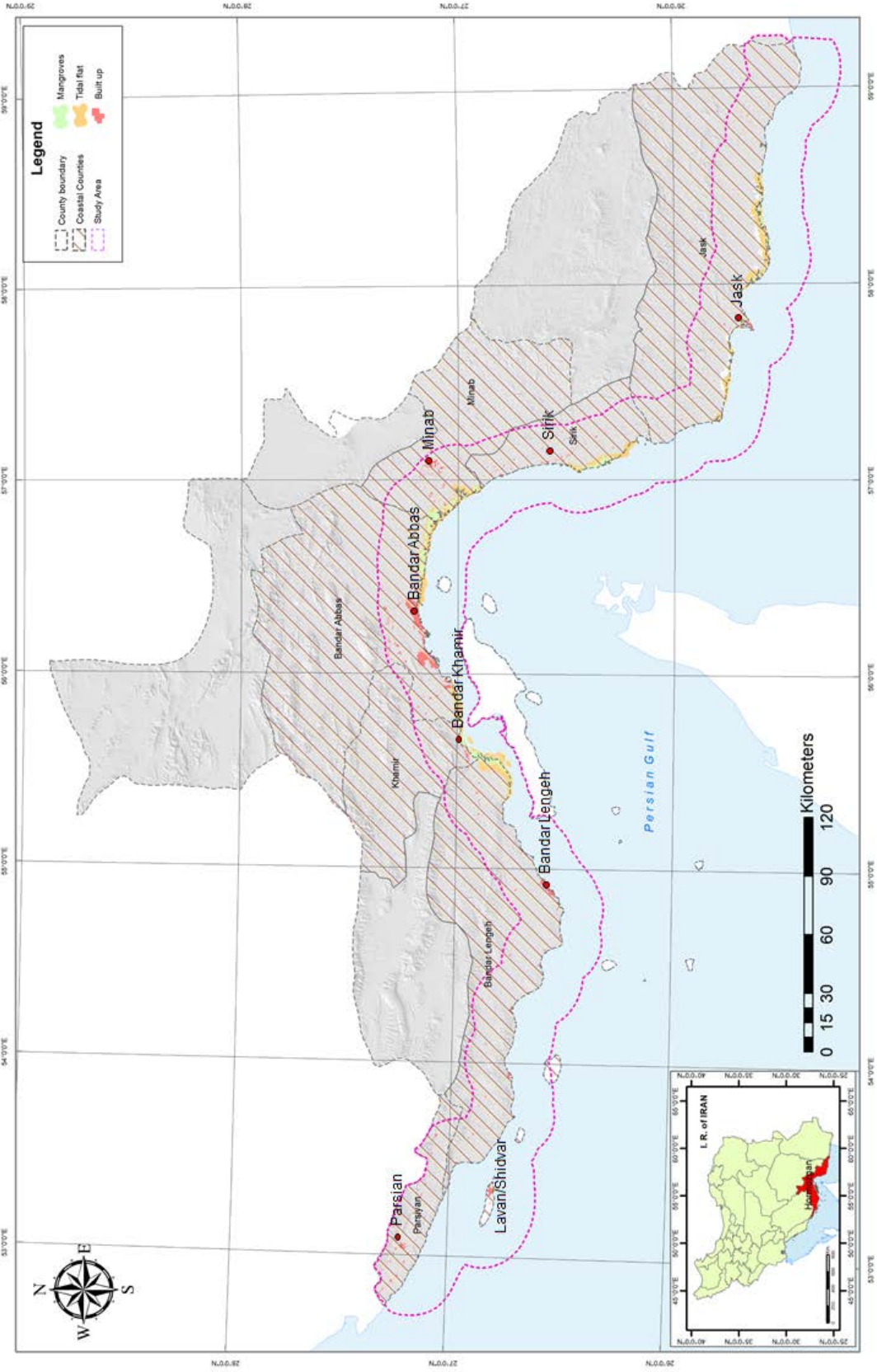
This Chapter mainly describes the activities of the M/P formulation. The draft M/P was finalized in February 2020 and subsequently submitted to the Hormozgan government for approval (the draft M/P and its summary is attached as Appendix 1).

#### **3.1 Objective of the M/P**

The principal objective of the M/P is to formulate strategies and action plans for the future conservation and management of the coastal environment in manner to achieve balance between development and environmental conservation.

#### **3.2 Target area of the M/P**

The target area of the M/P was set as the coastal area of mainland Hormozgan Province and Lavan and Shidvar islands. The target area is comprised from seven counties, namely, Parsian, Bandar Lengeh, Khamir, Bandar Abbas, Minab, Sirik and Jask. Lavan and Shidvar islands belong to Bandar Lengeh county. Figure 3.2.1 shows the target area of the M/P.



**Figure 3.2.1 Target area of the M/P**

Red circle: Capital city of County  
 Source: JICA Project Team

### **3.3 Target year of the M/P**

National Target 17 of Iran's National Biodiversity Strategies and Action Plan (2016-2030) aims to sustainably manage and protect marine and coastal ecosystems by 2030. The target year of the M/P was also set as year 2030, for to be consistent with National Target 17.

### **3.4 Basic approach of M/P formulation**

The M/P was formulated through the following basic approach:

- While the integrity of the coastal environment is dependent on the presence and interaction of multitude of habitats and species, conservation and management planning were focused mainly on coastal habitats and species that were considered to have high conservation priority in terms of maintaining ecosystem integrity and services.
- Conservation of the coastal environment is dependent on the cooperation of multitude of stakeholders. Key stakeholders were therefore consulted and involved throughout the process of M/P formulation.
- Conservation planning was as much as possible based on best available scientific and technical information. When there were gaps in information for decision making, the precautionary principle was applied.
- Relevant national plans were referred so that the M/P is consistent with the national policies.

### **3.5 Basic process of M/P formulation**

The M/P was formulated through the following key steps (outputs of each step are described in Chapters 3.8-3.15):

- **Step 1:** Establishment of organizational structure
- **Step 2:** Selection of main study area
- **Step 3:** Analysis of current status and future developments
- **Step 4:** Risk assessment on important coastal habitats and species
- **Step 5:** Development of spatial zoning plan
- **Step 6:** Development of strategies and action plans
- **Step 7:** Development of implementation framework

A total of eight WG meetings were held during the above process to report and discuss among stakeholders the key issues related to each step. Table 3.5.1 shows the main topics discussed in the WG meetings (the minutes of the WG meetings are attached as Appendix 2).

**Table 3.5.1 Main topics discussed in the WG meetings**

	Date	Location	No. of participants	Main topics
1	21 October 2017	Governor's office, Hormozgan	62	- Introduction of the Project - Objective of the WG
2	24 December 2017	DOE Hormozgan	47	- Structure and roles of the WG - Important ecosystem areas and TOR of the baseline surveys
3	10 May 2018	DOE Hormozgan	21	- Members and specific tasks of the WG
4	31 July 2018	Homa Hotel, Hormozgan	35	- Risk assessment method using InVEST - Results of baseline surveys
5	28 October 2018	Homa Hotel, Hormozgan	53	- Discussion on provincial master plan of PBO - Results of baseline surveys
6	19 February 2019	Homa Hotel, Hormozgan	48	- Results of risk assessment
7	25 April 2019	DOE Hormozgan	30	- Conservation hotspots - Results of risk assessment
8	6, 7 August 2019	DOE HQ	46	- Strategies and action plan - Implementation framework of the M/P

Source: JICA Project Team

### 3.6 Policies and plans relevant to the M/P

Table 3.6.1 outlines the national/regional policies and plans relevant to the M/P.

**Table 3.6.1 Outline of national/regional policies and plans relevant to the M/P**

Name	Outline
General Environment Policies by Supreme Leader (2015)	The state's General Environmental Policy was announced by the Supreme Leader in year 2015. It consists of 15 policies covering a wide range of topics such as natural resource management, pollution prevention, ecosystem improvement, research promotion, environmental awareness, environmental monitoring and so on.
Five-Year National Development Plan (5NDP)	Sets out the goals and objectives to be achieved by the country over five-year period including environmental conservation. The latest 6 <sup>th</sup> 5NDP (2017-2021) covers environmental topics such as EIA/SEA, wetland conservation and protected area management.
National Biodiversity Strategies and Action Plan 2016-2030 (NBSAP2)	National action plan prepared under the Convention of Biological Diversity (CBD). It consists of 4 strategic goals, 24 national target and 99 actions. It aims by 2030 to designate 5% of marine/coastal area as protected area, recovery of 50% of wetlands and sustainable management of coastal ecosystem.
National Wetland Conservation Strategy Action Plan (2017)	National strategy and action plan for wetland conservation prepared by DOE. It proposes to establish National Wetlands Committee which consists of relevant government organizations and stakeholders.
Integrated Coastal Zone Management Plan (ICZM)	ICZM prepared by Ports and Maritime Organization (PMO) which includes land use plan. The ICZM of Hormozgan province is under approval process.
Spatial Master Plan of Hormozgan Province	PBO Hormozgan developed Spatial Master Plan for the Hormozgan Province, which outlines directions for the socioeconomic development of the province including environmental conservation (target year: 2036). It includes land and water use plan.
Makran Region Development Master Plan	The Ministry of Roads and Urban Development (MRUD) developed a Master Plan for the Development of the Makran region, covering the period up to year 2031. One of the major developments planned in the Hormozgan region is to establish energy-intensive industries (e.g. petrochemical) in the coastal area of western Jask including an oil-export terminal and industrial park.

Source: JICA Project Team



### 3.7 Legislations and government organizations relevant to the M/P

Refer to Chapter 5.2.

### 3.8 Organizational structure for M/P formulation

Refer to Chapter 2.1.

### 3.9 Selection of main study area

Although the scope of the M/P is the Hormozgan coastal area, the studies mainly focused on areas that support important coastal habitats and hence have high conservation priority. Such areas were termed as “Important Ecosystem Area (IEA)”, which was identified by referring to the “Ecologically or Biologically Significant Areas (EBSA) criteria”, adopted by the CBD at the COP9 meeting in 2008. The EBSA criteria consist of seven scientific criteria for identifying ecologically or biologically significant marine areas in need of protection. The Ministry of Environment of Japan also used EBSA criteria to identify EBSA in Japanese waters. Table 3.9.1 shows the definition of each EBSA criteria.

**Table 3.9.1 Definition of EBSA criteria**

Criteria		Definition
C1	Uniqueness or Rarity	Area contains either (i) unique (“the only one of its kind”), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features
C2	Special importance for life history stages of species	Areas that are required for a population to survive and thrive
C3	Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species
C4	Vulnerability, Fragility, Sensitivity, or Slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery
C5	Biological Productivity	Area containing species, populations or communities with comparatively higher natural biological productivity
C6	Biological Diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity
C7	Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation

Source: CBD website (<https://www.cbd.int/ebsa/>)

Based on information obtained through existing literatures, field reconnaissance and expert opinion, an area that fitted one or more of the EBSA criteria was selected as IEA. Eventually five IEAs were selected, namely, Jask, Gaz, Minab, Khamir and Parsian regions. Figure 3.9.1 shows the locations of the selected IEAs. Table 3.9.2 summarizes the rationale behind the selection of the five IEAs. Note that the area of the selected IEAs were limited to shallow water areas as information of offshore areas were scarce. Further research is required to identify IEAs in offshore areas.



Note: The boundary of IEAs indicated in the figure is not a fixed one but rather shows the rough locations of the IEAs.

Source: JICA Project Team (prepared using Google Earth)

**Figure 3.9.1 Locations of the selected IEAs**

**Table 3.9.2 Rationale behind the selection of IEAs**

Area	Rationale	Relevant EBSA criteria
Jask	The area is an important habitat for threatened species such as Greater Spotted Eagle (VU).	C3
	The area has high ecosystem diversity: mixture of mangrove, tidal flat, sand bars, water channels.	C5
	The area has high degree of naturalness.	C7
Gaz	It is the only area in Hormozgan where two mangrove species coexist naturally.	C1
	The area is an important habitat for threatened species such as Greater Spotted Eagle (VU), Eastern Imperial Eagle (VU) and sea turtles.	C3
	The area has high ecosystem diversity: mixture of mangrove, tidal flat, sand bars, water channels.	C5
Minab	The area supports seagrass bed, which is rare in Hormozgan.	C1
	The area is an important habitat for threatened species such as Great knot (EN), Egyptian vulture (EN), Greater Spotted Eagle (VU) and Eastern Imperial Eagle (VU).	C3
	The area has high ecosystem diversity: mixture of mangrove, tidal flat, sand bars, water channels.	C5
Khamir	The area supports seagrass bed, which is rare in Hormozgan. The area also supports the largest mangrove/tidal flat ecosystem in the Gulf.	C1
	The area is an important habitat for threatened species such as Great Knot (EN), Greater Spotted Eagle (VU), Eastern Imperial Eagle (VU) and Finless porpoise (VU).	C3
	The area has high ecosystem diversity: mixture of mangrove, tidal flat, sand bars, water channels.	C5
Parsian	The area supports seagrass bed and corals which are rare in Hormozgan.	C1
	The area has special importance for life-history stages of species such as nesting sites for terns and sea turtles.	C2

Area	Rationale	Relevant EBSA criteria
	The area is an important habitat for threatened species such as Socotra Cormorant (VU) and sea turtles.	C3

Source: JICA Project Team

### 3.10 Analysis of current status and future developments

Fundamental for formulating the M/P is to acquire an in-depth understanding of the status of environment and human activities of the coastal area including future development prospective. The Project therefore conducted detailed surveys in the field of ecology, pollution and socioeconomic over one-year period between 2018-2019. This Section summarizes the environmental status of the Hormozgan coastal area based on the detailed survey results and other existing information (refer to Chapter 3 of the M/P for more details).

#### 3.10.1 Natural conditions

The Hormozgan coastal area faces two gulfs namely: Persian Gulf on the west and Gulf of Oman on the east. The Strait of Hormuz is located between these two gulfs. The total length of the coastline adds up to more than 2,000 km with inclusion of the 14 offshore islands. The coastal area of Persian Gulf is relatively shallow especially between Minab to Bandar Lengeh, where depth is less than 10 m in most nearshore areas. The Gulf of Oman on the other hand is much deeper and depth quickly exceeds 200 m in the offshore waters of Jask region. Seasonal upwelling occurs also in the Jask region. Water temperature fluctuates quite significantly with season, with summer temperature reaching up to around 35°C and winter lowering to around 20°C.

The climate in Hormozgan can be broadly separated into hot (May-October) and cool (December-March) seasons. The hot season is hot and humid and often exceeds 40°C. The cool season is on average around 20°C, which is when most rainfall occur. While most rivers are dry throughout the year, it will flow rapidly during heavy rainfall and subsequently discharge large amount of sediment into the sea.

#### 3.10.2 Protected area

In Hormozgan Province, there are 15 protected areas designated under the Environmental Protection and Improvement Act. Ten of those are located either in the mainland coastal area or offshore islands. The protected areas in the mainland coastal area are mainly located in the tidal flat/mangrove areas, whereas in the offshore islands coral reefs are the main ecosystem. Some of the protected areas are also designated as Ramsar site or Important Bird Area (IBA). Figure 3.10.1 shows the location of the protected areas in Hormozgan Province.

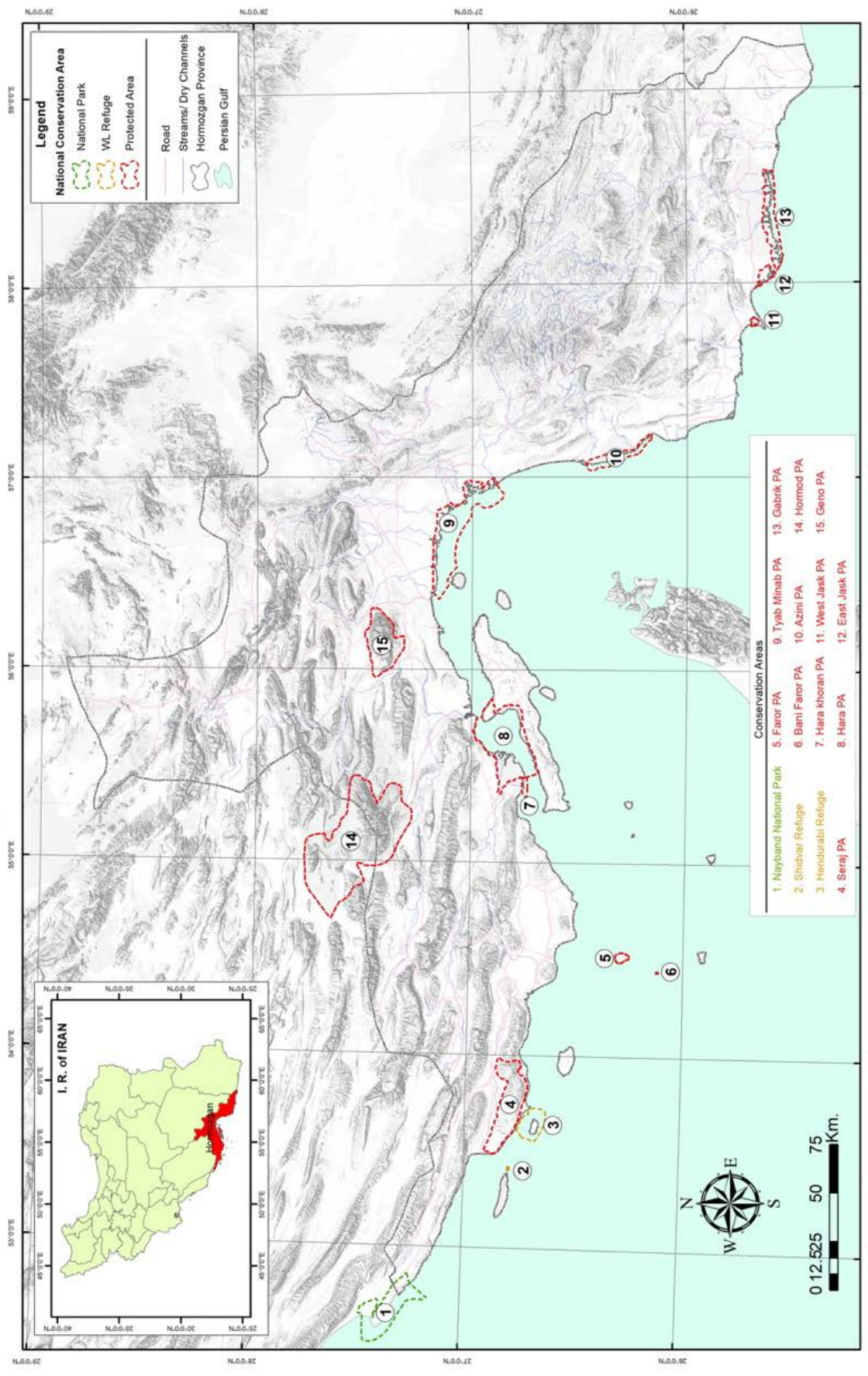


Figure 3.10.1 Location of protected areas in Hormozgan Province

Source: JICA Project Team

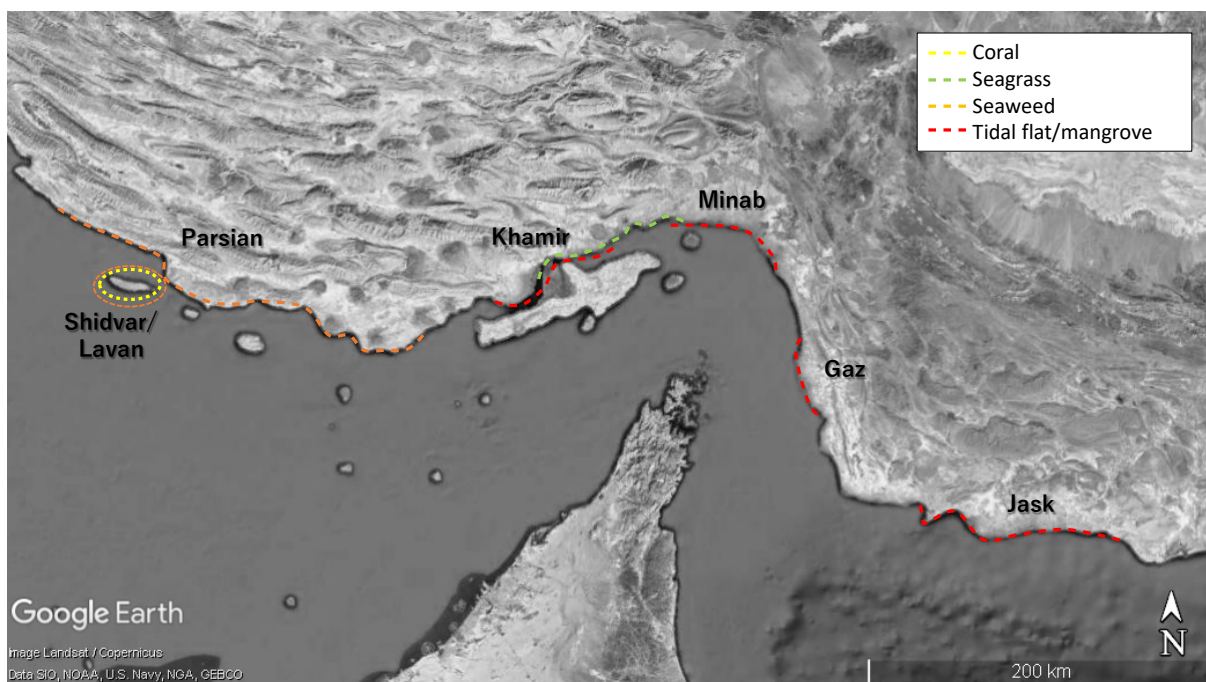
### 3.10.3 Ecosystem

Ecology survey was conducted for important coastal habitats (coral, seagrass, seaweed, intertidal flat, mangrove) and species (marine mammals, birds, sea turtles). While the survey basically focused in and around the five IEAs, marine mammals and sea turtles were studied over most of the coastal area. The survey was undertaken by contracting Isfahan University of Technology (IUT) (the report of IUT is attached as Appendix 3). Table 3.10.1 shows the outline of the ecology survey. Figure 3.10.2 shows the survey area of important coastal habitats.

**Table 3.10.1 Outline of the ecology survey**

	<b>Period</b>	<b>Area</b>	<b>Method</b>	<b>Item</b>
Coral	July 2018 Jan. 2019	Lavan/Shidvar	Quadrat survey	Coral coverage/species, benthos, fish
Seagrass	Aug. 2018 Jan.-Feb. 2019	Minab, Khamir	Quadrat survey	Seagrass coverage/species, benthos, fish
Seaweed	July 2018 Jan.-Feb. 2019	Lavan/Shidvar	Quadrat survey	Seaweed coverage/species, benthos, fish
	January 2019	Lavan/Shidvar, Parsian		
Tidal flat	May-July 2018	Jask, Gaz, Minab, Khamir	Quadrat survey, Fish net survey	Benthos, fish, sediment
Mangrove	May-July 2018	Jask, Gaz, Minab, Khamir	Quadrat survey	Benthos, mangrove coverage/height/DBH
Bird	May-June 2018 Jan.-Feb. 2019	Jask, Gaz, Minab, Khamir, Lavan/Shidvar	Line census survey	Abundance, species
Marine mammal	June 2018	Major fishing ports	Interview survey	Abundance, species
	Dec. 2018-Mar. 2019	Entire coastal area	Boat survey	Abundance, species
Sea turtle	June 2018	Major fishing ports	Interview survey	Nesting sites, abundance, species

Source: JICA Project Team



Source: JICA Project Team (prepared using Google Earth)

**Figure 3.10.2 Survey area of important coastal habitats**

Based on the information and data obtained through the ecology survey, the following sections summarize the status of important coastal habitats and species in Hormozgan province.

### **(1) Coral reef**

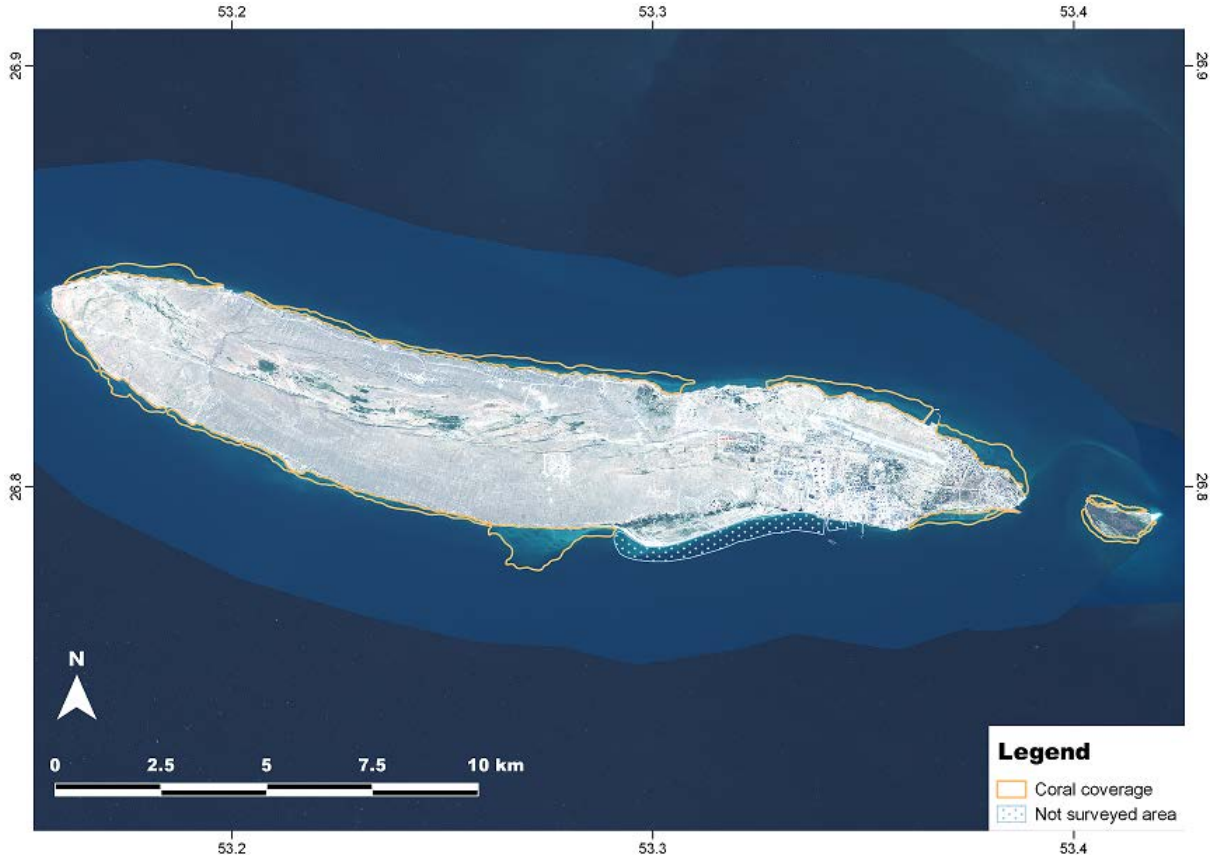
In Hormozgan, coral reefs are mainly distributed around the offshore islands. According to WG members, many of the coral reefs are now significantly degraded partly due to the significant coral bleaching event in 2017. While the main cause of coral degradation is probably high water temperature, it is not possible to specify the underlying causes due to lack of long-term monitoring data.

Coral survey was conducted in Lavan and Shidvar islands, which is the only area that supports coral reef within the M/P study area. The ensuing sections describe the status of the coral reefs in Lavan and Shidvar islands (raw data of the survey is attached as Appendix 4).

#### **1) Coral distribution, coverage and diversity**

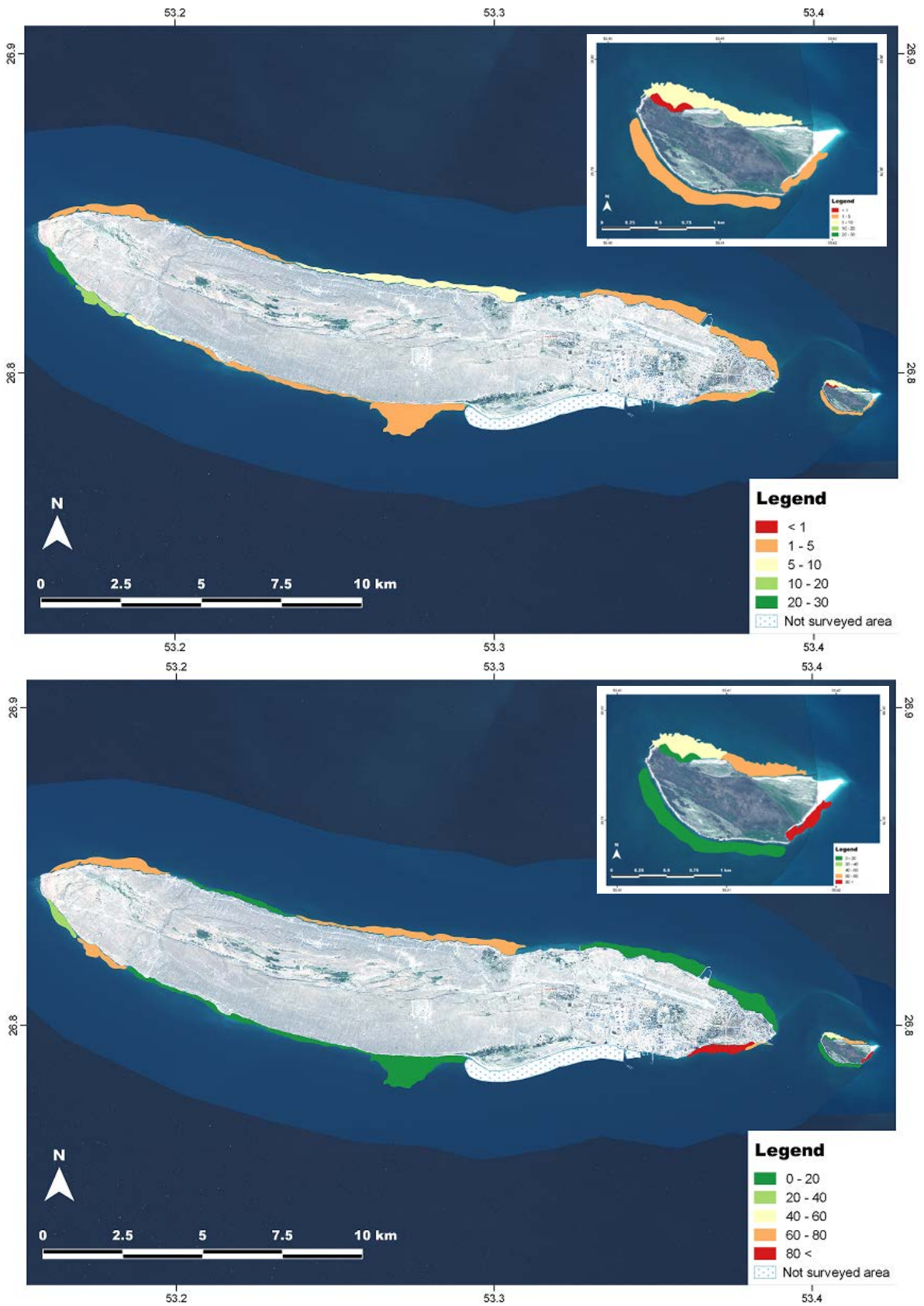
Corals in Lavan and Shidvar were distributed along most of the coastline albeit at varying extent and coverage. The depth range of coral distribution was around 1-5 m. A total of 11 coral species were identified with *Porites* species being most dominant followed by corals in the Merulinidae family. One IUCN threatened species, *Favites spinosa* (VU), was found in the north-side of Shidvar. Coral degradation was significant in most areas with some areas exceeding 80% dead coral coverage. Live coral coverage was in general low in both islands with most areas ranging between 1-10%. Highest live coral coverage was recorded in the western tip of Lavan island ranging between 20-30%. While local human activities (e.g. industry, ship traffic, fishing) may have contributed to the coral degradation, high water temperature is probably a major factor due to the extensiveness of coral degradation. Figure 3.10.3

shows the coral distribution in Lavan and Shidvar. Figure 3.10.4 shows the coverage of live and dead corals in Lavan and Shidvar (detailed coral distribution and coverage maps are attached as Appendix 5).



Source: JICA Project Team

**Figure 3.10.3 Coral distribution in Lavan and Shidvar**



Source: JICA Project Team

**Figure 3.10.4 Coverage of live (above) and dead (below) corals in Lavan/Shidvar**



## 2) Conservation hotspot

Conservation hotspots of corals in Lavan and Shidvar were selected based on the following four hotspot criteria established through the study:

- Areas with high total coral coverage (>50%)
- Areas with relatively high live coral coverage (>10%)
- Areas with relatively high live coral diversity (>5 spp.)
- Areas with threatened corals

Coral areas that satisfied one or more of the hotspot criteria were considered as hotspot, but naturally priority for conservation will become higher in proportion to the number of criteria satisfied. Figure 3.10.5 shows the selected coral hotspots in Lavan and Shidvar. In Lavan, the coral area in the south-western side of the island can be considered to have higher conservation priority as it satisfied two criteria. In Shidvar, the coral area in north side of the island can be considered to have high conservation priority as it satisfied three criteria (detailed hotspot and analysis maps are attached as Appendix 6).



Source: JICA Project Team

**Figure 3.10.5 Conservation hotspots of corals (Lavan and Shidvar)**

## **(2) Seagrass bed**

Existing information on seagrass distribution along the Hormozgan area was limited to the DOE study conducted in 2009-2010. In the DOE study, small seagrass patches were found along the shallow coast from Bandar Abbas to Bandar Khamir. While the JICA Project Team attempted to search for additional seagrass areas with satellite image, none could be identified due to high turbidity of the coastal area. The seagrass survey was hence restricted to the seagrass areas identified in the DOE study. Based on the survey results, the ensuing sections describe the status of the seagrass in Hormozgan coastal area (raw data of the survey is attached as Appendix 4).

### **1) Seagrass distribution, coverage and diversity**

Seagrass beds were identified along the intertidal area between Khamir and Bandar Abbas. The total seagrass area was estimated at approximately 3,600 ha. Seagrass coverage was in general low, with highest coverage recorded in Bostanu ranging between 30-50%. Only two seagrass species were identified, namely, *Halodule uninervis* and *Halophila ovalis*. While *Halodule uninervis* was distributed in all the seagrass area, *Halophila ovalis* was only observed in small patches in Bostanu and Khamir. Figure 3.10.6 shows the seagrass distribution and coverage (detailed seagrass distribution and coverage maps are attached as Appendix 5).

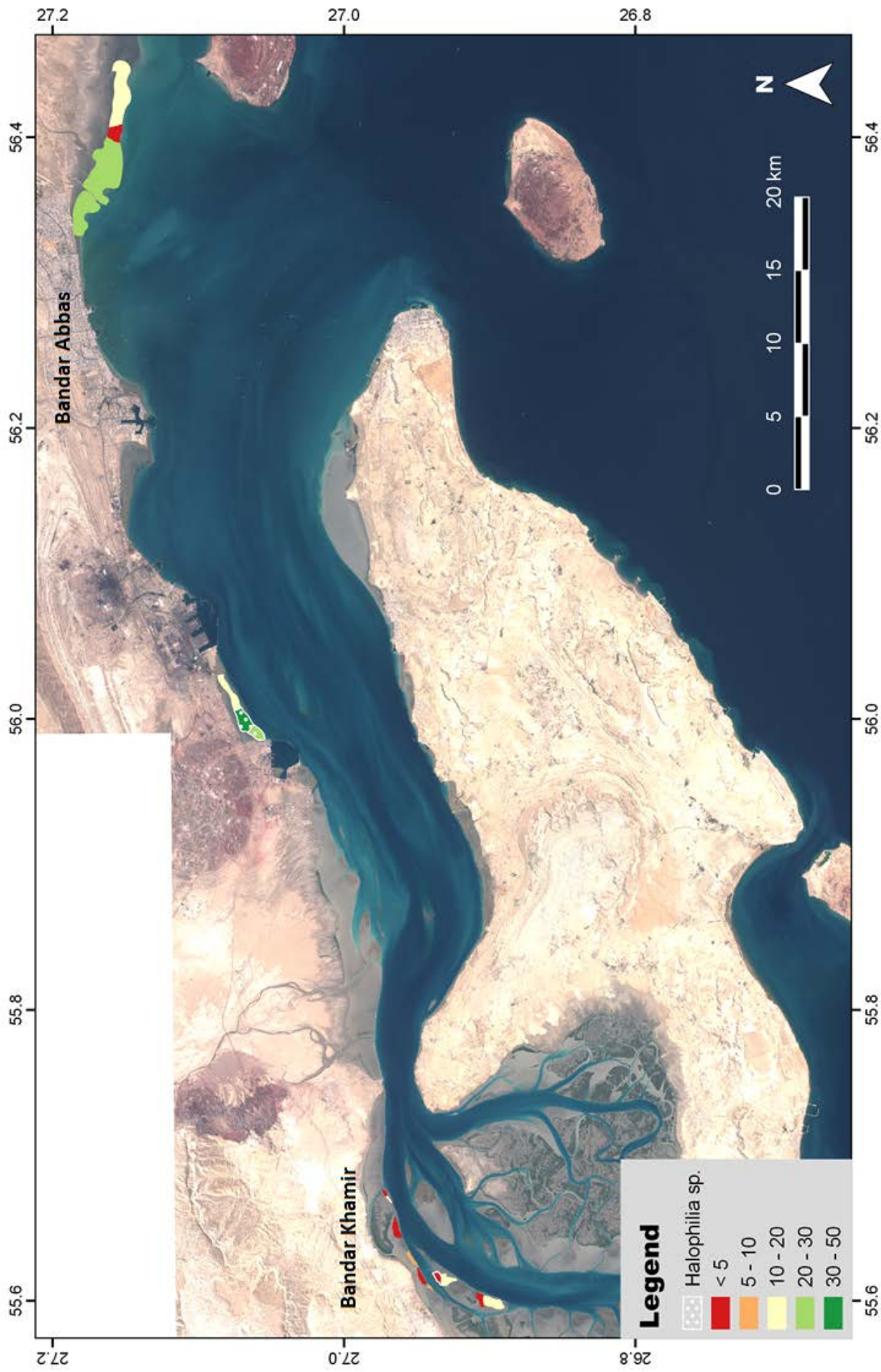
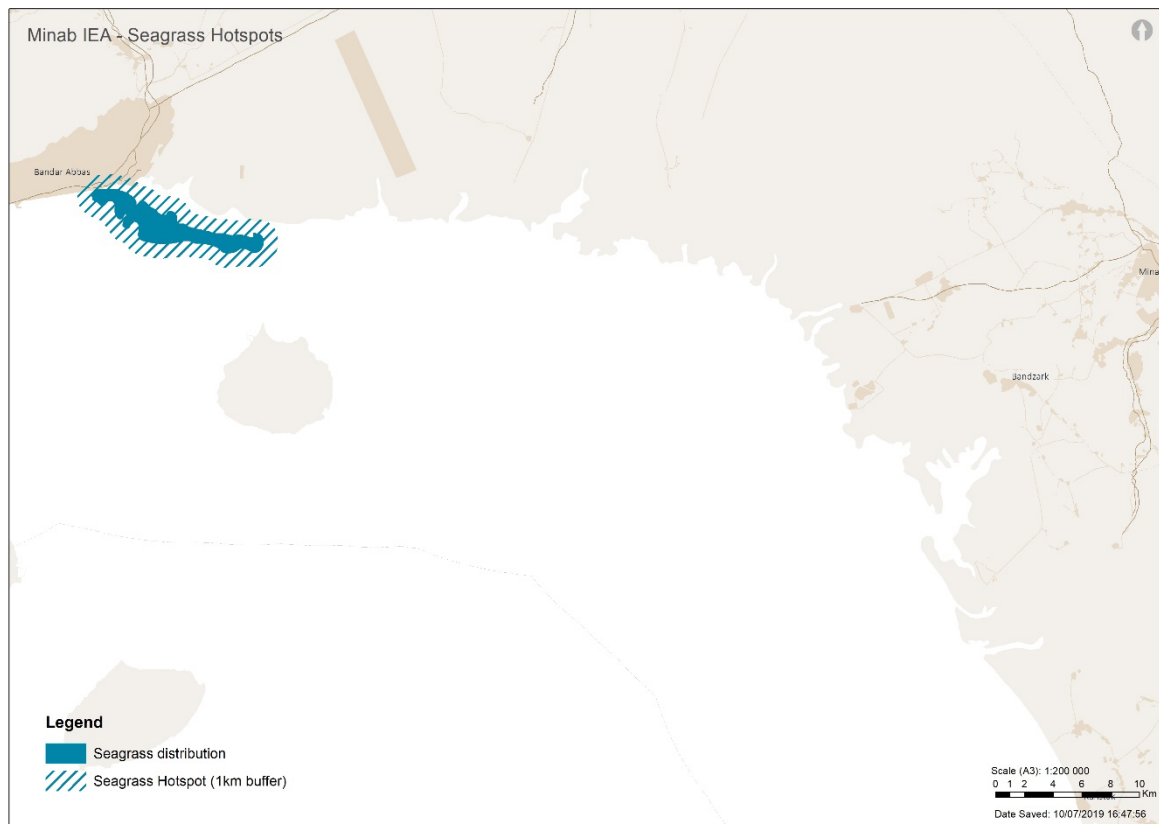
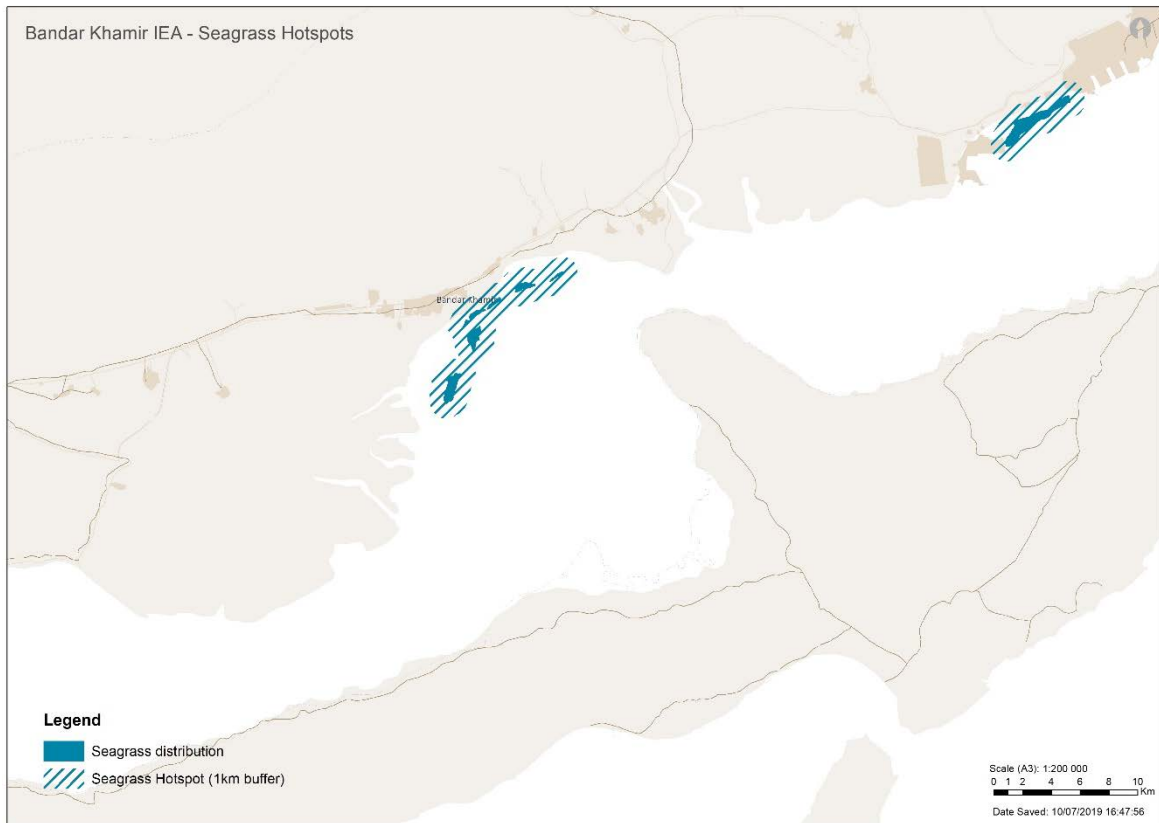


Figure 3.10.6 Seagrass distribution and coverage

Source: JICA Project Team

## **2) Conservation hotspots**

Due to the limited distribution and its rareness, all seagrass beds identified through the survey were considered as conservation hotspots. Figure 3.10.7 shows the conservation hotspots for seagrass (detailed hotspot maps are attached as Appendix 6).



Source: JICA Project Team

**Figure 3.10.7 Conservation hotspots of seagrass**

### **(3) Seaweed bed**

Since, existing information on seaweed distribution along the Hormozgan area was limited, seaweed survey was conducted along areas that were identified as potential sites through satellite image. However, due to the high turbidity of the coastal area, the identified areas were limited to the nearshore zone. Based on the survey results, the ensuing sections describe the status of the seaweed in Hormozgan coastal area (raw data of the survey is attached as Appendix 4).

#### **1) Seaweed distribution and diversity**

Seaweed beds were distributed along the coast between Bandar Lengeh and Parsian, and reefs of Lavan and Shidvar. A total of 43 macroalgae species were identified in the survey, including four *Sargassum* species. Figure 3.10.8 shows the distribution of seaweed beds (detailed seaweed distribution maps are attached as Appendix 5).



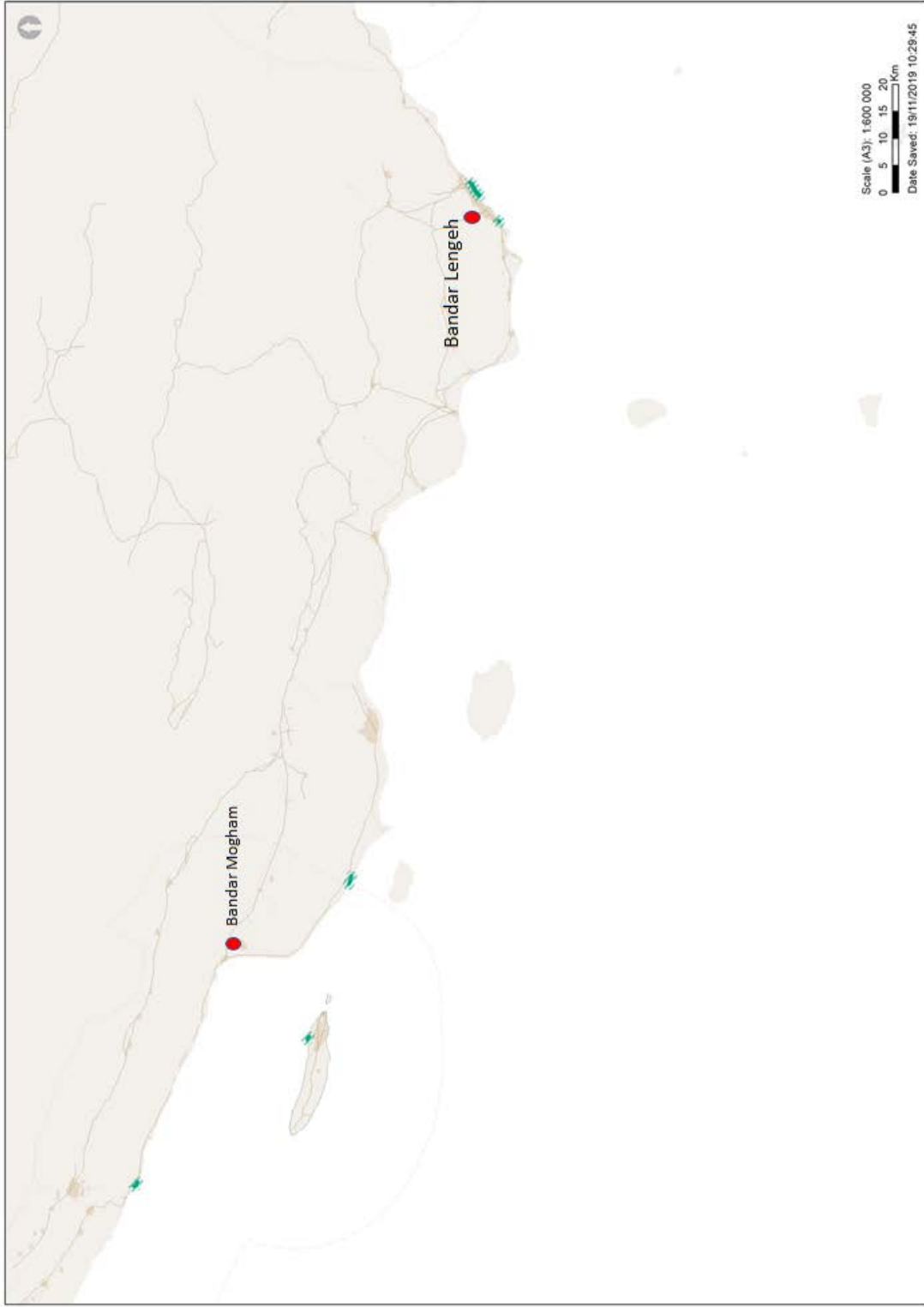
Figure 3.10.8 Distribution of seaweed bed

Source: JICA Project Team

## 2) Conservation hotspots

Within the seaweed distribution area, areas with high coverage of *Sargassum* species were considered as conservation hotspots. This is because *Sargassum* bed canopies can form complex structures and host a wide diversity of invertebrates or act as sheltering nursery grounds for several fish species (Mattoo et al., 2008). Figure 3.10.9 shows the selected seaweed hotspots (detailed hotspot maps are attached as Appendix 6).





Source: JICA Project Team

**Figure 3.10.9 Conservation hotspots of seaweed**

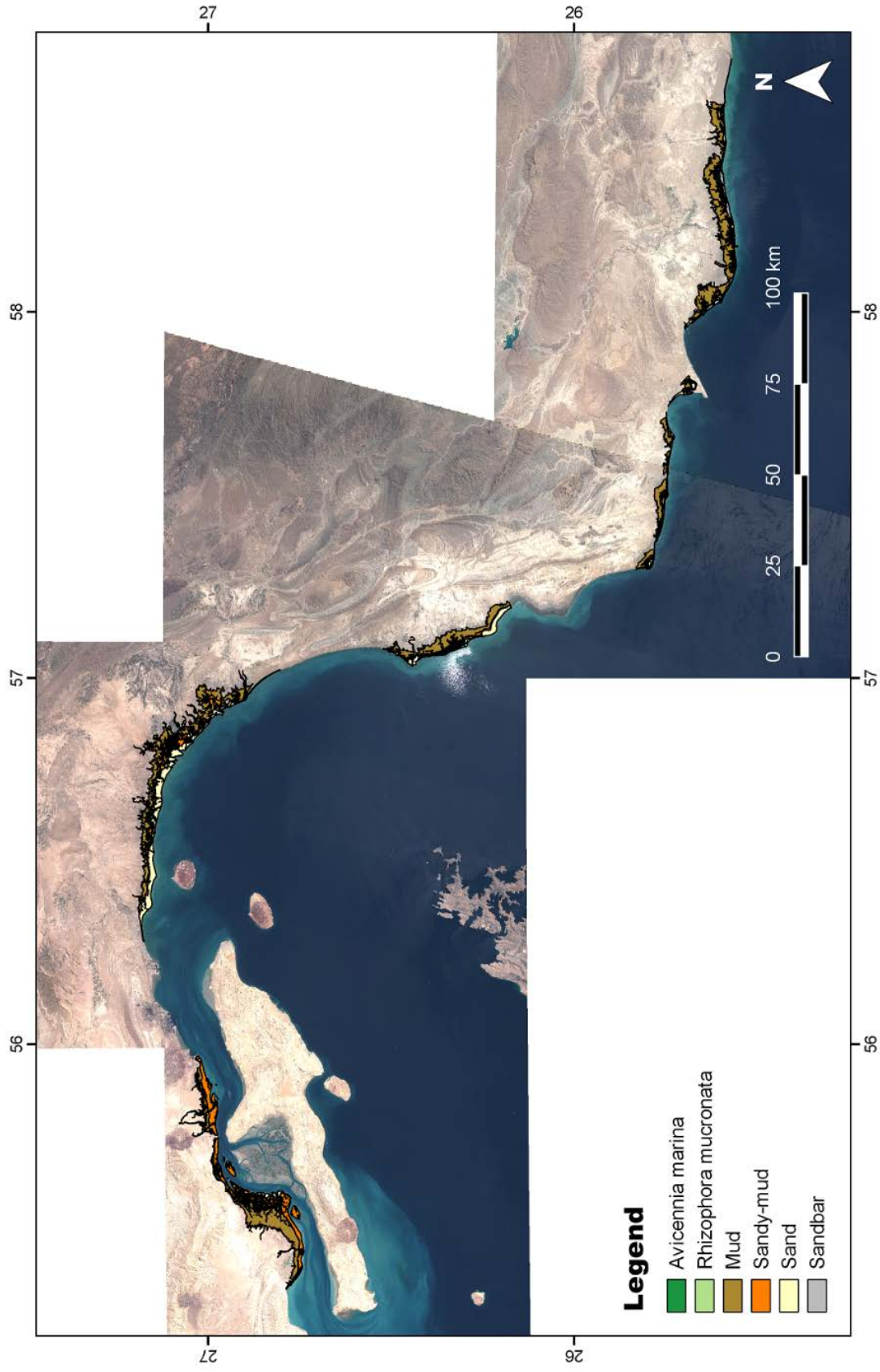
#### **(4) Tidal flat and mangrove**

In the coastal area of Hormozgan Province, tidal flats are extensively distributed in the area from Khamir through to Jask. In some areas, tidal flats can extend to several kilometers offshore. Mangroves are also extensively distributed in these tidal flat areas along creeks and calm areas. There are two mangrove species, namely, *Avicennia marina* and *Rhizophora mucronate*. However, *Rhizophora mucronate* is found only in Gaz region. These intertidal flat/mangrove areas support high abundance and diversity of benthic species, fishes and birds, and many of the areas are designated as protected area and Ramsar site. Based on the survey results, the ensuing sections describe the status of the tidal flat/mangrove in Hormozgan coastal area (raw data of the survey is attached as Appendix 4).

##### **1) Tidal flat/mangrove distribution and diversity**

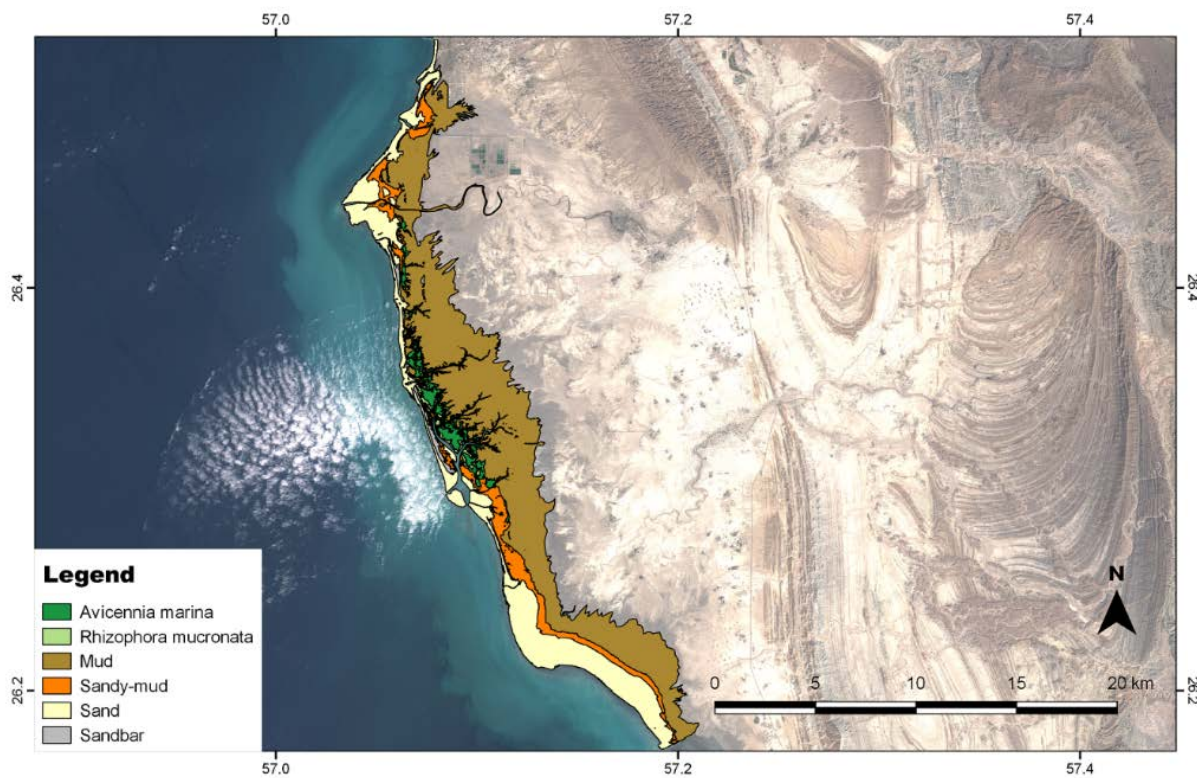
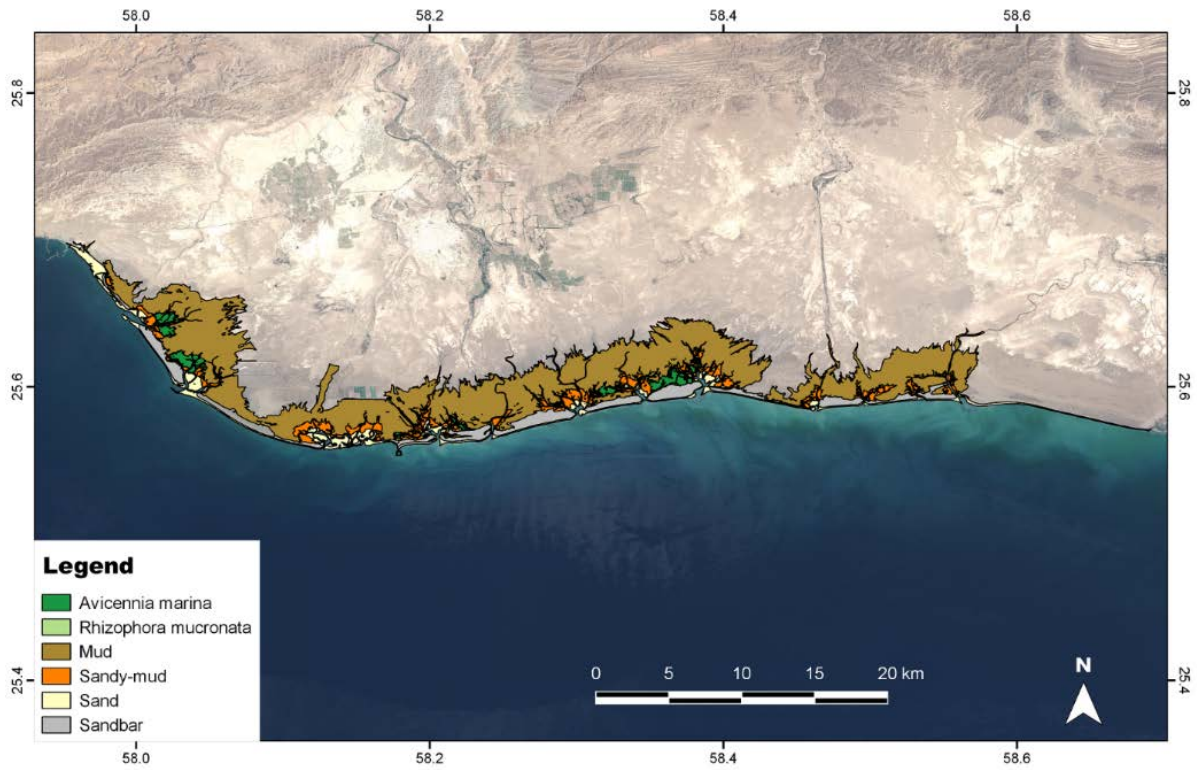
Tidal flats in the Hormozgan coastal area can be classified by its sediment type namely: sand, sandy-mud and mud. Sandy tidal flat is usually formed in areas exposed to relatively high waves and strong currents. Sandy-mud or muddy tidal flat is usually formed in calm areas. Areas around mangroves are also often sandy-mud or muddy due to organic decomposition of the fallen leaves. According to the survey, the composition of benthic species varied quite significantly with sediment type, which implies that biodiversity is enhanced when tidal flats are comprised of varying sediment types. Figures 3.10.10 to 3.10.12 show the distribution of tidal flat/mangrove (detailed tidal flat/mangrove distribution maps are attached as Appendix 5). The maps are classified into six habitat classes namely: sand, sandy-mud, mud, *Avicennia* mangrove, *Rhizophora* mangrove and sand bar. The maps were produced through satellite image analysis (e.g. Planet Labs images), and verified with substratum data acquired through the tidal flat survey.

A total of 35 and 37 benthic species were identified in the tidal flat and mangrove areas respectively. Main benthic species were crustaceans, mollusks, fish and polychaetes. A total of 17 species were identified in the water channels, which included commercial species such as mullets, whiting and shrimps.



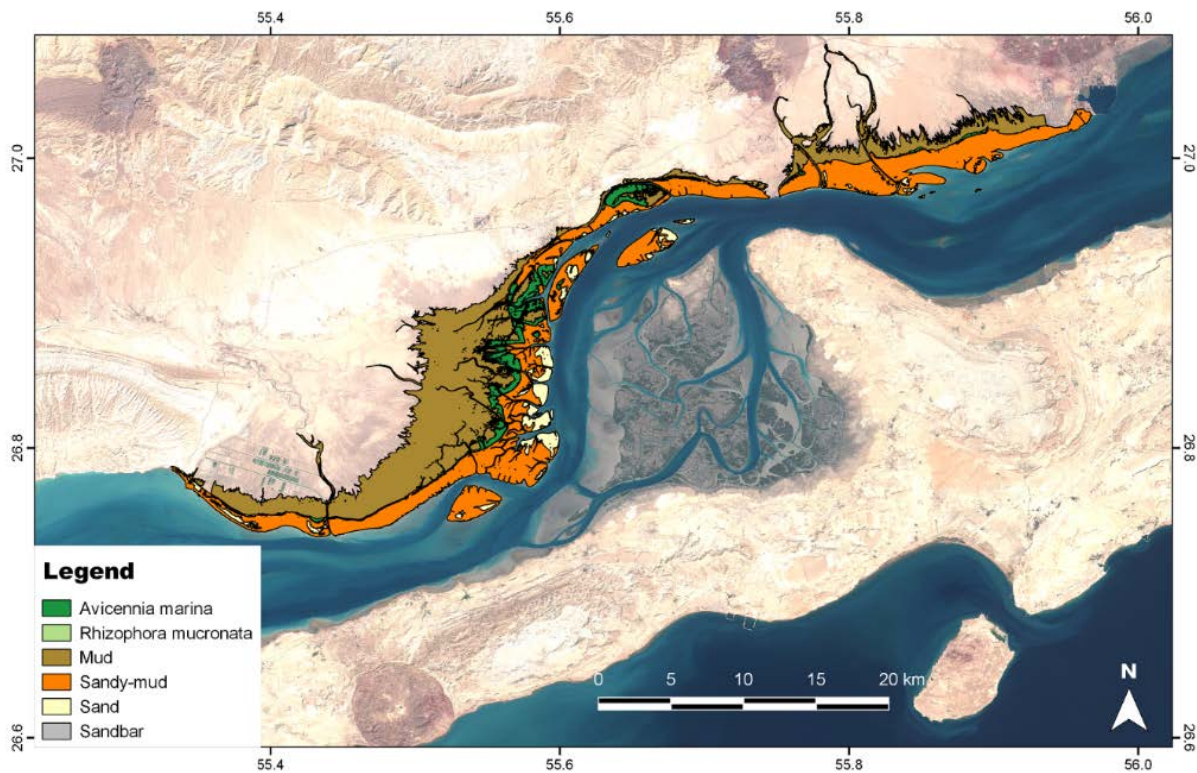
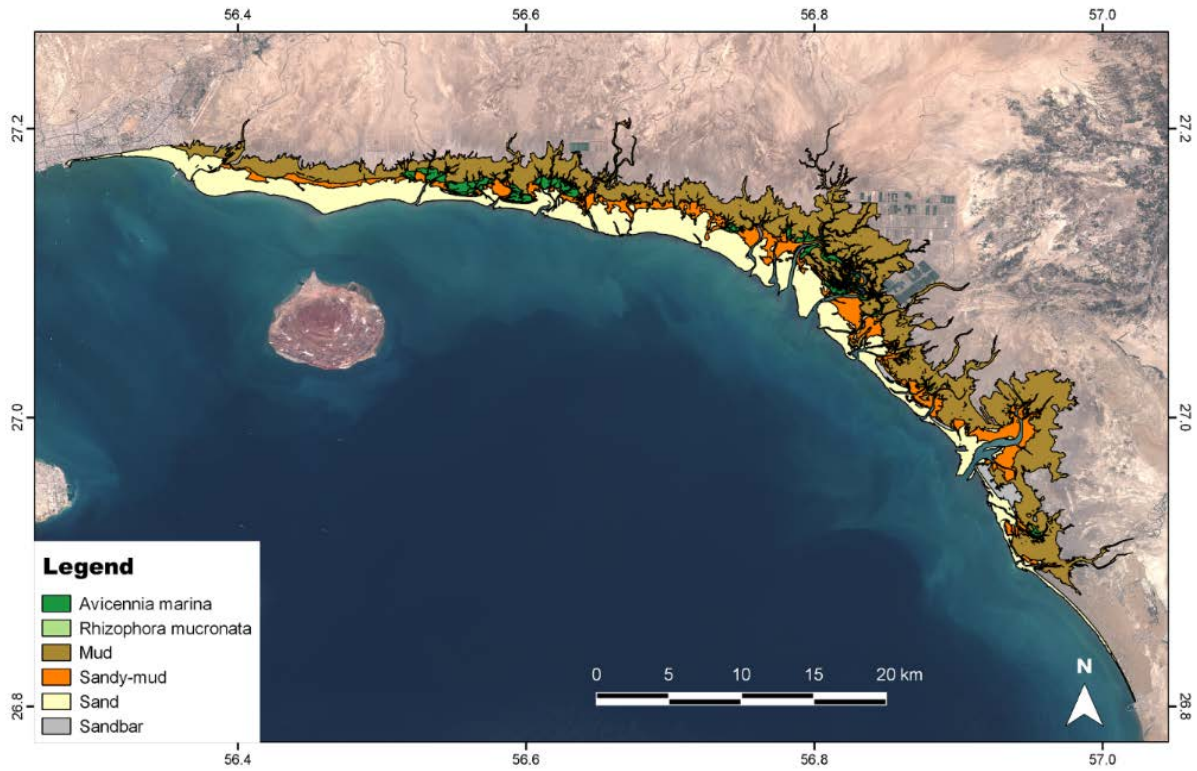
Source: JICA Project Team

Figure 3.10.10 Distribution of tidal flat/mangrove (Hormozgan coast)



Source: JICA Project Team

**Figure 3.10.11 Distribution of tidal flat/mangrove (Jask and Gaz)**



Source: JICA Project Team

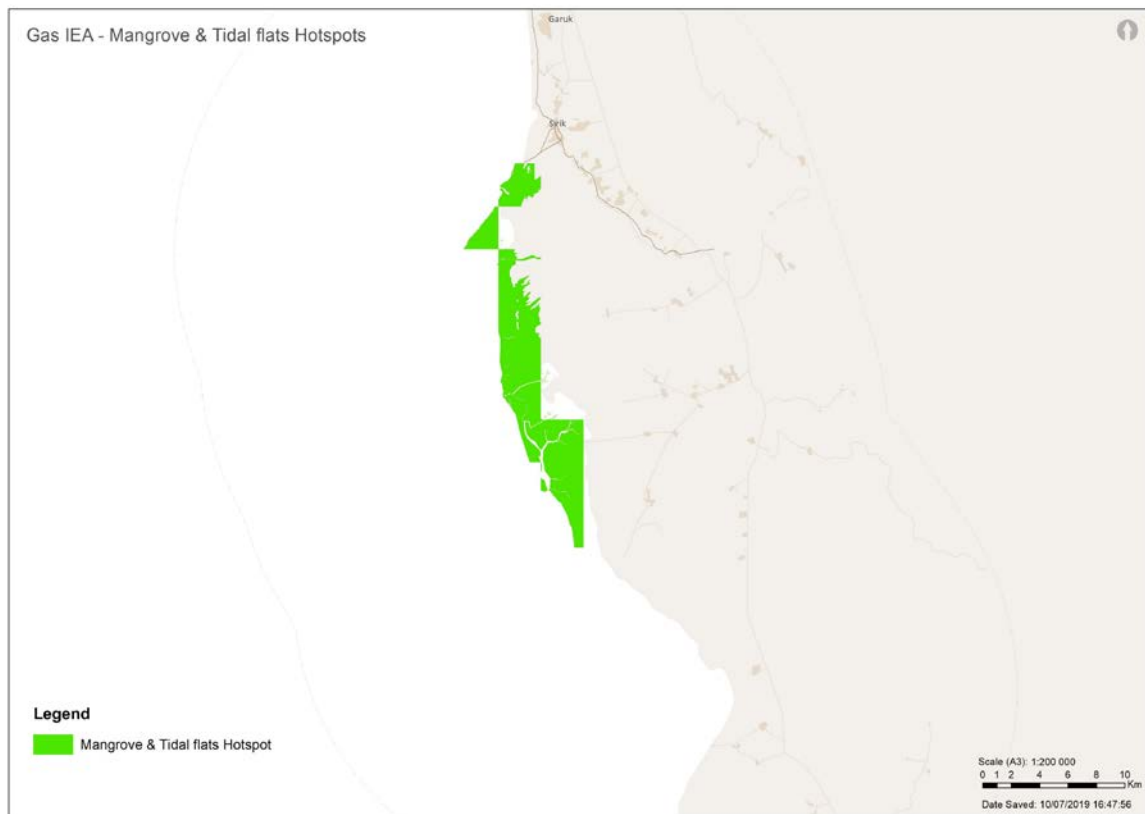
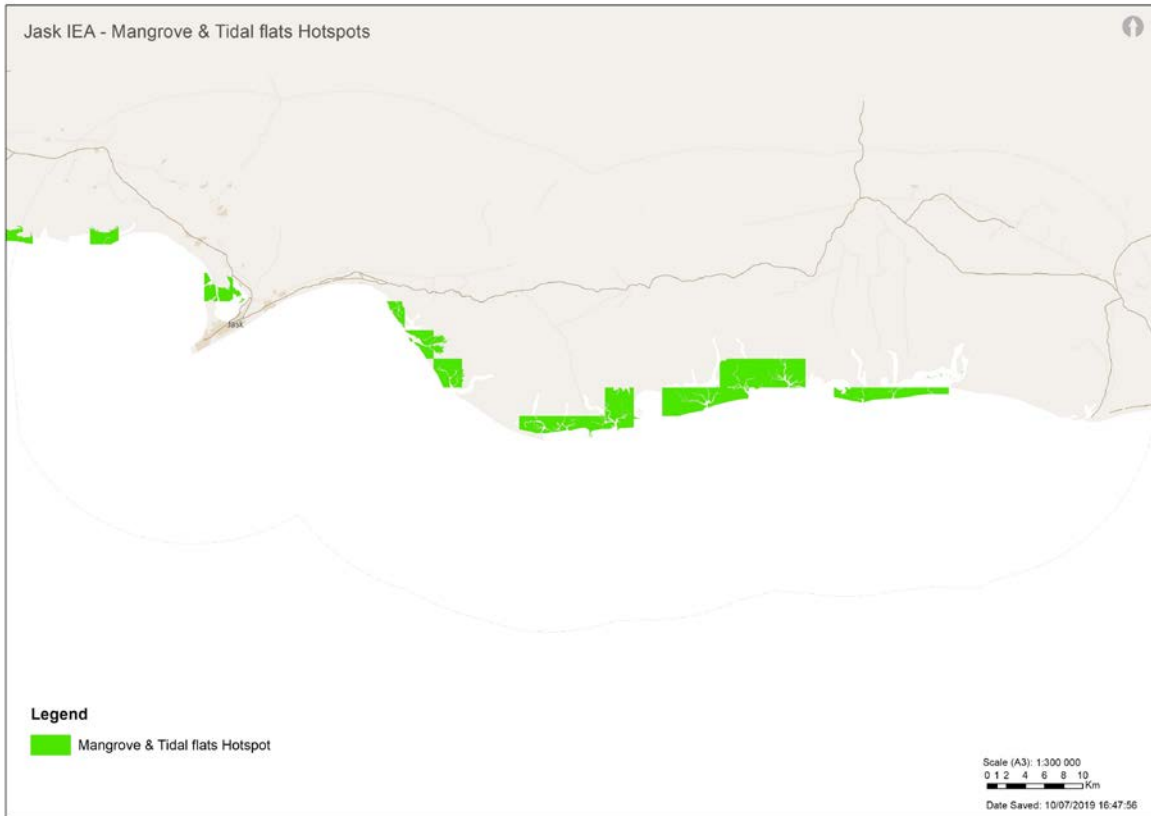
**Figure 3.10.12 Distribution of tidal flat/mangrove (Minab and Khamir)**

## 2) Conservation hotspots

Conservation hotspots of intertidal flat/mangrove areas were identified based on the following criteria:

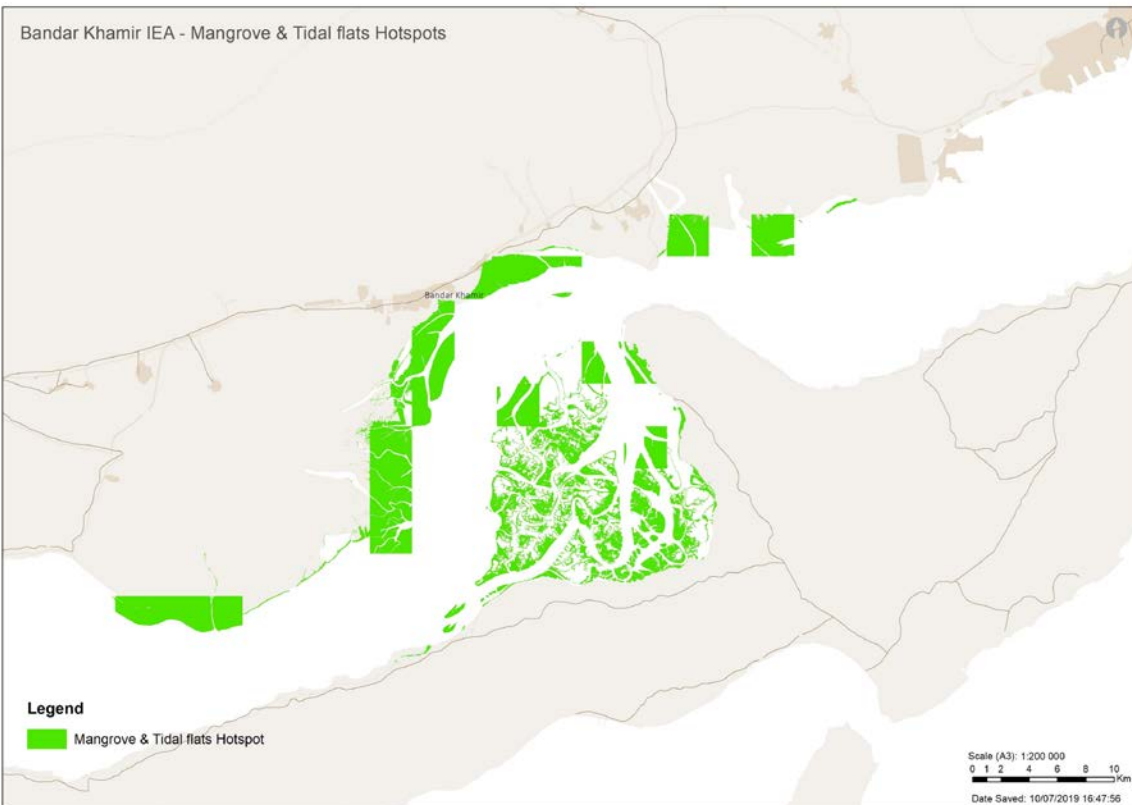
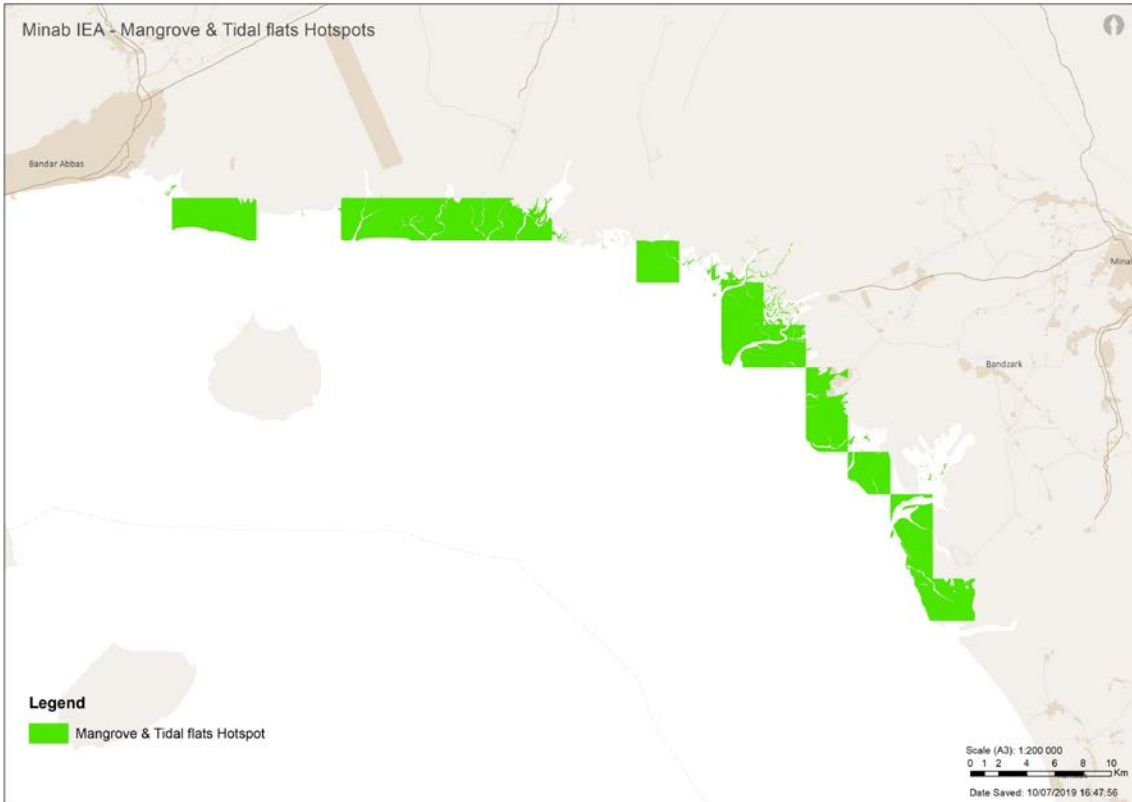
- All mangrove areas were considered as hotspots due to its importance for life-history stages of various species (e.g. bird reproduction) and slow recovery capability.
- Areas with comparatively high habitat diversity were considered as hotspots.

Habitat diversity of the intertidal flat/mangrove area was analyzed by counting the number of habitat types that exist in a set area/grid (i.e. 3 x 3 km). The habitat types considered were 1) sandy intertidal flat, 2) sandy-mud intertidal flat mud, 3) mud intertidal flat, 4) mangrove, 5) sand bar and 6) seagrass. Grids containing more than 4 habitats within the 6 habitat types were considered as conservation hotspots. Figures 3.10.13 to 3.10.14 show the conservation hotspots of Khamir, Minab, Gaz and Jask regions as per the habitat diversity analysis (detailed hotspot and analysis maps are attached as Appendix 6).



Source: JICA Project Team

**Figure 3.10.13 Conservation hotspots of tidal flat/mangrove (Jask and Gaz)**



Source: JICA Project Team

**Figure 3.10.14 Conservation hotspots of tidal flat/mangrove (Minab and Khamir)**

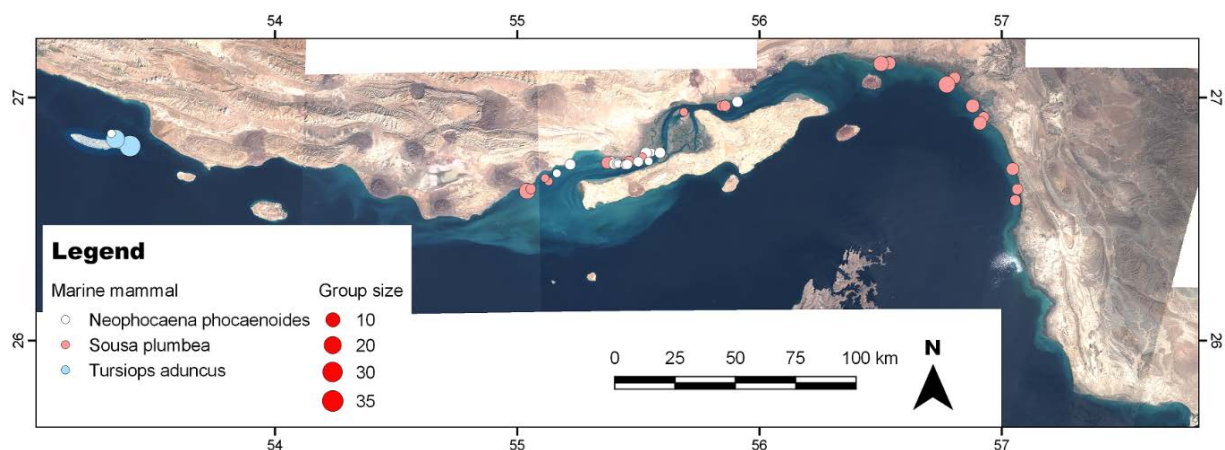


## (5) Marine mammals

According to Braulik et al. (2010), 14 marine mammal species have been confirmed in the southern coastal area of Iran. There have been two definite sightings of dugongs in the mangroves of the Hara Protected Area but none has been observed since then. Based on the survey results, the ensuing sections describe the status of marine mammals in Hormozgan coastal area (raw data of the survey is attached as Appendix 4).

### 1) Marine mammal distribution and diversity

A total of 39 sightings were made during the survey consisting of 21 sightings of Humpback dolphin (*Sousa plumbea*), 16 sightings of Finless porpoise (*Neophocaena phocaenoides*) and 2 sightings of Indo-Pacific bottlenose dolphin (*Tursiops aduncus*). Humpback dolphin and Finless porpoise are classified as endangered (EN) and vulnerable (VU) under the IUCN Red List respectively. Figure 3.10.15 shows the sighting locations (detailed map is attached as Appendix 7). According to Collins et al. (2005), the habitat range of Humpback dolphin and Finless porpoise in Persian Gulf typically includes shallow, sheltered areas, mangroves and estuaries. Since these species inhabit nearshore areas, they are vulnerable to human activities.



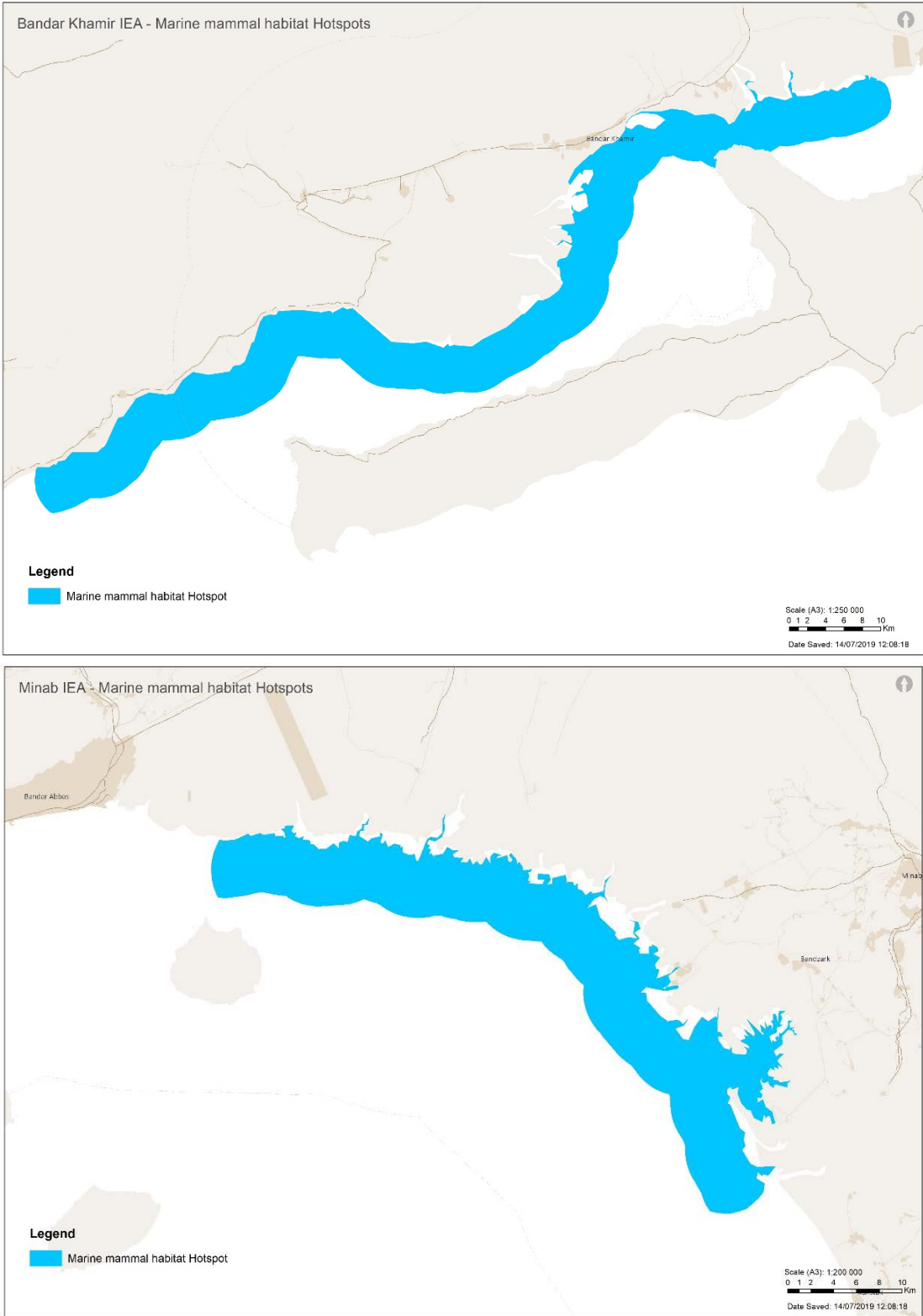
Source: JICA Project Team

**Figure 3.10.15 Sighting locations of marine mammals**

### 2) Conservation hotspots

The habitats of Humpback dolphin and Finless porpoise were considered as marine mammal conservation hotspots, as both species are IUCN threatened species and are vulnerable to human activities due to their preference for shallow coastal areas. The habitats of these species were identified based on analysis of sighting data and information on their habitat preference. Figure 3.10.16 shows the conservation hotspots of marine mammals (detailed hotspot and analysis maps are attached as Appendix 6).

Note that the identified hotspot was based on analysis of limited data and information. Hence for more accurate hotspot analysis, further research is recommended to identify their critical habitats (e.g. feeding and breeding ground) such as through satellite tracking survey.



Source: JICA Project Team

**Figure 3.10.16 Conservation hotspots of marine mammals**

## **(6) Birds**

The diverse habitats of the Hormozgan coastal area support a variety of breeding and wintering waterfowl and sea birds. The vast intertidal flat and mangrove forest are also important flyway point for migratory birds. In the Hormozgan coastal area, there are nine Important Bird Area (IBA) designated by BirdLife International such as Shidvar Island, Khuran Straits, Minab and Gaz. Based on the survey results, the ensuing sections describe the status of birds in Hormozgan coastal area (raw data of the survey is attached as Appendix 4).

### **1) Bird diversity and abundance**

A total of 55 species (26,000 individuals) and 83 species (140,000 individuals) were observed during the hot (May-June) and cool (January-March) season surveys respectively. The number of observed birds was higher in the cool season, as it is the main bird migratory period (the list of observed bird species is attached as Appendix 4).

### **2) Bird breeding areas**

The survey identified breeding sites of 13 species such as of spoonbills, egrets, terns and plovers. Spoonbills and egrets, mainly nest in mangrove areas. Terns and plovers mainly nest behind the supratidal zone where halophyte vegetation is formed. Shidvar island is one of the most important breeding sites for terns, and around 14,000 individuals were counted during the survey. According to local experts, the threatened Socotra cormorant (*Phalacrocorax nigrogularis*) also breed in Shidvar island. Figure 3.10.17 shows the location of the identified bird breeding sites (detailed maps are attached as Appendix 7). During the survey, nest of the invasive species Black Rat (*Rattus rattus*) was observed in some mangrove areas. According to Neinavaz et al. (2013), Black Rat predation is the most important factor affecting the breeding performance of great egrets in Hara Biosphere Reserve.



Source: JICA Project Team

**Figure 3.10.17 Bird breeding sites identified in the survey**

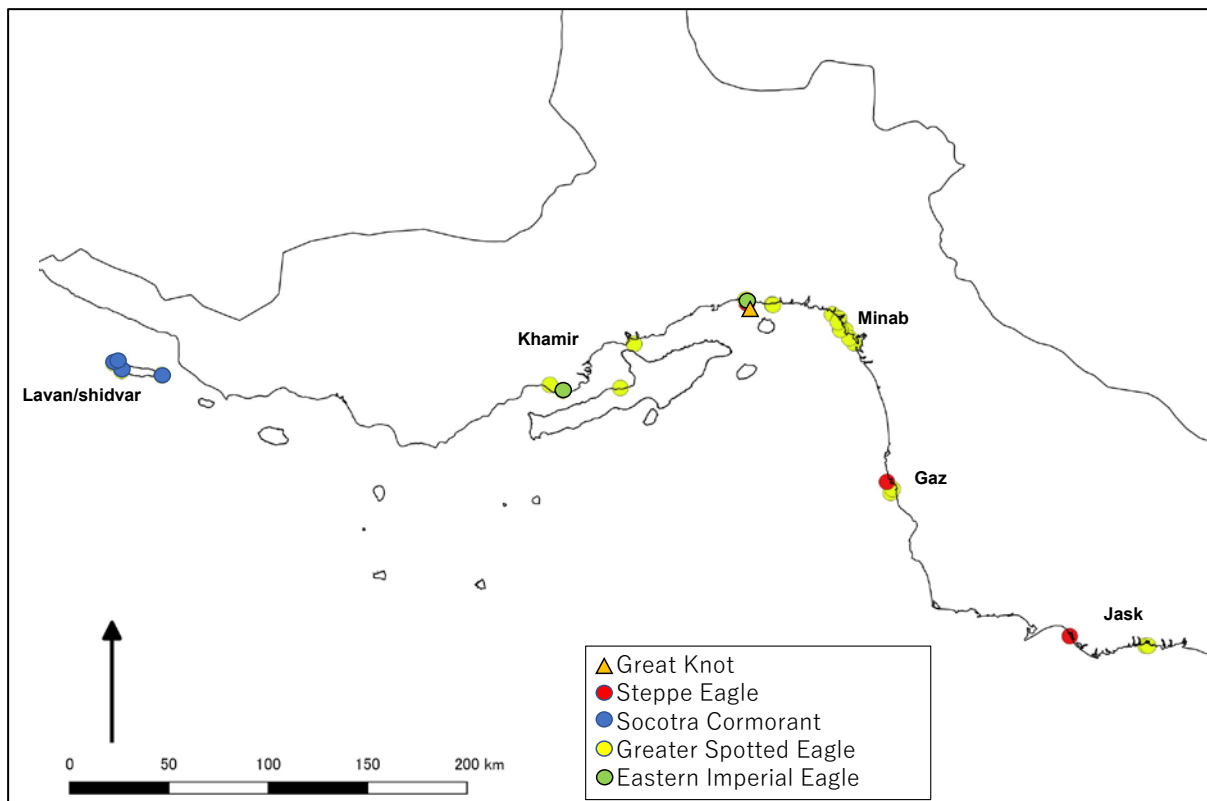
### 3) Threatened bird species

Five threatened bird species under the IUCN Red List were observed in the study area. Table 3.10.2 shows the observed threatened bird species and counted individuals. Figure 3.10.18 shows the location where the threatened bird species were observed. Apart from Socotra Cormorant, all the threatened species were observed during the wintering season survey mainly along the intertidal flat/mangrove areas.

**Table 3.10.2 Threatened bird species observed in the study area**

Common name (Scientific name)	IUCN category	Jask	Gaz	Minab	Hara	Lavan/Shidvar
Great Knot ( <i>Calidris tenuirostris</i> )	EN	-	-	10	-	-
Steppe Eagle ( <i>Aquila nipalensis</i> )	EN	1	1	-	-	-
Socotra Cormorant ( <i>Phalacrocorax nigrogularis</i> )	VU	-	-	-	-	110
Greater Spotted Eagle ( <i>Clanga clanga</i> )	VU	2	12	9	7	-
Eastern Imperial Eagle ( <i>Aquila heliaca</i> )	VU	-	-	1	1	-

Source: JICA Project Team



Source: JICA Project Team

**Figure 3.10.18** Locations where threatened bird species were observed

#### 4) Conservation hotspots

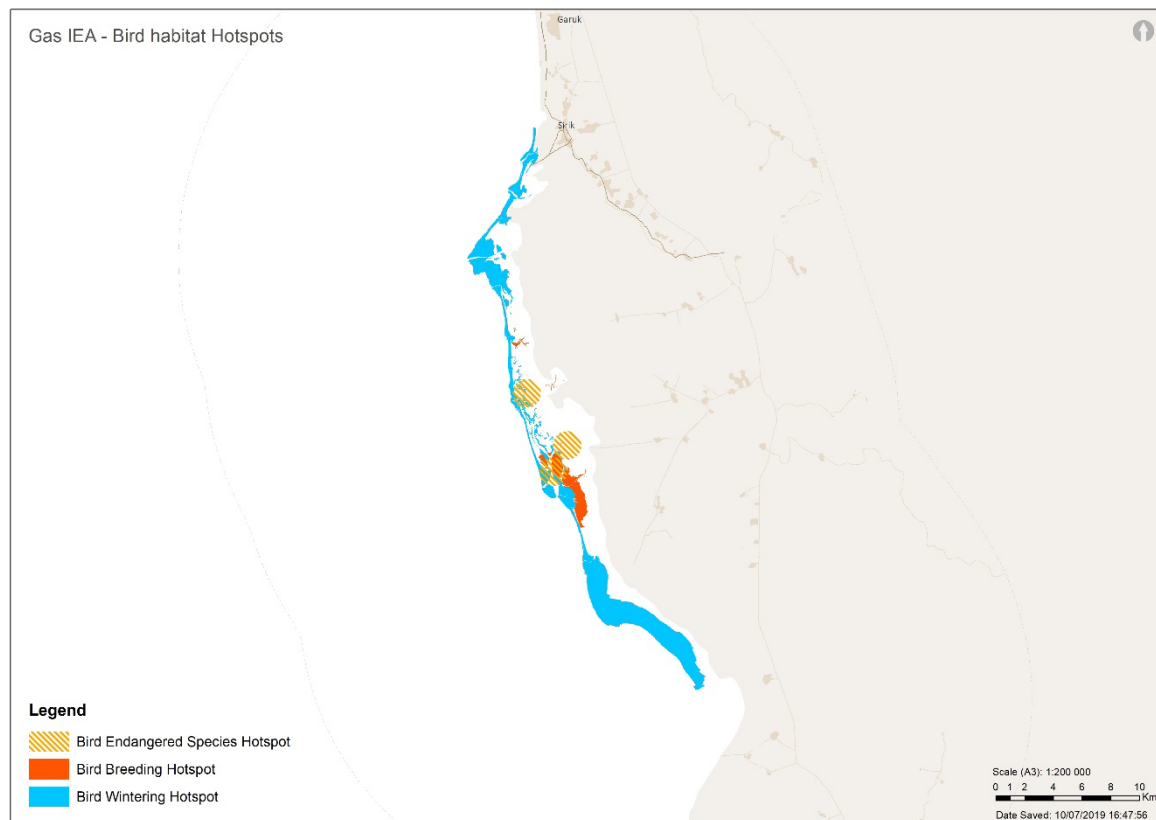
Conservation hotspots of birds in the mainland coastal areas (Hara, Minab, Gaz and Jask) were identified by analyzing the habitat preference of breeding, threatened and wintering bird species observed in the field survey. Habitat preference was analyzed through odds ratio analysis of 6 types of habitats used by birds namely: mud, sandy-mud, sandy tidal flats, sand-bar, mangrove (*Avicennia*) and mangrove (*Rhizophora*). Based on the results of the odds ratio analysis, bird hotspots in the mainland coastal areas were determined as shown in Table 3.10.3.

**Table 3.10.3** Conservation hotspots of birds in the mainland coastal area

Type	Hotspot
Wintering birds	All sandy intertidal areas and <i>Rhizophora</i> mangrove areas
Threatened birds	1-km radius area from the threatened species observation site
Breeding birds	All muddy-intertidal areas and <i>Avicennia/Rhizophora</i> mangrove areas that exist within 1-km radius area from the breeding observation site

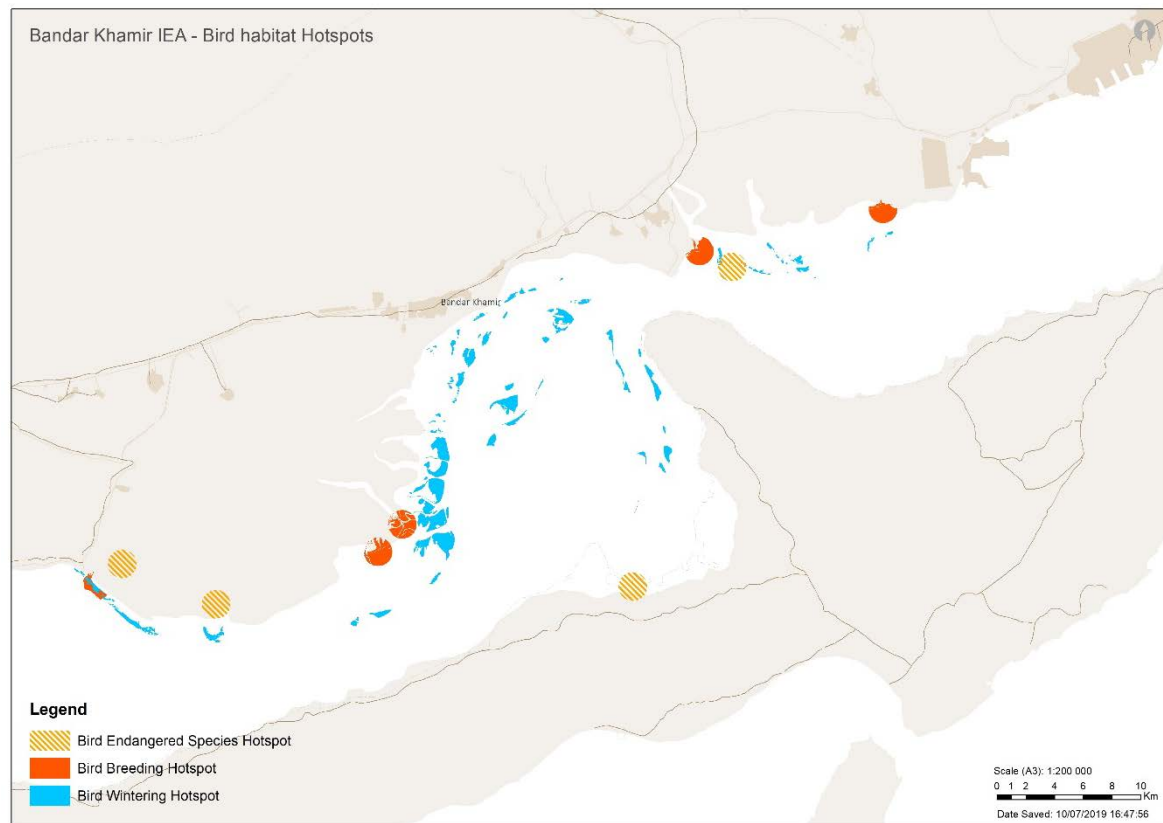
Source: JICA Project Team

For Shidvar/Lavan, the whole Shidvar island was considered as a hotspot as it is an important breeding area especially for terns. In addition, 1-km radius area from the threatened species observation site were considered as a hotspot. Figures 3.10.19 to 3.10.21 show the conservation hotspots of birds.



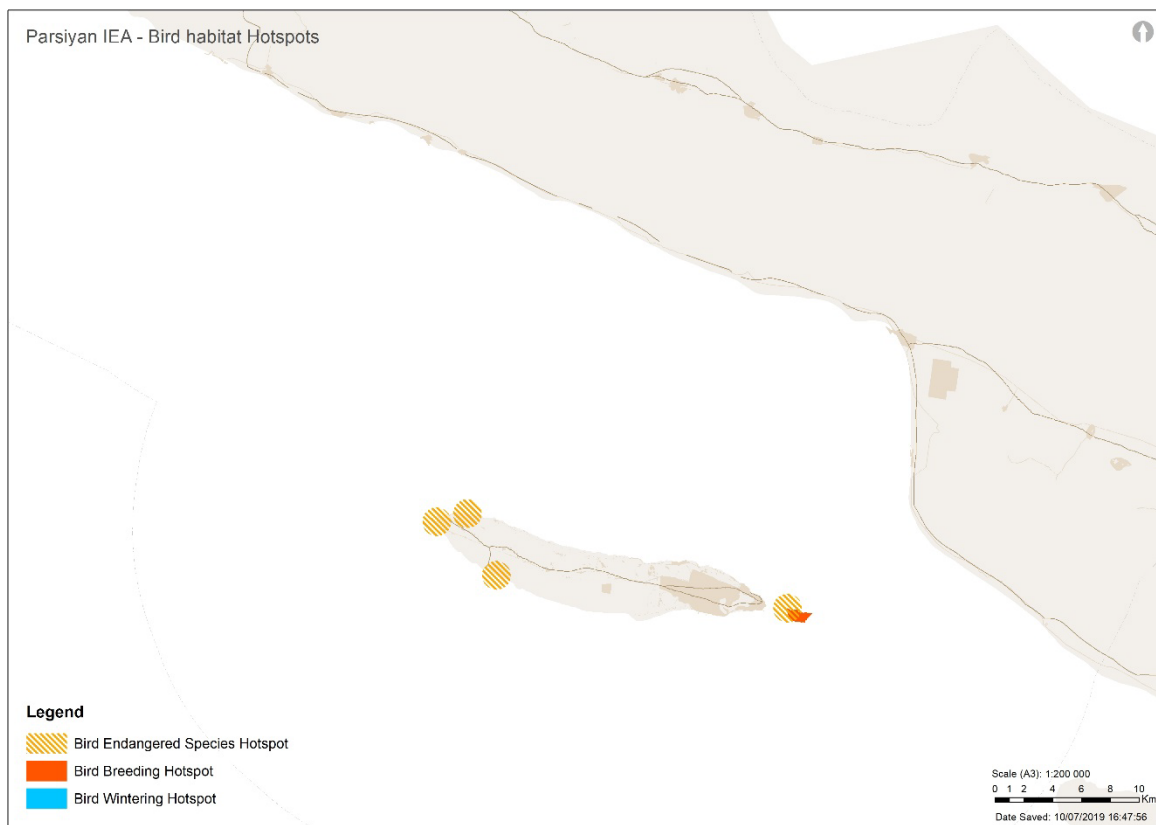
Source: JICA Project Team

**Figure 3.10.19 Conservation hotspots of birds (Jask and Gaz)**



Source: JICA Project Team

**Figure 3.10.20 Conservation hotspots of birds (Minab and Khamir)**



Source: JICA Project Team

**Figure 3.10.21 Conservation hotspots of birds (Lavan and Shidvar)**

## **(7) Sea turtles**

Five species of sea turtles have been recorded from the coastal waters of Hormozgan Province namely: Loggerhead sea turtle (*Caretta caretta*), Green sea turtle (*Chelonia mydas*), Hawksbill turtle (*Eretmochelys imbricate*), Olive ridley sea turtle (*Lepidochelys olivacea*) and Leatherback sea turtle (*Dermochelys coriacea*). All species are classified as threatened under the IUCN Red List. Hawksbill turtle and Green sea turtle are most commonly sighted in Hormozgan, where they are known to nest and forage along the coastal waters and islands of Hormozgan. Based on the survey results, the ensuing sections describe the status of sea turtles in Hormozgan coastal area (raw data of the survey is attached as Appendix 4).

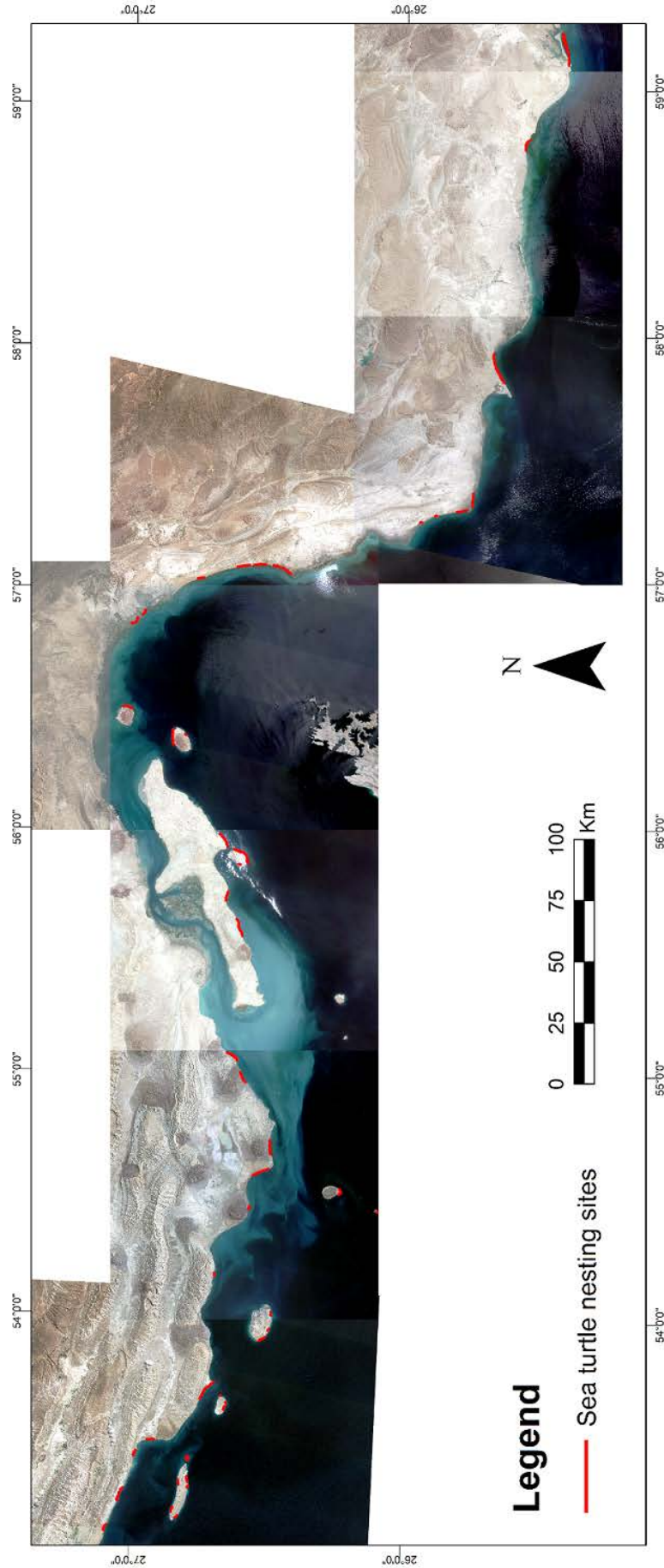
### **1) Distribution of sea turtle nesting sites and habitats**

Information on sea turtle nesting sites and sighting records were collected through literature review, fishermen interviews and DOE sea turtle survey in 2019.

Nesting sites were widely distributed along the sandy coasts of Hormozgan mainland and offshore islands. Confirmed nesting species were only Hawksbill turtle and Green sea turtle. Nesting sites of Green sea turtles were limited to Shidvar and Jask region. Figure 3.10.22 shows the distribution of nesting sites along the Hormozgan coast (detailed nesting maps are attached as Appendix 7).

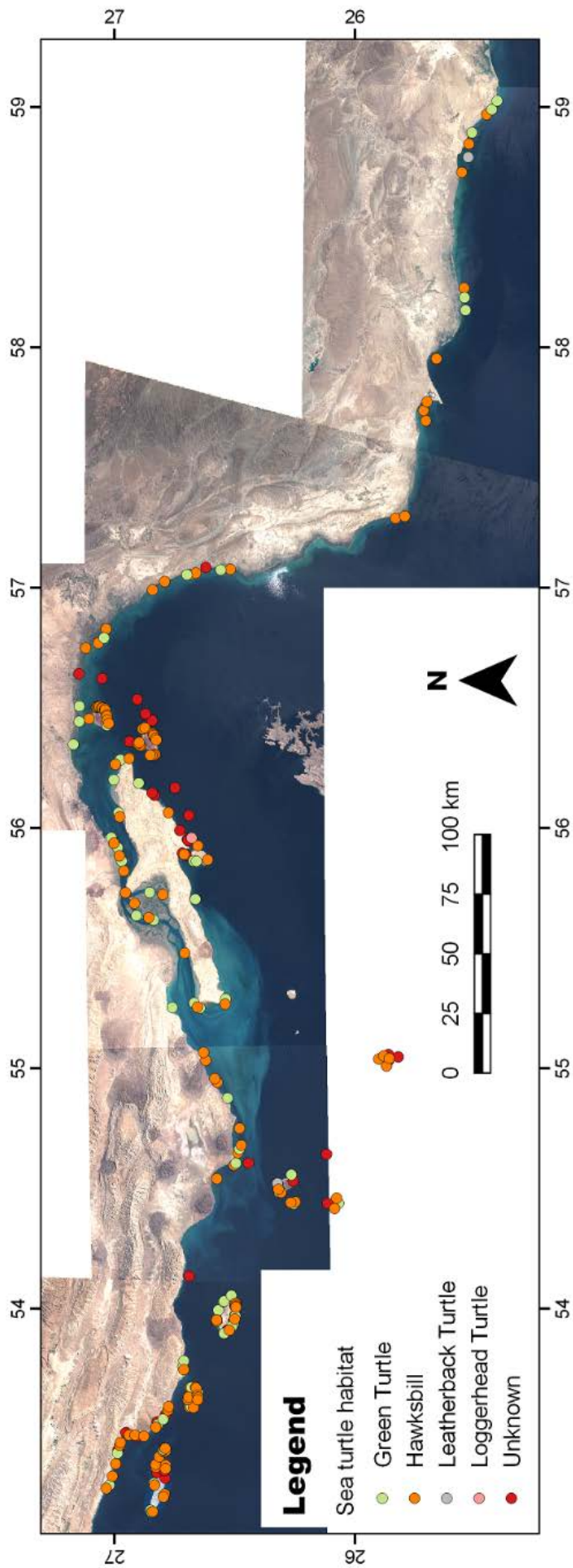


Over 250 sighting data were collected consisting of Hawksbill, Green, Loggerhead and Leatherback sea turtles. Sightings were recorded not only around nesting sites but throughout the Hormozgan coastline. This implies that the entire Hormozgan coast is an important area for sea turtles especially around coral reefs, seaweed beds and seagrass beds, which are likely to be important foraging areas. Figure 3.10.23 shows the sighting locations along the Hormozgan coast (detailed sighting maps are attached as Appendix 7).



Source: JICA Project Team

**Figure 3.10.22** Distribution of sea turtle nesting sites along the Hormozgan coast



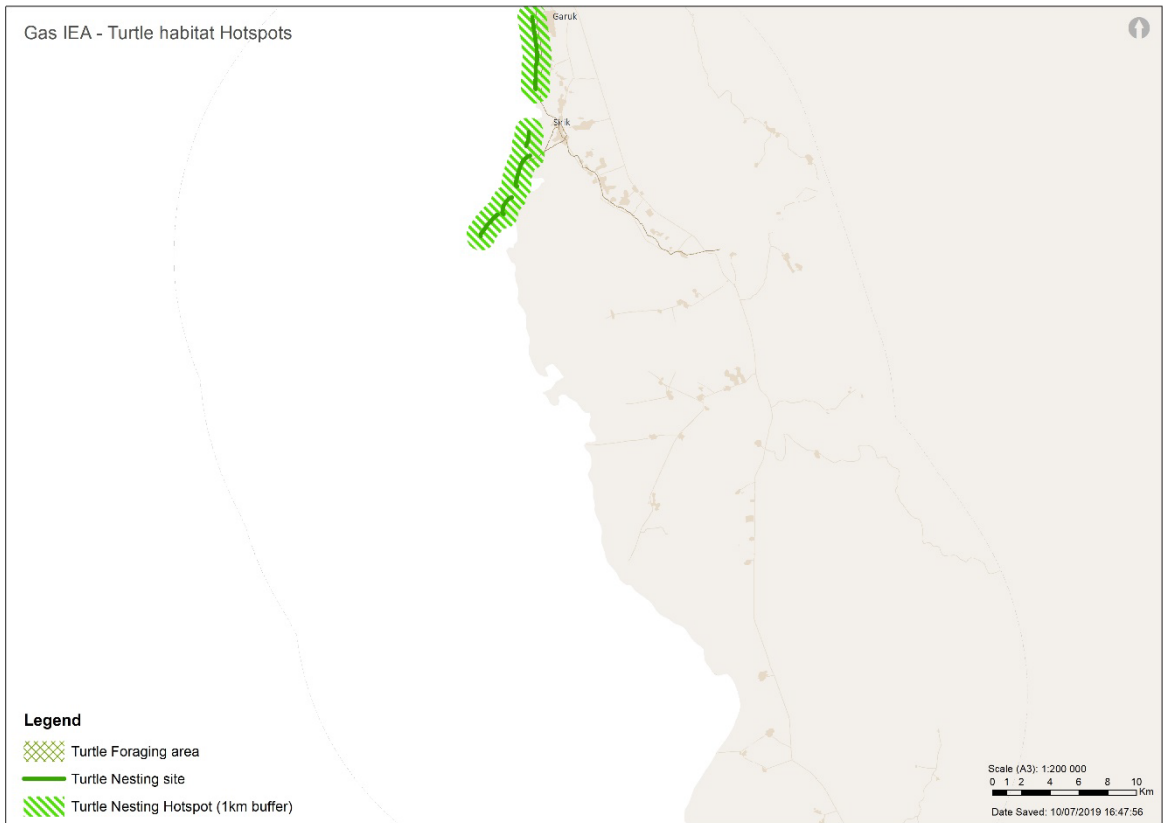
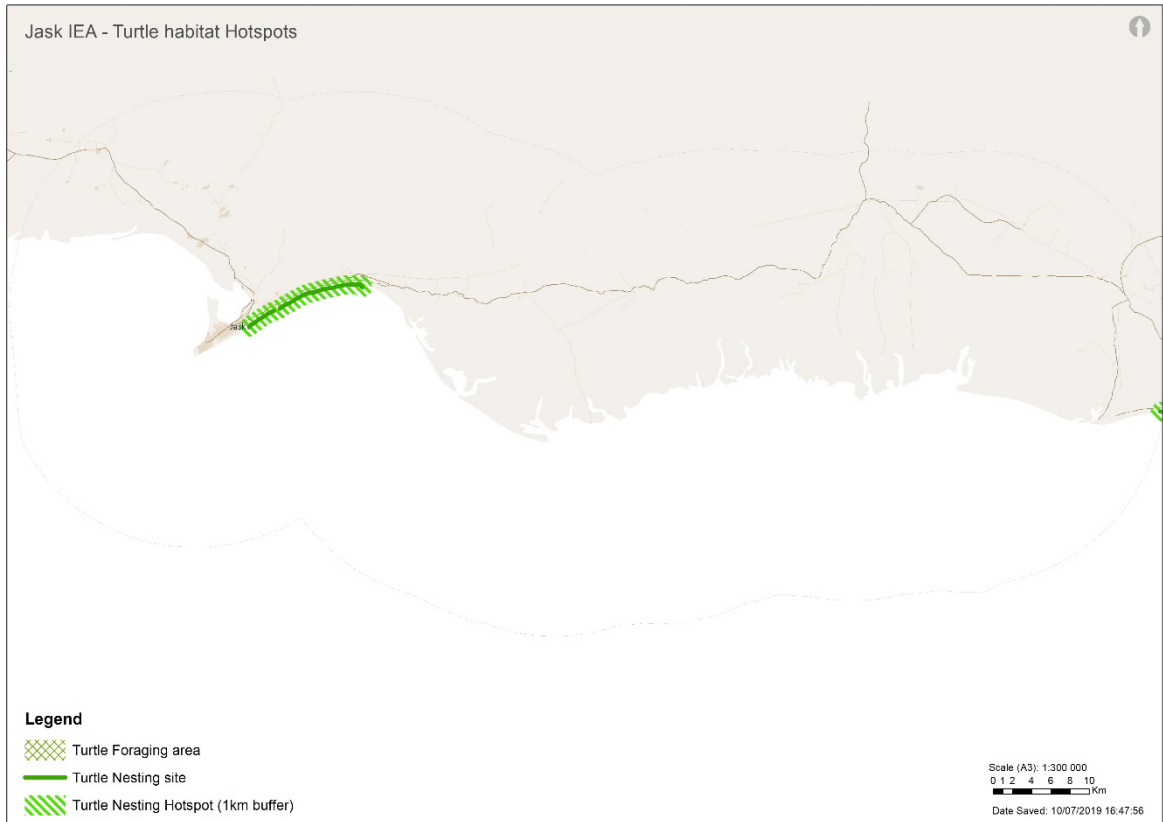
Source: JICA Project Team

Figure 3.10.23 Sea turtle sighting locations along the Hormozgan coast

## **2) Conservation hotspots**

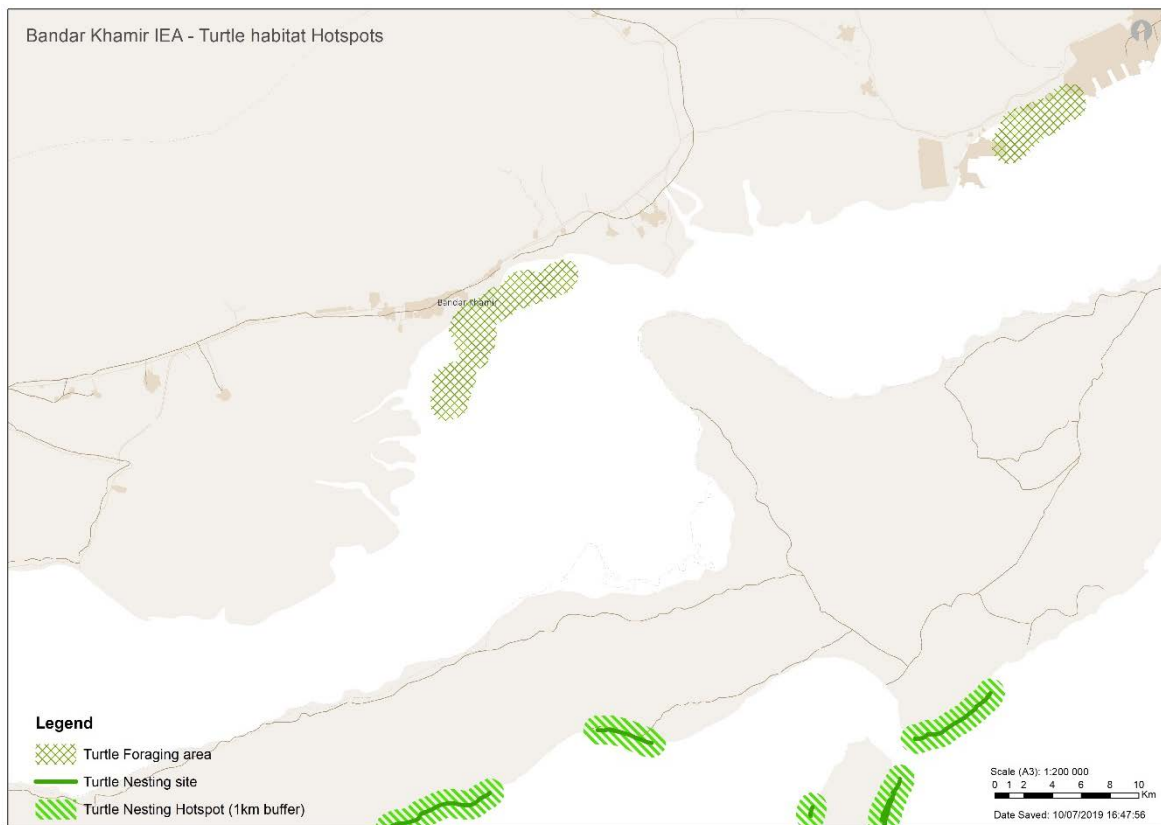
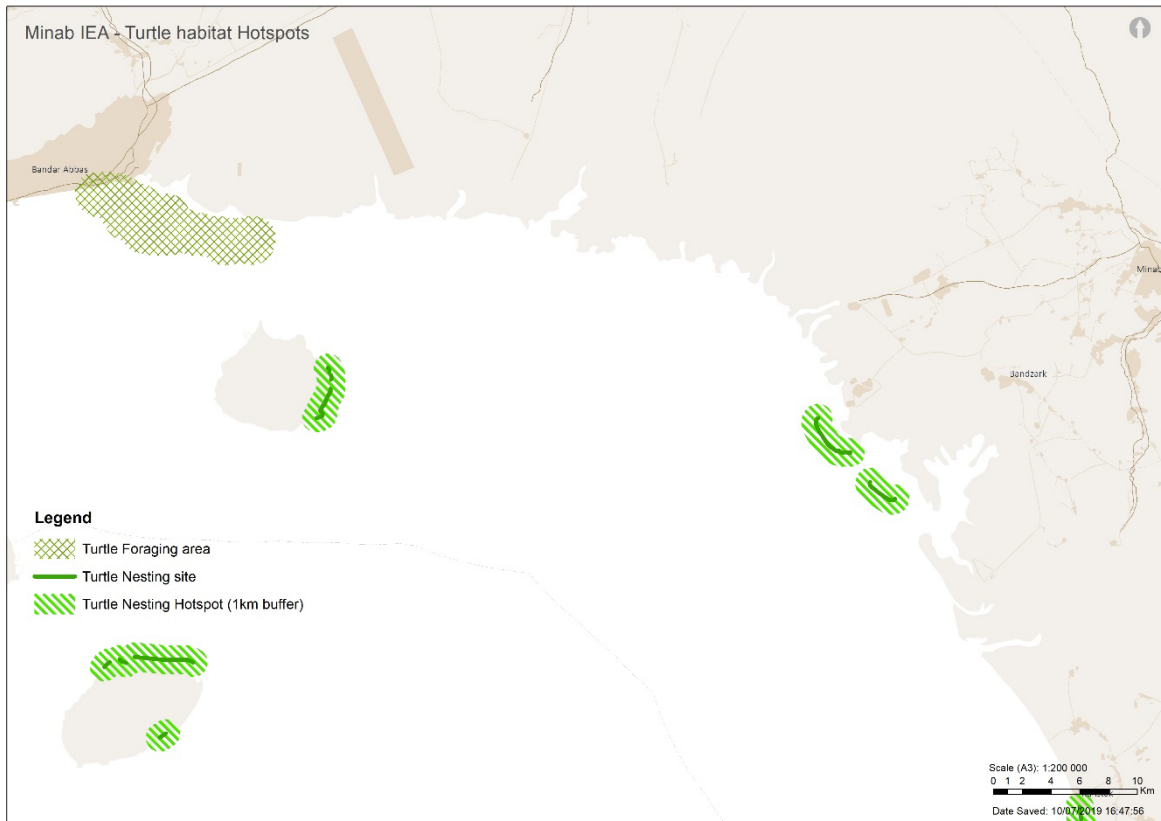
Conservation hotspots of sea turtles were considered to be confirmed nesting sites and major foraging areas. Coral, seaweed and seagrass habitats were considered as major foraging areas due to abundance of their preferred food (e.g. algae, sponges, seagrass). Figures 3.10.24 and 3.10.26 show the conservation hotspots of sea turtles. Note that 1-km buffer area was established around the nesting sites and major foraging areas. (Detailed hotspot maps are attached as Appendix 6)

Note that the identified hotspot for foraging area was based on available coral, seaweed and seagrass distribution information. Hence for more accurate hotspot analysis, further research is recommended to identify their critical habitats such as through satellite tracking survey.



Source: JICA Project Team

**Figure 3.10.24 Conservation hotspots of sea turtles (Jask and Gaz)**



Source: JICA Project Team

**Figure 3.10.25 Conservation hotspots of sea turtles (Minab and Khamir)**



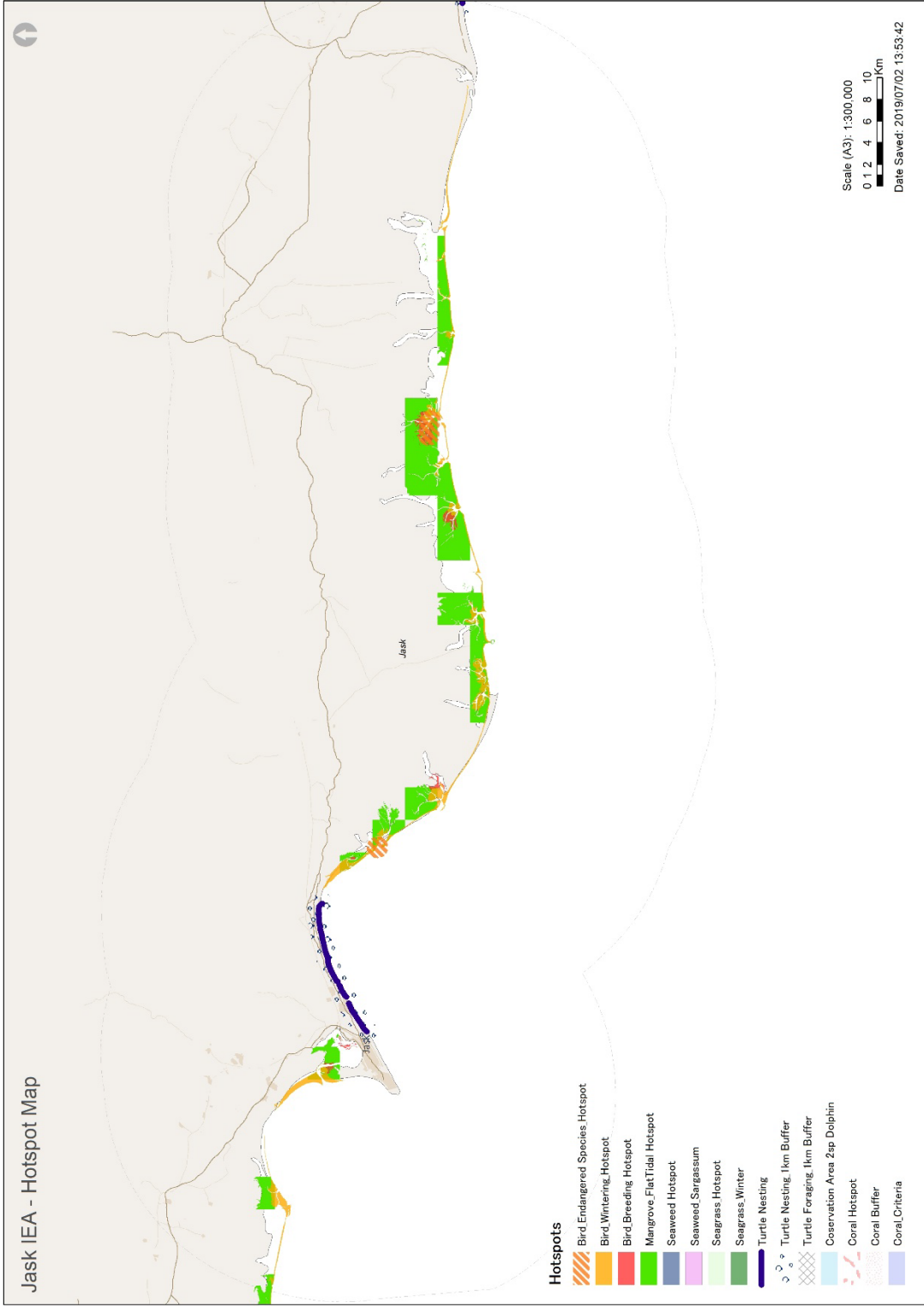
Source: JICA Project Team

**Figure 3.10.26 Conservation hotspots of sea turtles (Parsian)**

## **(8) Conservation hotspots**

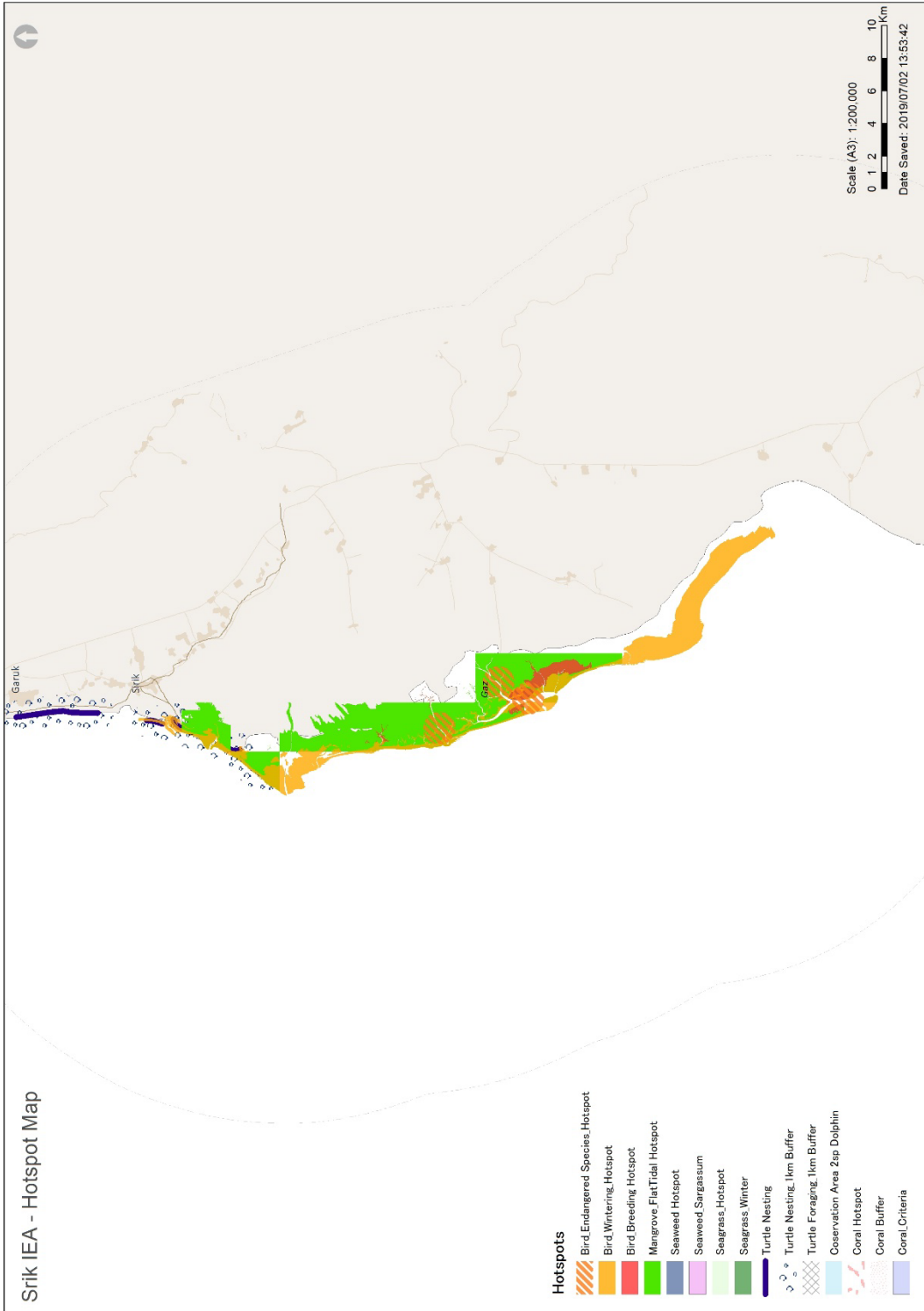
Figures 3.10.27 to 3.10.31 show combined (global) hotspot map of important habitats (coral, seagrass, seaweed, tidal flat) and species (marine mammal, bird, sea turtle).





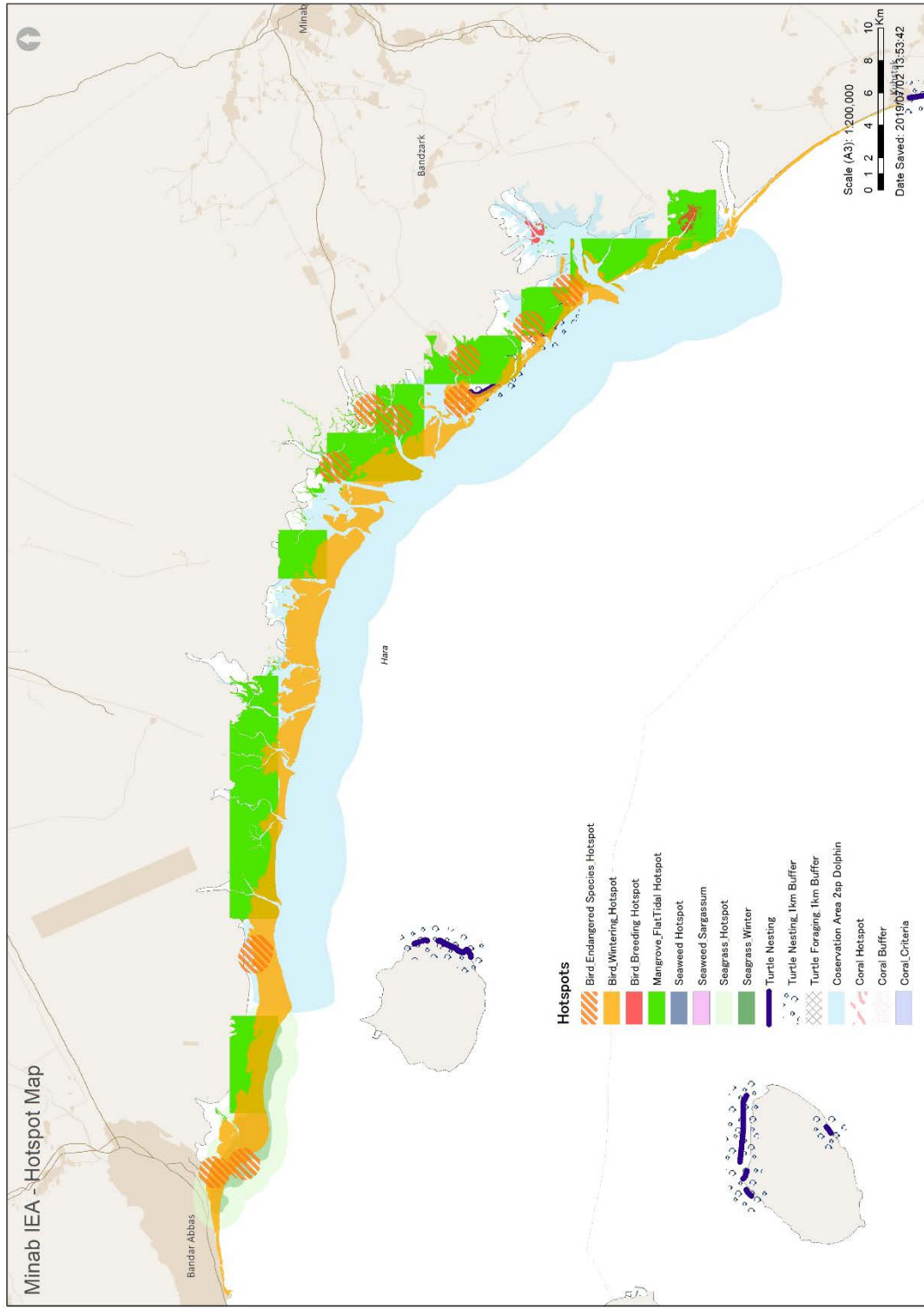
Source: JICA Project Team

**Figure 3.10.27 Global conservation hotspot map (Jask)**



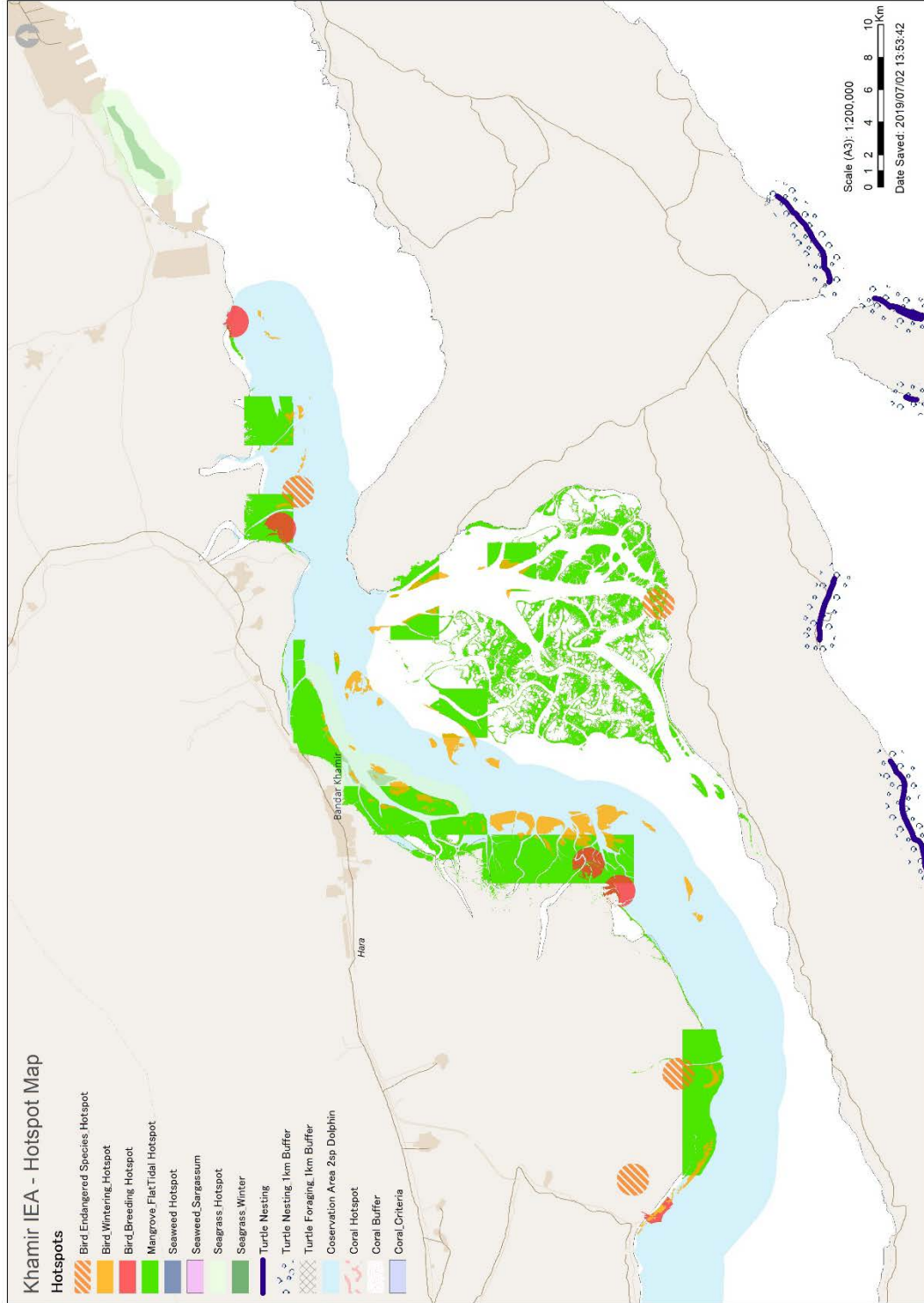
**Figure 3.10.28 Global conservation hotspot map (Gaz)**

Source: JICA Project Team



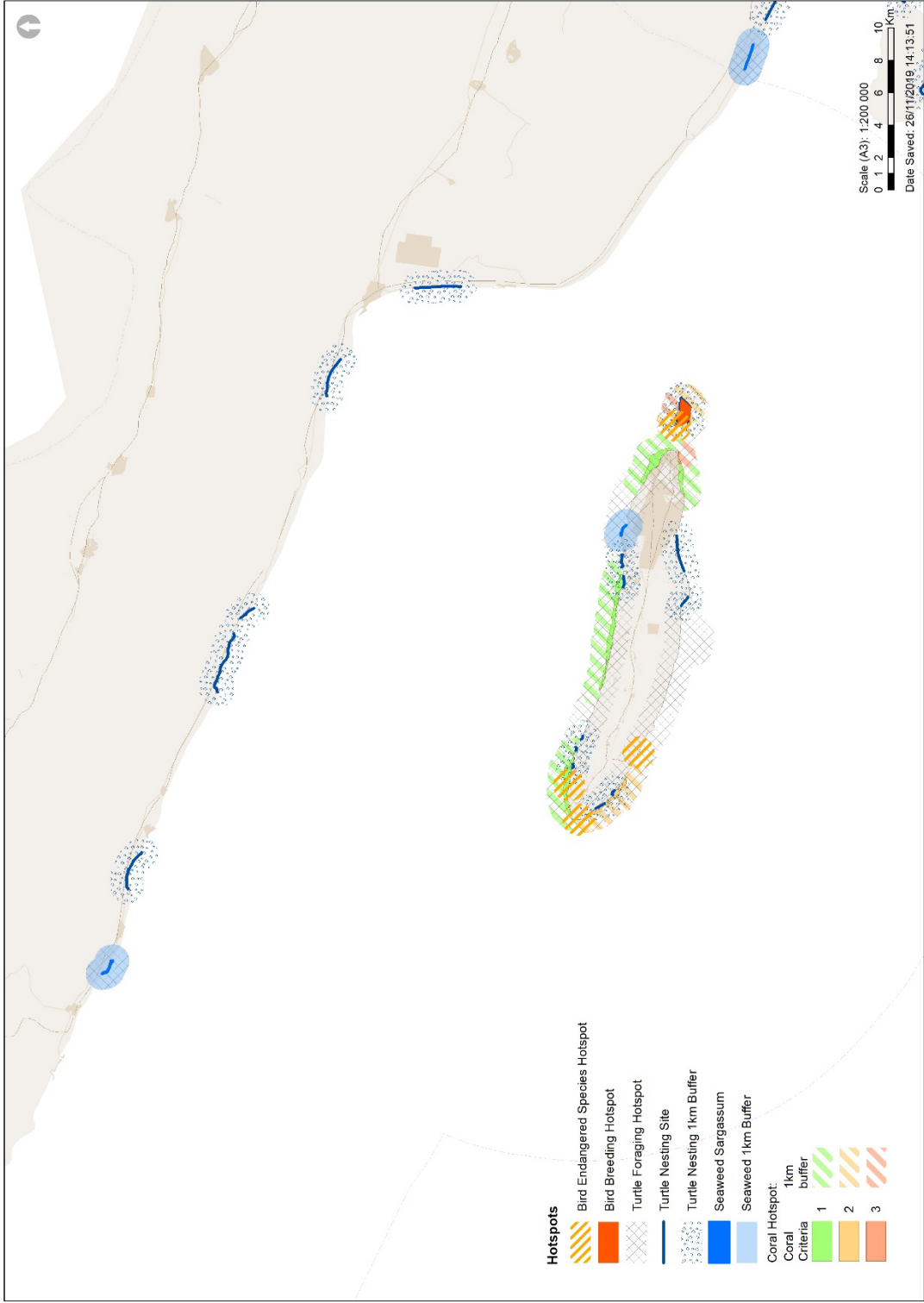
**Figure 3.10.29 Global conservation hotspot map (Minab)**

Source: JICA Project Team



Source: JICA Project Team

Figure 3.10.30 Global conservation hotspot map (Khamir)



Source: JICA Project Team

Figure 3.10.31 Global conservation hotspot map (Parsian)

### 3.10.4 Pollution

Pollution survey was conducted along the entire Hormozgan coastal area, consisting of seawater, wastewater and sediment quality. To consider seasonal variations, seawater and wastewater surveys were conducted for multiple seasons. The survey (i.e. field sampling and laboratory analysis) was undertaken by contracting Research Institute of Petroleum Industry (RIPI) (the report of RIPI is attached as Appendix 3). Table 3.10.4 shows the outline of the pollution survey.

**Table 3.10.4 Outline of pollution survey**

	No. of sampling sites	Survey period
Seawater quality	37	1 <sup>st</sup> : 26 April-14 May 2018 & 15-17 July 2018 (St.14-19) 2 <sup>nd</sup> : 12-29 September 2018 3 <sup>rd</sup> : 11-28 January 2019
Sediment quality	37	1 <sup>st</sup> : 12-29 September 2018
Wastewater quality	25	1 <sup>st</sup> : 12-29 September 2018 2 <sup>nd</sup> : 11-28 January 2019

Source: JICA Project Team

#### (1) Seawater quality

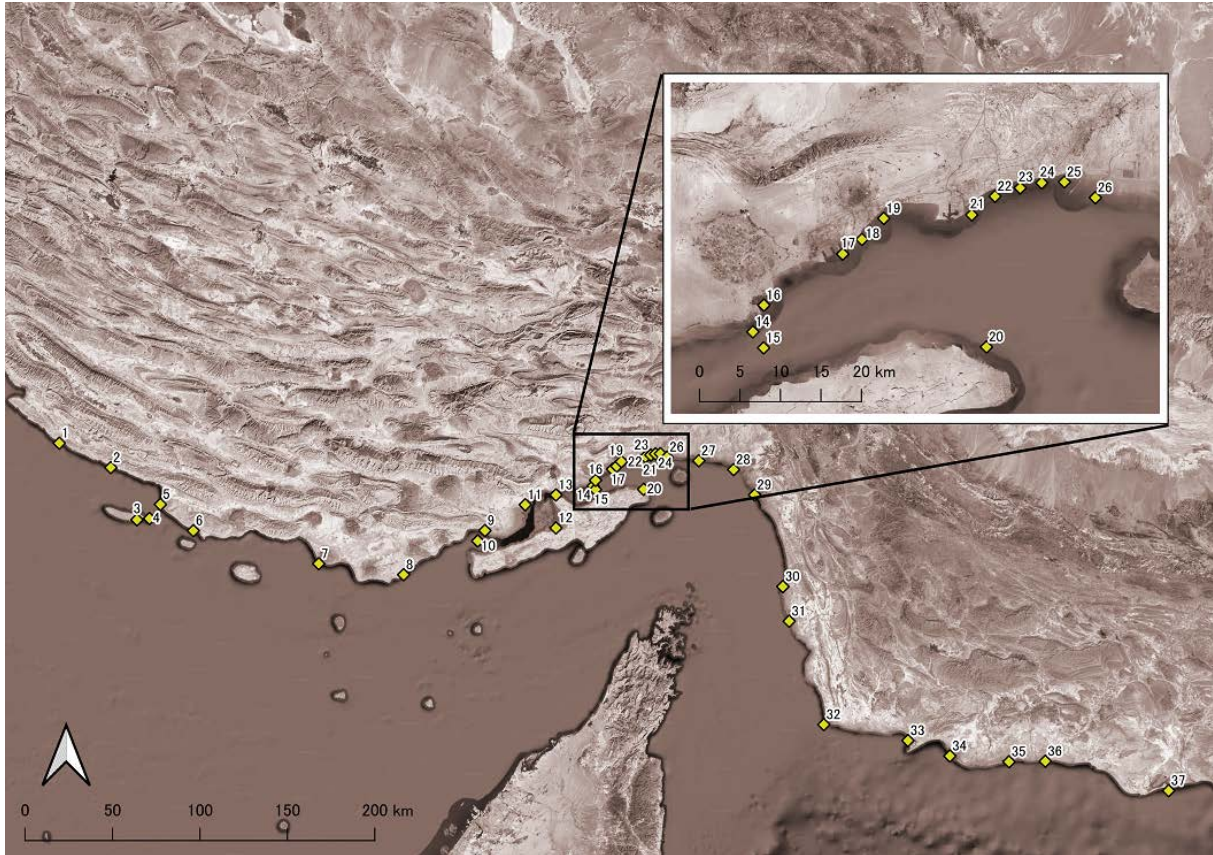
Table 3.10.5 shows the surveyed parameters and analysis method of seawater quality survey. Figure 3.10.32 shows the locations of the sampling sites.

**Table 3.10.5 Surveyed parameters and analysis method of seawater quality survey**

	Parameter	Unit	Analysis method	Detection limit
1	Water temp.	°C	<i>In situ</i> (HACH multi analyzer)	0.1
2	Salinity	‰	<i>In situ</i> (HACH multi analyzer)	1.0
3	pH	-	<i>In situ</i> (HACH multi analyzer)	0-14
4	Suspended solids (SS)	mg/L	St. Method 2540F	10
5	Turbidity	NTU	St. Method 2130	0.1
6	Chemical oxygen demand (COD <sub>cr</sub> )	mg/L	St. Method 5220B	5
7	Dissolved oxygen (DO)	mg/L	ASTM D888	0.1
8	NH <sub>4</sub> <sup>+</sup> -N	mg/L	ASTM D1426	0.1
9	NO <sub>2</sub> <sup>-</sup> -N	mg/L	St. Method 4500-NO2	0.01
10	NO <sub>3</sub> <sup>-</sup> -N	mg/L	St. Method 4500-NO3	0.1
11	Total nitrogen (TN)	mg/L	St. Method 4500-Norg B	0.1
12	PO <sub>4</sub> <sup>3-</sup> -P	mg/L	St. Method 4500-P C	0.2
13	Total phosphorus (TP)	mg/L	St. Method 4500-P H	0.2
14	Chlorophyll a	mg/L	US-EPA Method 446.0	0.08
15	Fecal Coliform	CFU/100mL	St. Method 9211 B	2
16	Enterococcus	CFU/100mL	St. Method 9230 A	2
17	Total petroleum hydrocarbon (TPH)	mg/L	ASTM D7066	0.2
18	Cu	mg/L	US-EPA 6020B & PerkinElmer SOP	0.001
19	Zn	mg/L		0.001
20	Cd	mg/L		0.0001
21	Pb	mg/L		0.001
22	As	mg/L		0.0005
23	Fe	mg/L		0.01
24	Al	mg/L		0.01

	Parameter	Unit	Analysis method	Detection limit
25	Ni	mg/L	St. Method 3112B	0.001
26	V	mg/L		0.001
27	Cr (VI)	mg/L		0.001
28	Hg	mg/L		0.001

Source: JICA Project Team

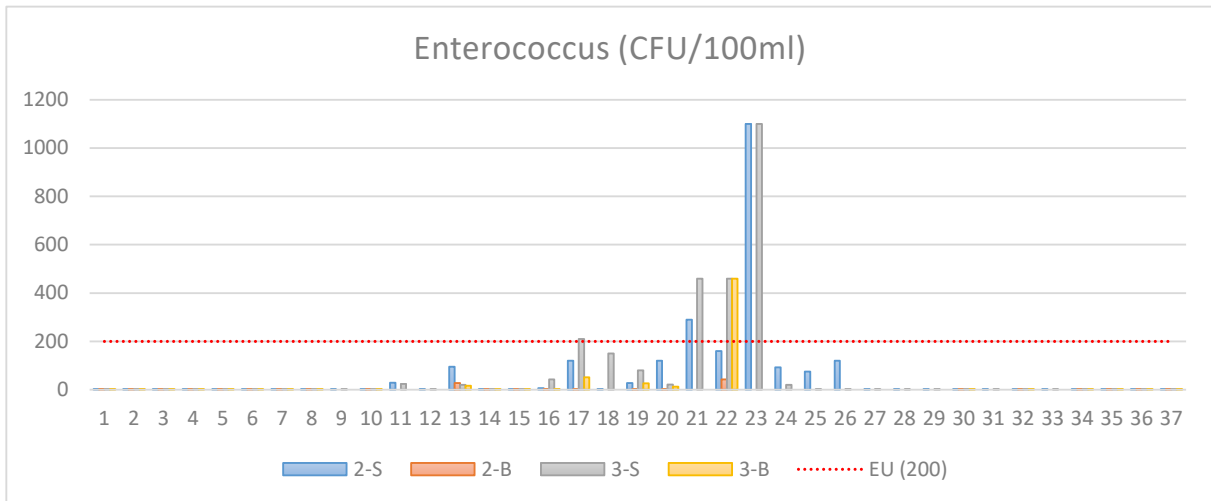


Source: JICA Project Team

**Figure 3.10.32 Sampling sites of seawater**

The main findings of the seawater quality survey are summarized below (raw data of the survey is attached as Appendix 8). Since Iran has no environmental standards for seawater, the results were compared with standards of other countries.

Fecal Coliform and *Enterococcus* values were in general high in the Bandar Abbas region. Wastewater from Bandar Abbas city is probably the main source, as high values were also recorded from the city's wastewater outlets. Figure 3.10.33 shows the analysis results of *Enterococcus* (red line: EU standard).

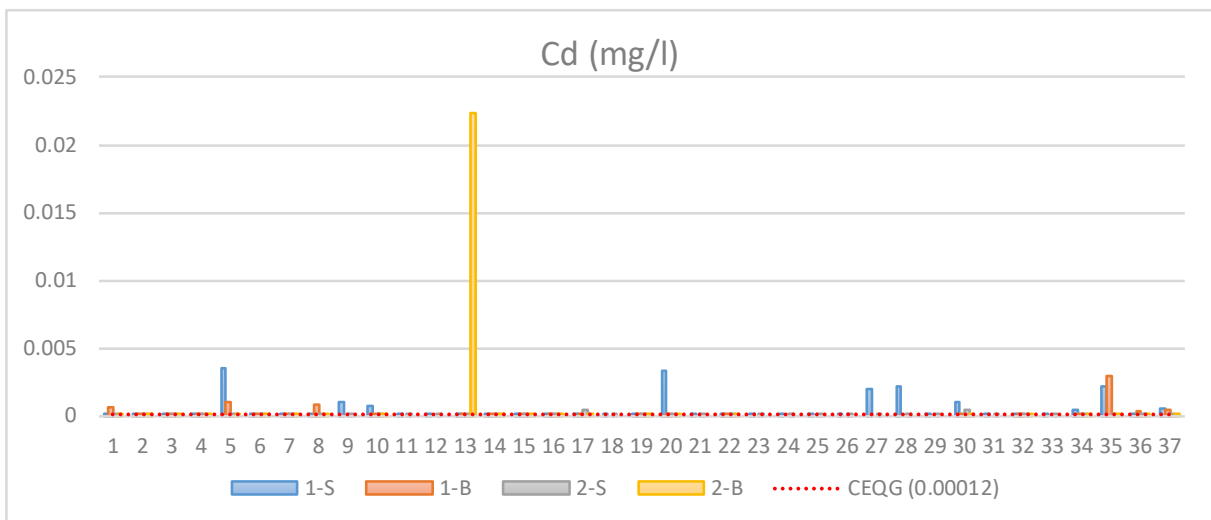


S: surface, B: bottom

Source: JICA Project Team

**Figure 3.10.33 Analysis results of *Enterococcus* (2<sup>nd</sup> and 3<sup>rd</sup> surveys)**

Cadmium (Cd) and hexavalent chromium (Cr (Vi)) values were high in certain locations. Cd was especially high near Hara protected area (Bandar Pol (St.13)), which its value (0.0224 mg/l) was almost 200 times the referred guideline value (Canadian Environmental Quality Guidelines: CEQG). Since there are no major pollution source in the vicinity, it is difficult to specify the reason. Nevertheless, this site should be monitored continuously in the future. Figure 3.10.34 shows the analysis results of Cd (red line: CEQG guideline value).



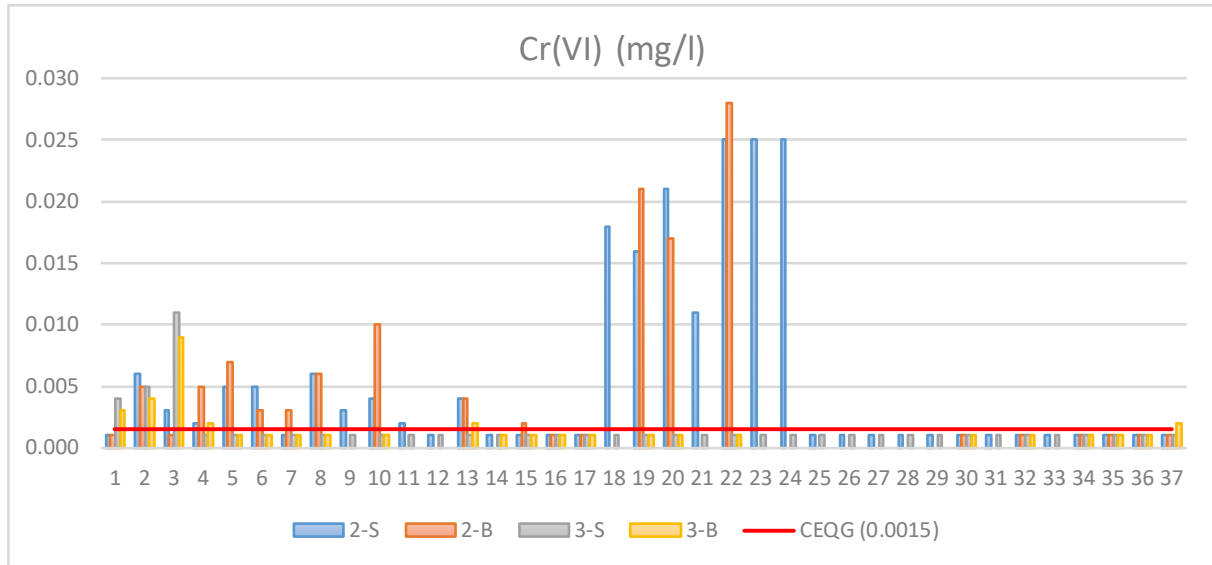
S: surface, B: bottom

Source: JICA Project Team

**Figure 3.10.34 Analysis results of Cd (1<sup>st</sup> and 2<sup>nd</sup> surveys)**

Cr (IV) was especially high in the Bandar Abbas region from stations 18 to 24. The elevated Cr (IV) levels could be due to industrial effluents from the Bandar Abbas industrial area. Figure 3.10.35 shows the analysis results of Cr (VI) (red line: CEQG guideline value).





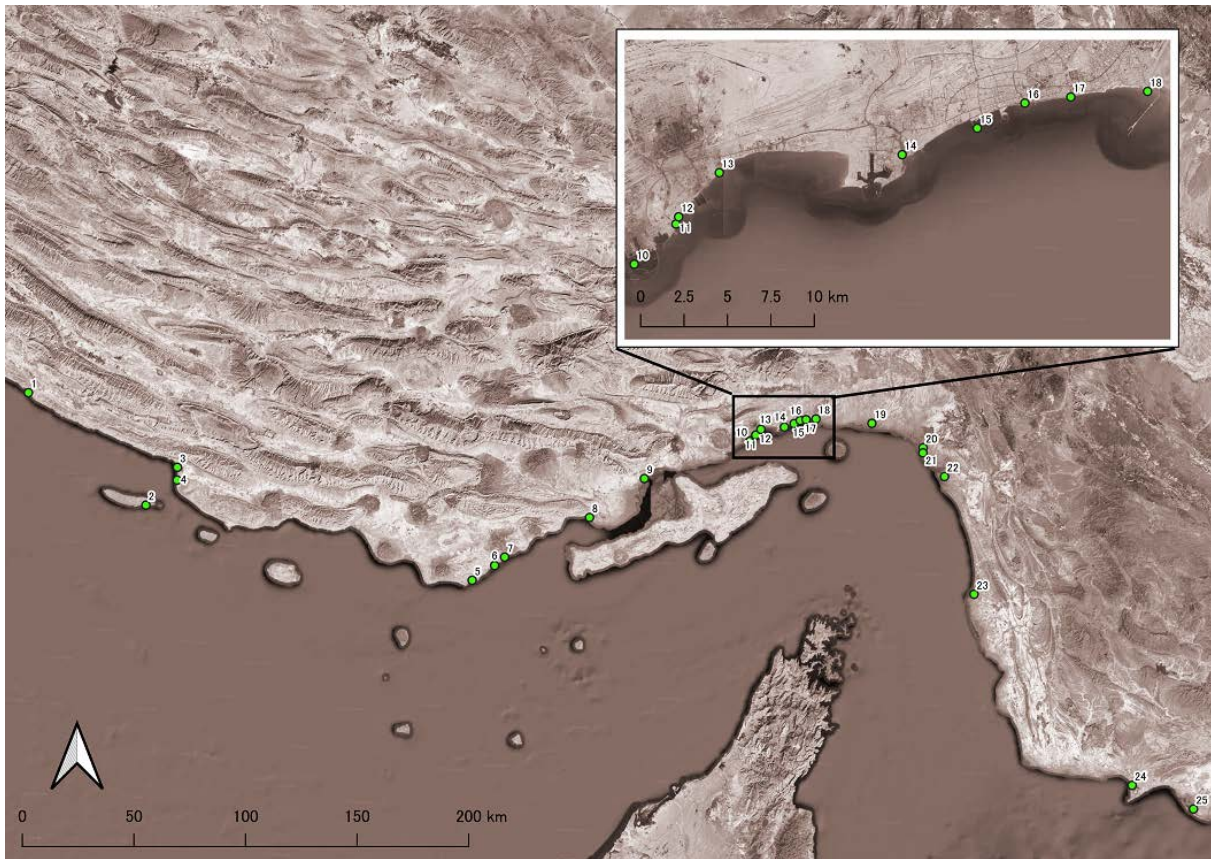
S: surface, B: bottom

Source: JICA Project Team

**Figure 3.10.35 Analysis results of Cr (VI) (2<sup>nd</sup> and 3<sup>rd</sup> surveys)**

**(2) Wastewater quality**

The analyzed parameters and analysis method of wastewater were the same as seawater quality. Figure 3.10.36 shows the wastewater sampling locations. Note that most samples were not collected directly from the wastewater outlets but instead from the mixing zone of wastewater and seawater.



Source: JICA Project Team

**Figure 3.10.36 Sampling sites of wastewater**

The main findings of the wastewater quality survey are summarized below (raw data of the survey is attached as Appendix 8). The results were compared with Iranian wastewater discharge standards for inland surface water.

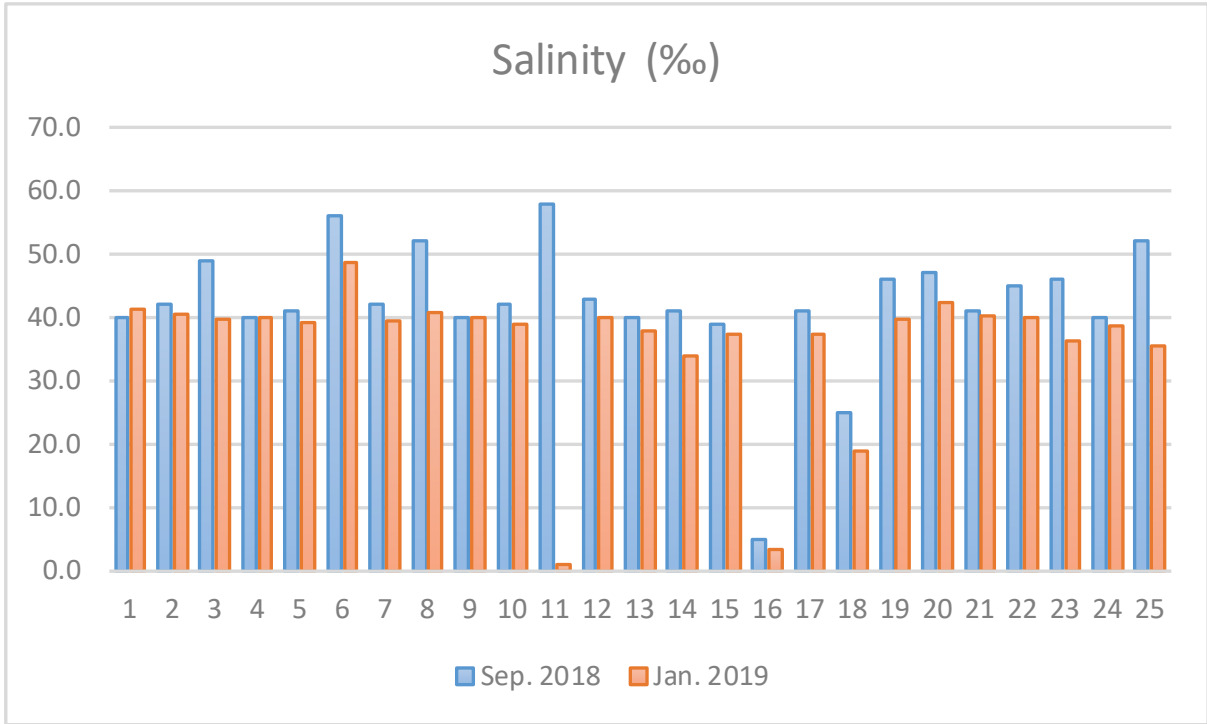
High wastewater temperature was recorded at the outlet of Lavan Oil Refinery (St. 2) and Bandar Abbas Power Plant (St. 13) for both 1<sup>st</sup> (September 2018) and 2<sup>nd</sup> (January 2019) surveys. For Lavan Oil Refinery, the temperature difference with the ambient water temperature was 6.4-6.7°C. For Bandar Abbas Power Plant, the temperature difference with the ambient water temperature was 8.0-10.8°C. Table 3.10.6 shows the wastewater temperature of Lavan Oil Refinery and Bandar Abbas Power Plant.

**Table 3.10.6 Wastewater temperature of Lavan Oil Refinery and Bandar Abbas Power Plant**

	Sampling season	Wastewater temp. (°C)	Ambient water temp. (°C)	Temp. difference (°C)
Lavan Oil Refinery (St. 2)	Sep. 2018	39.8	33.1	6.7
	Jan. 2019	28.8	22.4	6.4
Bandar Abbas Power Plant (St. 13)	Sep. 2018	39.5	31.5	8.0
	Jan. 2019	33.8	23.0	10.8

Source: JICA Project Team

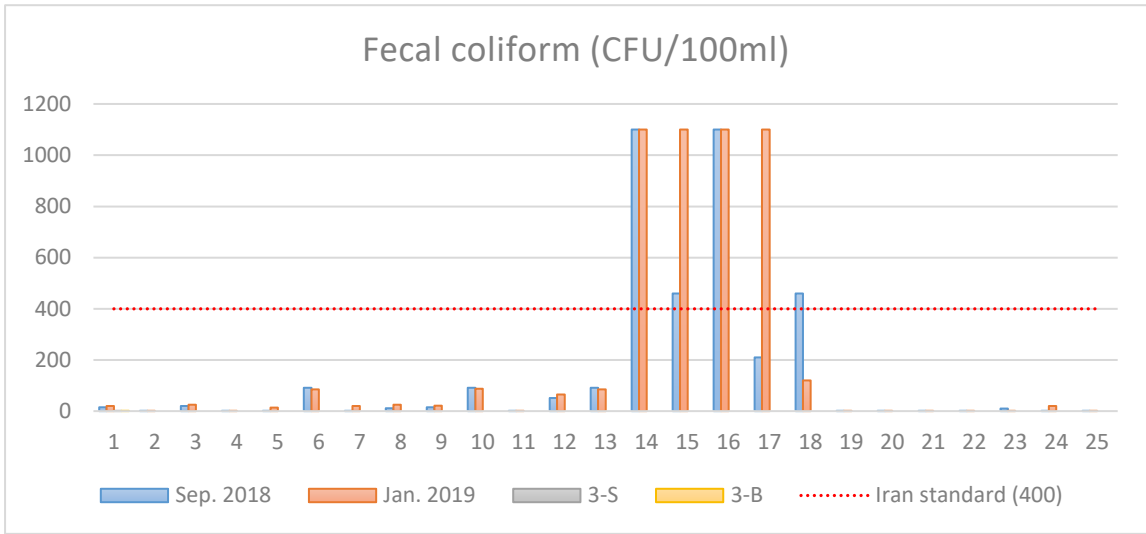
High salinity values ( $> 50\text{‰}$ ) were recorded from wastewater of industrial zone (St.11:  $58\text{‰}$ ), desalination plant (St.6:  $58\text{‰}$ ) and shrimp farm (St.8, St.25:  $52\text{‰}$ ). The ambient salinity was around  $40\text{‰}$ . Figure 3.10.37 shows the salinity recorded in the 1<sup>st</sup> and 2<sup>nd</sup> surveys.



Source: JICA Project Team

**Figure 3.10.37 Salinity recorded in 1<sup>st</sup> and 2<sup>nd</sup> surveys**

Fecal coliform levels were high ( $>1,000$  MPN/100 ml) at outlets of domestic wastewater and urban runoff in Bandar Abbas (St.14-18). Figure 3.10.38 shows the analysis results of fecal coliform.



Source: JICA Project Team

**Figure 3.10.38 Analysis results of fecal coliform**

### (3) Sediment quality

Table 3.10.7 shows the surveyed parameters and analysis method of sediment quality survey. The sampling locations are the same as the seawater quality survey.

**Table 3.10.7 Surveyed parameters and analysis method of sediment quality survey**

	Parameter	Unit	Analysis method	Detection limit
1	Water content	%	ASTM D4959	0.1
2	Particle-size distribution	µm	ASTM D6913	75
3	Total organic carbon (TOC)	%	St. Method 5310B	-
4	Total petroleum hydrocarbon (TPH)	mg/kg	ASTM 5368 ASTM D5369 (for extraction) ASTM D7066 (for determination)	0.2
5	Polycyclic Aromatic Hydrocarbons (PAHs) <sup>*1</sup>	mg/kg	ASTM 5368 ASTM D5369 (for extraction) ISO 17993:2002(E) (for determination)	0.001
6	Cu	mg/kg	ASTM D 3974 (for digestion and extraction) US-EPA 6020B & PerkinElmer SOP (for determination)	1.0
7	Zn	mg/kg		1.0
8	Cd	mg/kg		0.1
9	Pb	mg/kg		1.0
10	As	mg/kg		0.1
11	Fe	mg/kg		0.01
12	Al	mg/kg		0.01
13	Ni	mg/kg		1.0
14	V	mg/kg		1.0
15	Cr	mg/kg		1.0
16	Hg	mg/kg	St. Method 3112B	0.05
17	Pesticides <sup>*2</sup>	mg/kg	US-EPA METHOD 1699	0.01
18	Total PCBs <sup>*3</sup>	mg/kg	US-EPA METHOD 8082A	0.01

Source: JICA Project Team

The main findings of the sediment quality survey are summarized below (raw data of the survey is attached as Appendix 8). Since Iran has no environmental standards for sediment, the results were compared with standards of other countries.

Significant pollution was recorded for heavy metals, especially nickel (Ni) and chromium (Cr). Values were high around the Bandar Abbas industrial region, which could partly be due to the effluents from the metal industries. Table 3.10.8 shows the analysis results of heavy metals.

**Table 3.10.8 Analysis results of heavy metals (mg/kg)**

No.	Sampling site	Cu	Zn	Cd	Pb	As	Fe	Al	Ni	V	Cr	Hg
	<i>Reference standard* (risk low if below)</i>	<b>18.7</b>	<b>124</b>	<b>0.7</b>	<b>30.2</b>	<b>7.24</b>	-	-	<b>21</b>	-	<b>52.3</b>	<b>0.15</b>
	<i>Reference standard* (risk high if above)</i>	<b>108</b>	<b>271</b>	<b>4.2</b>	<b>112</b>	<b>41.6</b>	-	-	<b>52</b>	-	<b>160</b>	<b>1</b>
1	Parsian	11	13	0.2	<1	5.5	6,188	11,010	41	26	41	0
2	Moghdan	<b>43</b>	37	0.1	7.0	3.2	17,521	29,833	<b>89</b>	54	<b>99</b>	0
3	Lavan Harbor	5	9	<0.1	<1	<0.1	1,510	1,672	16	15	13	0
4	Shidvar	4	6	<0.1	<1	<0.1	1,400	1,448	10	14	16	0
5	Nakhi-Lu	7	15	0.1	<1	4.6	8,586	12,724	24	32	<b>153</b>	0
6	Seraj River	9	15	0.1	1.0	2.5	9,414	18,257	29	34	<b>86</b>	0
7	Hassinh	16	38	0.1	<1	2.7	18,214	30,250	<b>69</b>	57	<b>82</b>	0
8	Bandar Lengeh	5	9	<0.1	9.0	1.2	8,979	17,947	16	30	48	0
9	Saye-khosh shrimp farm-1	10	21	0.2	4.0	6.2	12,603	20,350	41	41	<b>62</b>	0
10	Saye-khosh shrimp farm-2	18	39	0.1	6.0	6.2	19,960	31,287	<b>77</b>	60	<b>83</b>	0
11	Khamir (Hara)	8	21	0.2	4.0	4.5	13,911	14,178	42	37	<b>67</b>	0
12	Qeshm (Hara-SE)	<b>19</b>	40	0.2	4.0	5.0	21,391	36,332	<b>96</b>	65	<b>149</b>	0
13	Bandar Pol	<b>21</b>	47	0.1	4.0	4.7	21,992	36,452	<b>97</b>	65	<b>105</b>	0
14	Persian Gulf Industrial Park-1	11	22	0.1	2.0	<b>8.9</b>	16,500	23,217	50	51	<b>80</b>	0
15	Persian Gulf Industrial Park-2	11	19	0.1	3.0	6.8	13,269	25,029	42	41	<b>64</b>	0
16	Shipbuilding Complex	10	20	0.1	2.0	<b>9.4</b>	12,473	20,469	36	40	<b>95</b>	0
17	Shahid Rajaei Port	<b>27</b>	42	0.1	10.0	4.0	21,562	38,136	<b>78</b>	61	<b>112</b>	0
18	Rajaei Water Desalimization	<b>22</b>	42	<0.1	<1	4.4	27,767	47,048	<b>124</b>	87	<b>215</b>	0
19	Bandar Abbas Power Plant	<b>22</b>	48	<0.1	1.0	4.4	22,242	38,508	<b>80</b>	65	<b>134</b>	0
20	N-Qeshm City	<b>23</b>	28	0.1	<1	2.8	16,565	28,435	<b>60</b>	49	<b>127</b>	0
21	Suru Domestic Discharge	11	27	0.2	2.0	4.6	18,073	30,022	<b>52</b>	56	<b>308</b>	0
22	Posht e Shahr Area	<b>23</b>	44	0.1	3.0	3.8	22,072	39,552	<b>88</b>	64	<b>167</b>	0
23	Gursuzan	16	36	<0.1	7.0	3.2	19,029	37,814	<b>71</b>	60	<b>189</b>	0
24	Shilat	12	23	0.1	7.0	<b>9.6</b>	14,944	21,057	<b>52</b>	47	<b>153</b>	0
25	Dolat Park	11	21	0.1	1.0	8.3	12,657	30,843	<b>45</b>	43	<b>94</b>	0
26	Yewshow	9	20	0.2	<1	6.8	16,242	29,311	44	51	<b>161</b>	0
27	Kulaghan	16	33	0.1	1.0	4.5	22,483	43,270	<b>75</b>	72	<b>217</b>	0
28	Tiab (1)	17	35	<0.1	4.0	7.0	23,471	43,475	<b>116</b>	70	<b>153</b>	<0.05
29	Tiab (2)	13	28	0.2	1.0	<b>8.3</b>	17,531	29,301	50	52	<b>115</b>	0
30	Sirik	10	19	0.1	<1	<b>9.4</b>	15,146	34,344	<b>51</b>	41	<b>60</b>	<0.05
31	Gaz Protected Area	14	34	<0.1	6.0	6.2	21,280	43,521	<b>70</b>	60	<b>205</b>	0

No.	Sampling site	Cu	Zn	Cd	Pb	As	Fe	Al	Ni	V	Cr	Hg
32	Kouth Mobarak	13	26	0.1	2.0	9.5	17,178	42,638	50	48	77	0
33	Bandar Jask	12	22	0.2	4.0	3.5	13,615	42,725	37	45	59	0
34	Khalasi	15	30	0.1	3.0	3.3	18,513	45,463	57	54	49	0
35	Jagin	28	28	0.1	11.0	4.4	18,561	46,760	44	57	64	0
36	Gabrik	15	28	0.1	6.0	4.4	18,998	48,097	41	56	67	<0.05
37	Kereti	12	29	0.1	<1	3.6	15,814	42,237	41	45	62	<0.05

\*: Ni and Hg are from Australian and New Zealand Environment and Conservation Council (ANZECC), 1997 interim sediment quality guidelines. All others are from Canadian Council of Ministers of the Environment (CCME), 1999 Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (Marine).

Red shade indicates exceedance of high-risk reference standard. Yellow shades indicate exceedance of moderate-risk reference standard.

Source: JICA Project Team

### **3.10.5 Socioeconomic**

Socioeconomic survey was conducted to understand the current status of socioeconomic activities along the Hormozgan coastal area and also to collect information on future development plans, with main focus on activities that are potential stressors to the coastal environment. The survey was subcontracted to Hormozgan University (the report of Hormozgan University is attached as Appendix 3). Information and data were collected through literature review and interviews with organizations and local community. The main findings of the survey are summarized below. (Maps of socioeconomic activities prepared in the Project is attached as Appendix 9).

#### **(1) Demography**

As per 2016 census data, the population of Hormozgan coastal area (within the 20 km coastal band) is around 1 million, in which Bandar Abbas county has the largest population of around 600,000. The population of other coastal counties is relatively small which are at around 50,000-150,000. Figure 3.10.39 shows the distribution of population within the 20 km coastal band of Hormozgan province.





Table 3.10.9 shows the projected population of the Hormozgan coastal counties for year 2030, which was calculated based on the population growth rate from 2006 to 2016. By 2030, the total population of the coastal counties is projected to exceed 1.5 million. The ratio of urban population in 2030 is projected to exceed 75% of the total population.

**Table 3.10.9 Projected future population (year 2030) of the Hormozgan coastal counties**

County	Population (2016)		% urban population	Population (2030)		% urban population
	Total	Urban		Total	Urban	
Jask	54,242	16,860	31.3	82,036	30,787	37.5
Sirik	44,385	12,205	27.5	56,381	16,707	29.6
Minab	166,047	73,170	44.1	227,172	113,280	49.8
Bandar Abbas	594,207	530,911	89.4	961,477	888,291	92.4
Khamir	27,100	15,320	56.5	33,419	23,704	70.9
Bandar Lengeh	106,566	53,714	50.4	150,435	73,546	48.9
Parsian	49,494	26,000	52.5	77,422	48,287	62.4
Total	1,042,041	728,180	69.9	1,588,342	1,194,602	75.1

Note: Population of 2030 calculated based on population growth rate from 2006 to 2016.

Source: JICA Project Team

## (2) Oil and gas industry

Oil fields are concentrated in the western side of Hormozgan mainly in the offshore waters of Persian Gulf, which are connected to land-based oil facilities by underwater pipelines. Currently, there are five oil/gas refineries operating in Hormozgan, which are producing products such as gasoline, kerosene, jet fuel and LPG. Three are located in Bandar Abbas and the others in Lavan Island and Qeshm Island. Development of a new oil refinery (capacity: 300,000 barrel/day) is planned in the west of Bandar Abbas near the other two existing oil refineries. The production capacity of the existing three refineries are also planned to be increased. A new oil pipeline is under construction along the Hormozgan mainland which runs from Khuzestan province to Jask area. The pipeline is intended to supply oil to the new industrial zone planned in the Jask area. Figure 3.10.40 shows the location of existing and planned oil/gas refineries.

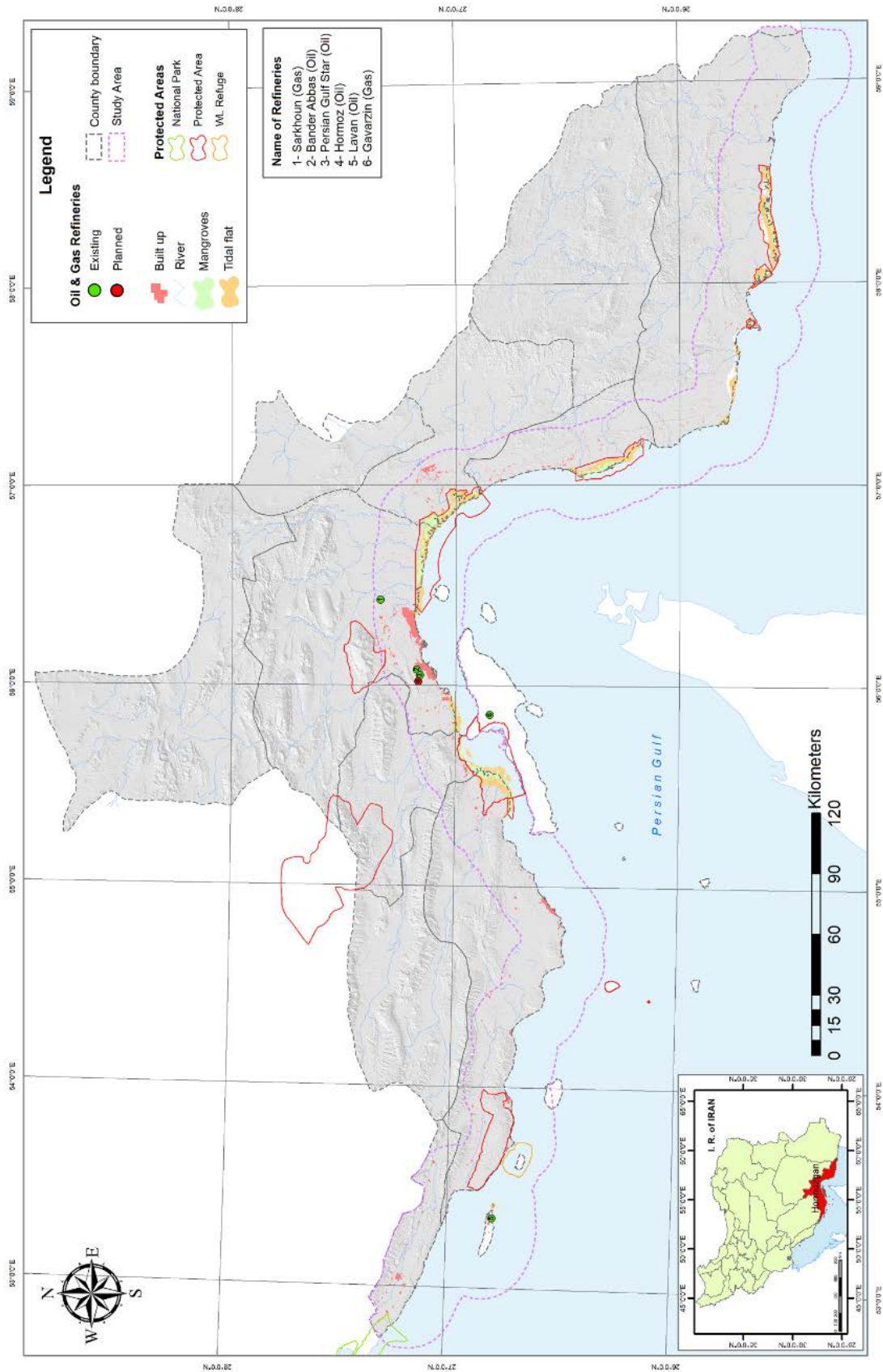


Figure 3.10.40 Location of existing and planned oil/gas refineries in the Hormozgan coastal area

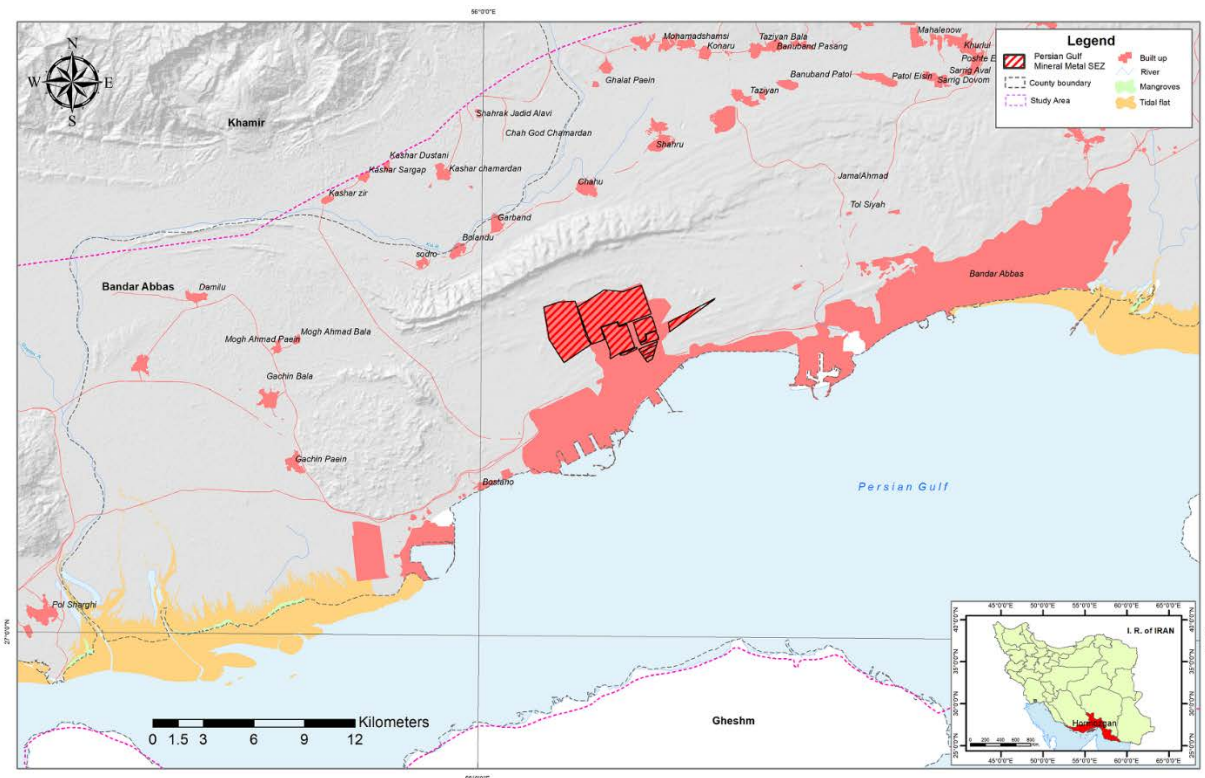
Source: JICA Project Team

### (3) Heavy industry

Heavy industries (e.g. metal and ship building) are mainly concentrated in the west-side of Bandar Abbas. Major metal manufacturing factories are aggregated inside the Persian Gulf Mineral & Metal SEZ. They manufacture products such as aluminum, iron, steel and zinc. Figure 3.10.41 shows the location of the Persian Gulf Mineral & Metal SEZ.

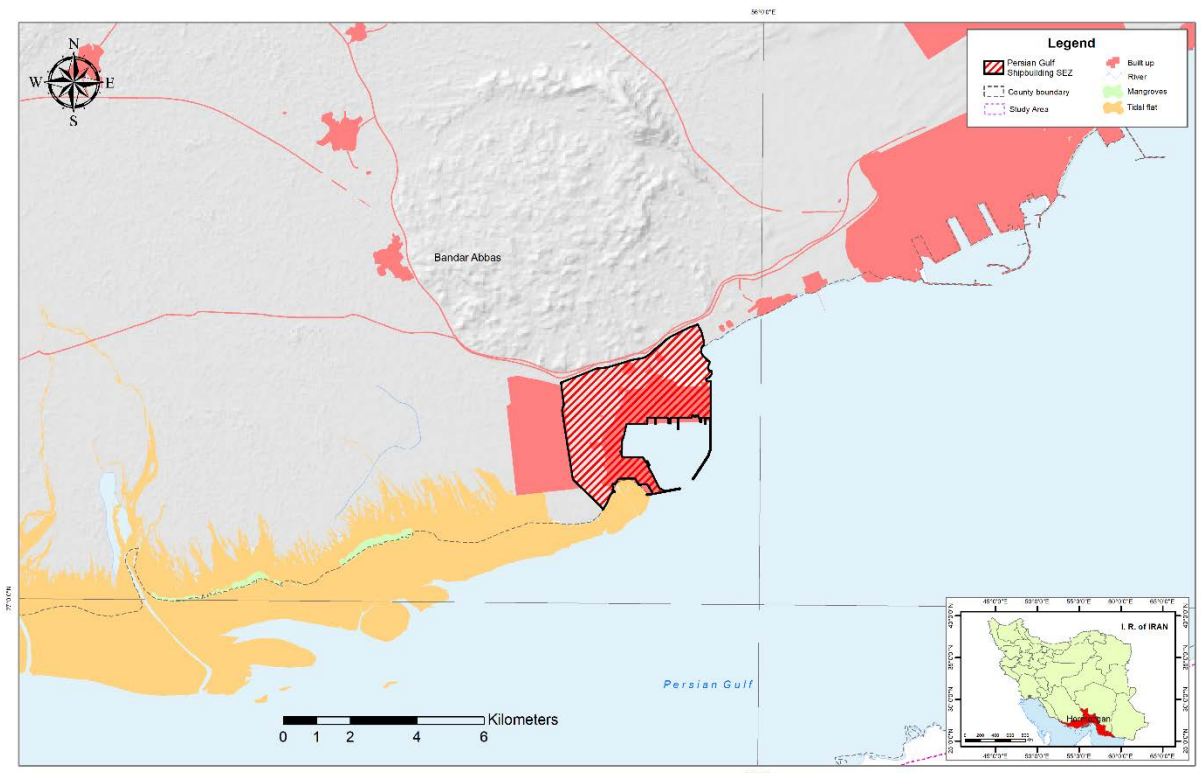
There is a large shipbuilding yard complex (Persian Gulf Shipbuilding SEZ) west of Bandar Abbas. The shipyard has dry dock and is capable of constructing various type of vessels including bulk carrier, containership, and oil product carrier. Figure 3.10.42 shows the location of the Persian Gulf Shipbuilding SEZ.

Large-scale heavy industries are now planned to be developed in relatively remote regions such as Jask and Parsian, which will also include development of associated infrastructures such as port and power plant.



Source: JICA Project Team

**Figure 3.10.41 Location of Persian Gulf Mineral & Metal SEZ**



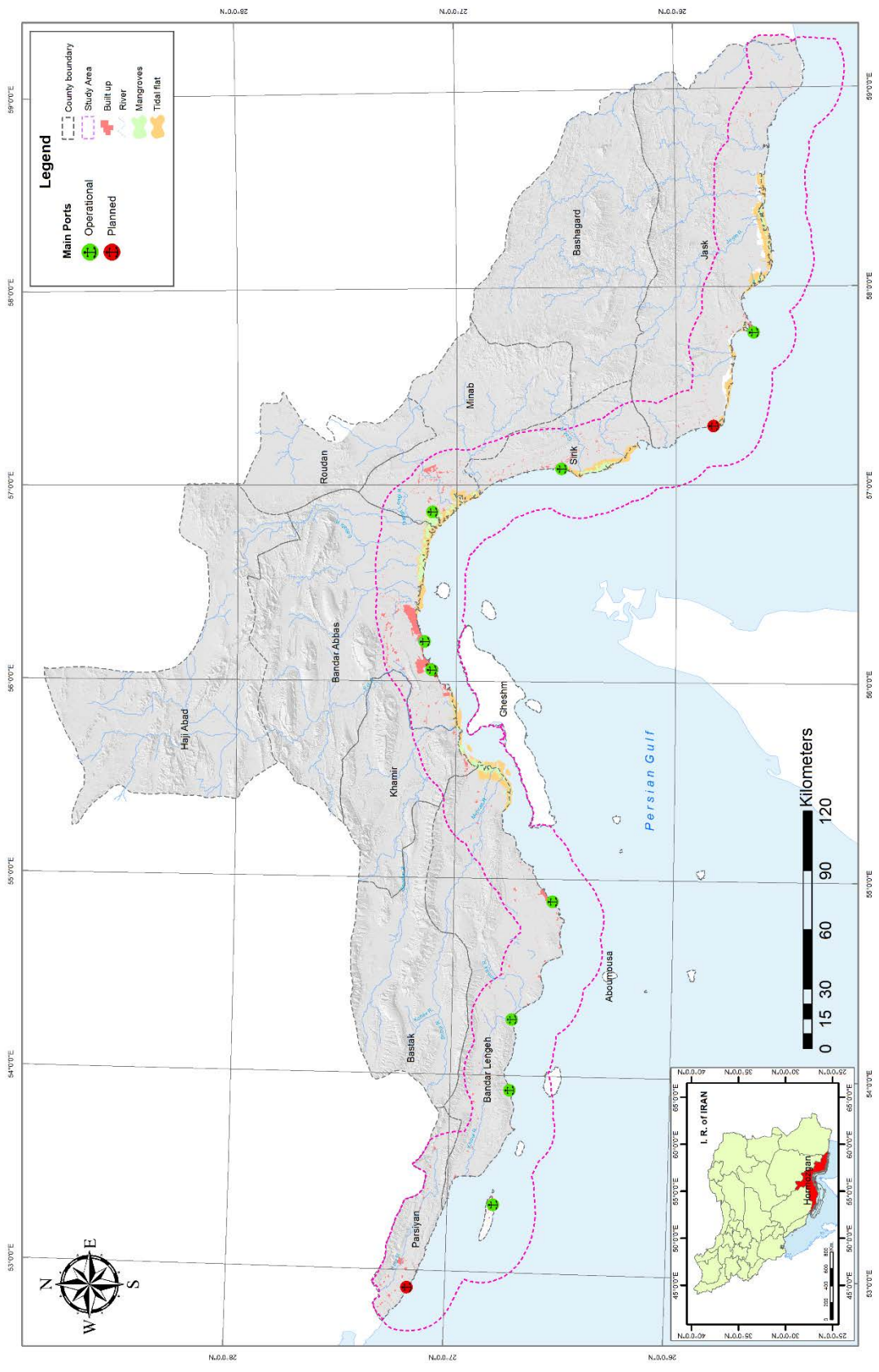
Source: JICA Project Team

**Figure 3.10.42 Location of Persian Gulf Shipbuilding SEZ**

#### **(4) Port and maritime**

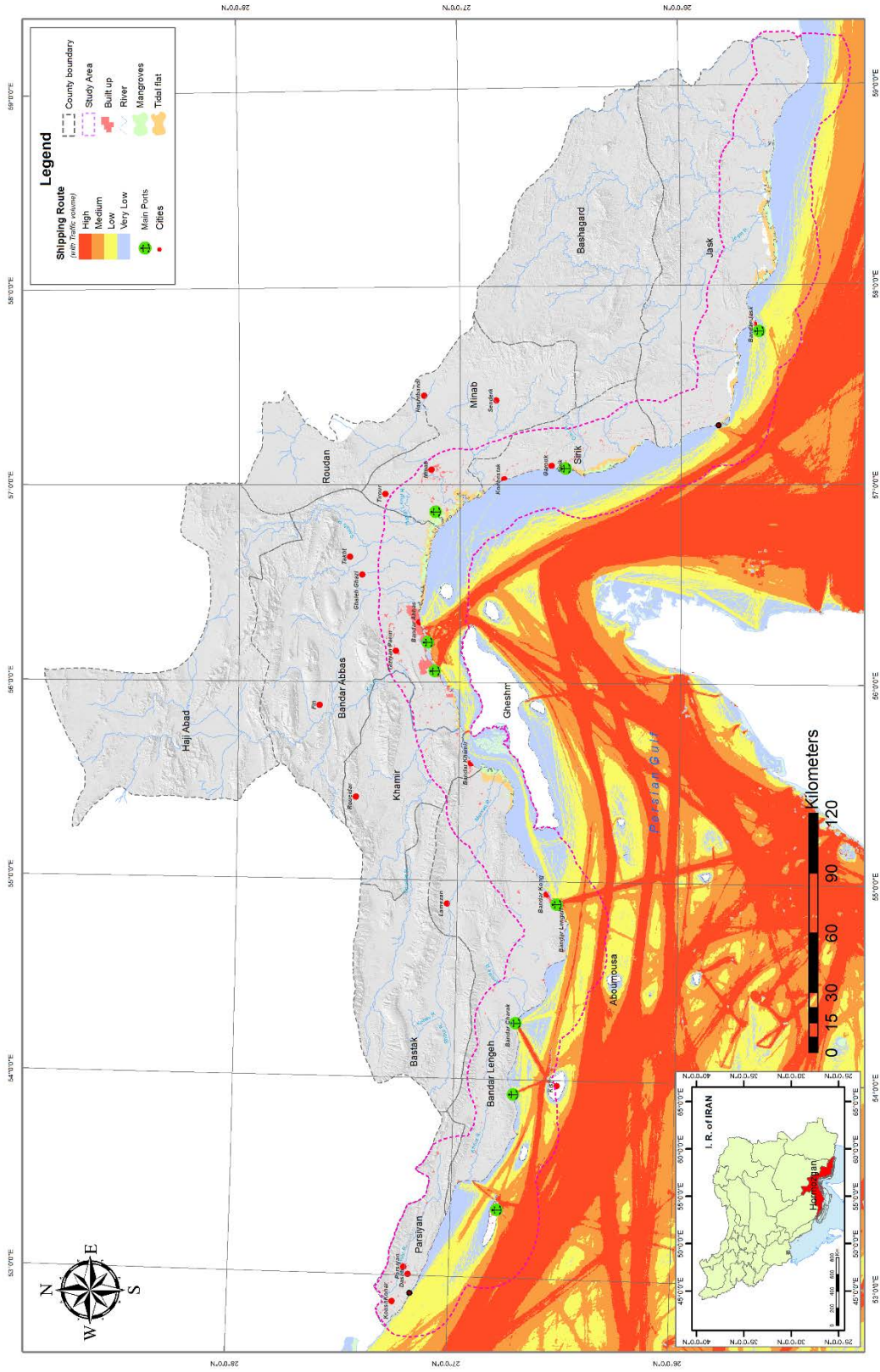
More than 60 ports exist along the Hormozgan coastal area ranging from multipurpose, commercial, passenger, military and fishing ports. The Shahid Rajaei port in Bandar Abbas is one of the largest and most important commercial port in Iran. In association with the industrial development of Parisan and Jask regions, new large ports are planned to be developed in Parsian and Jask. They will handle products such as oil/gas, petrochemical and metal products. Figure 3.10.43 shows the location of existing and planned major ports along the Hormozgan coastal area.

Various types of ships travel along the Hormozgan coastal area such as oil tanker, bulk carrier, cargo ships, container ship and passenger ship. Figure 3.10.44 shows the ship traffic density along the Hormozgan coastal and offshore areas. Although ship traffic is mainly concentrated in offshore waters, ship traffic is also high near major ports and offshore islands. Ship traffic is likely to keep increasing in line with the socioeconomic development.



**Figure 3.10.43** Location of existing and planned major ports along the Hormozgan coastal area

Source: JICA Project Team

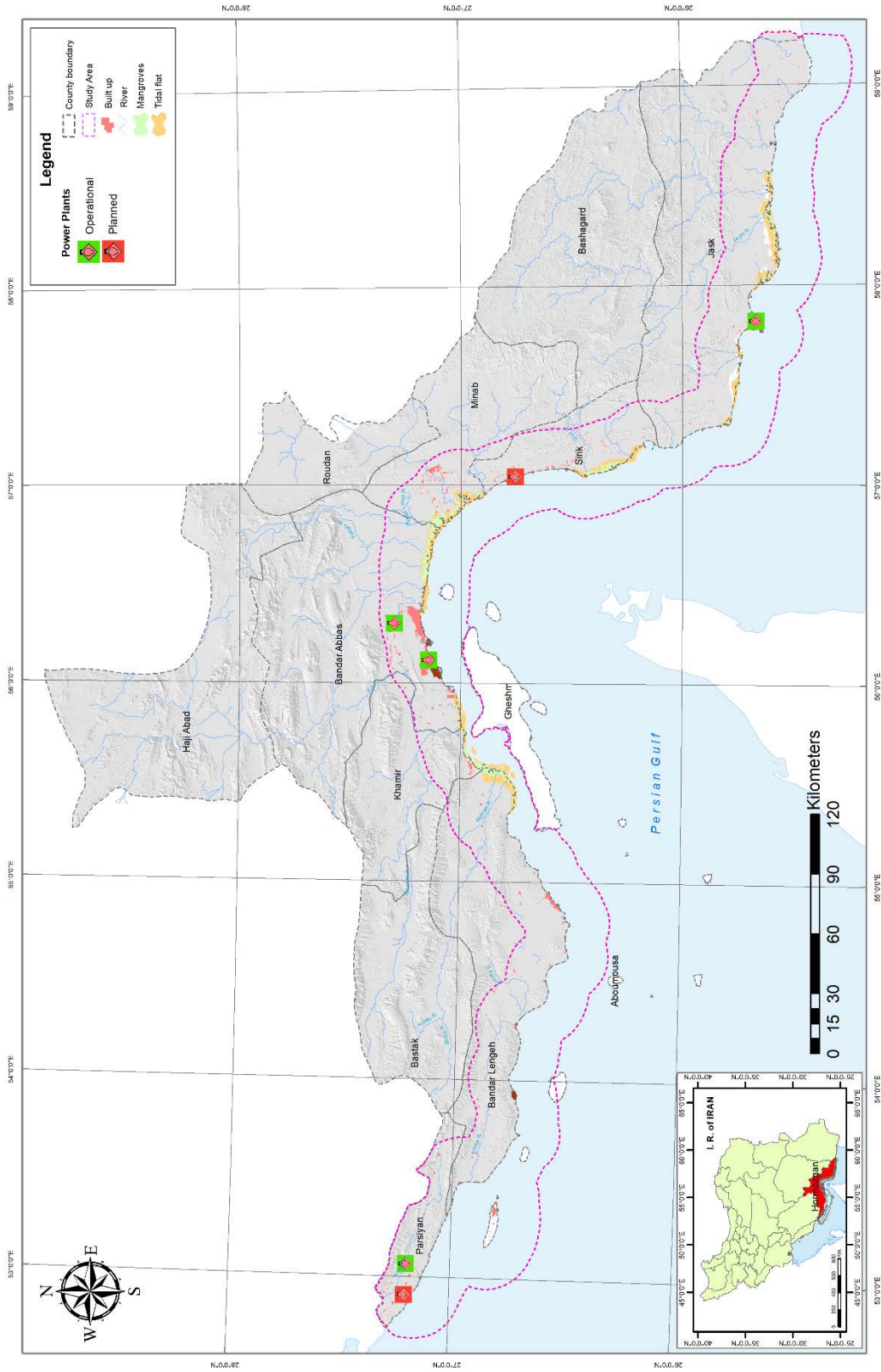


Source: Marine Traffic data of 2017 (<https://www.marinetraffic.com/>)

**Figure 3.10.44 Ship traffic density along the Hormozgan coastal and offshore areas**

## **(5) Power plant**

There are four operational power plants in the Hormozgan coastal area, which are in Parsian, Bandar Abbas and Jask. The largest power plants are in Bandar Abbas namely: Bandar Abbas power plant (oil: 1,280 MW) and Persian Gulf power plant (gas: 990 MW). The power plants in Parsian and Jask are smaller in scale with capacity of 15 MW (oil) and 21 MW (gas) respectively. Development of two new large-scale power plants are planned: one in Sirik (1,400 MW) and the other in Parsian (4,300 MW). Figure 3.10.45 shows the location of the existing and planned power plants in the Hormozgan coastal area.



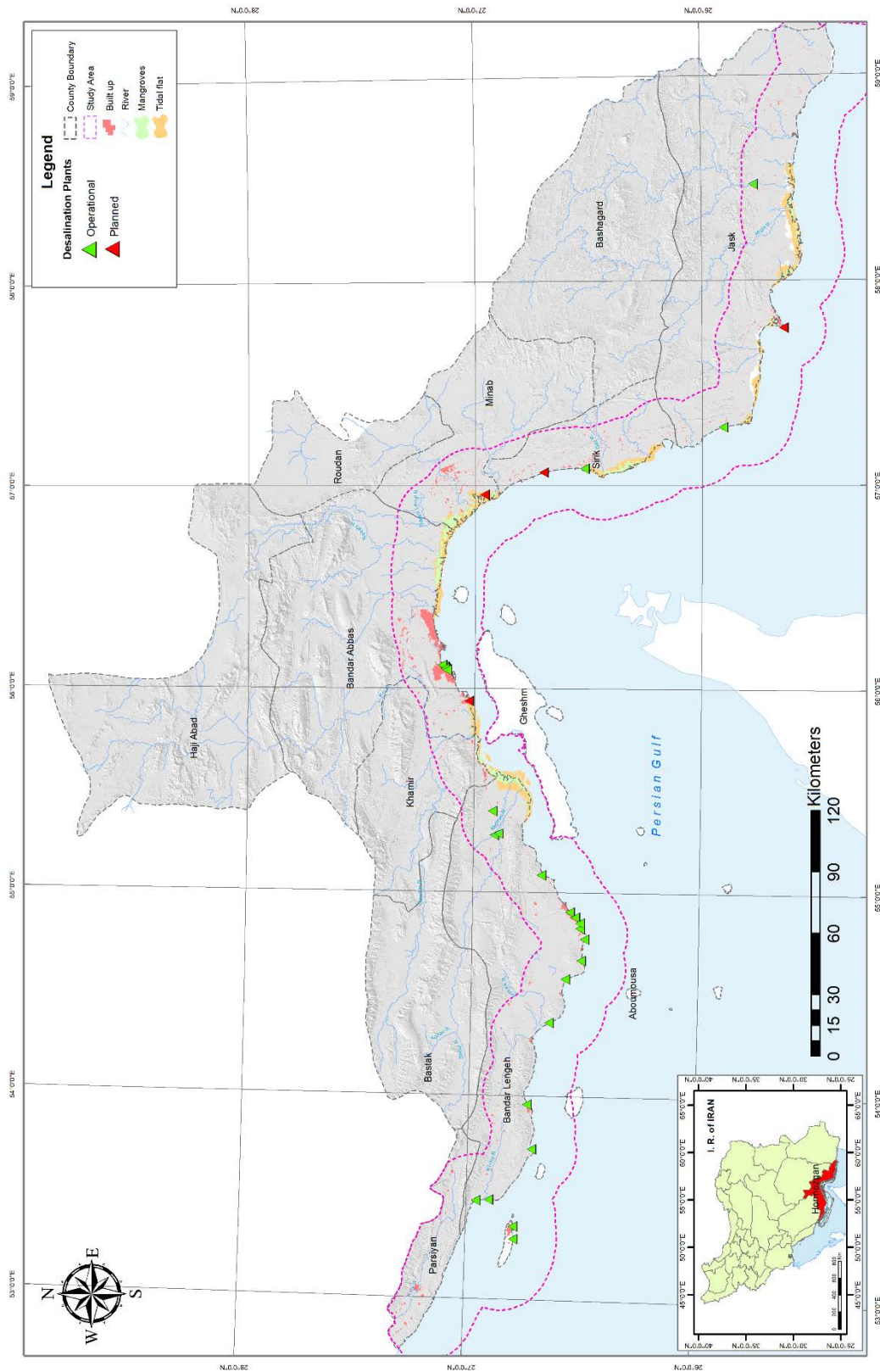
**Figure 3.10.45** Location of existing and planned power plants in the Hormozgan coastal area

Source: JICA Project Team



## **(6) Desalination plant**

There are 28 desalination plants in the Hormozgan coastal area, which are mainly concentrated in Bandar Abbas and Bandar Lengeh. These plants are either for industrial or domestic purposes or both, with varying production capacity. The Bandar Abbas desalination plant currently has the highest production capacity at 20,000 m<sup>3</sup>/day. The country's largest desalination plant with production capacity of 1 million m<sup>3</sup>/day is under construction near Hara Protected Area. Figure 3.10.46 shows the location of the existing and planned desalination plants.

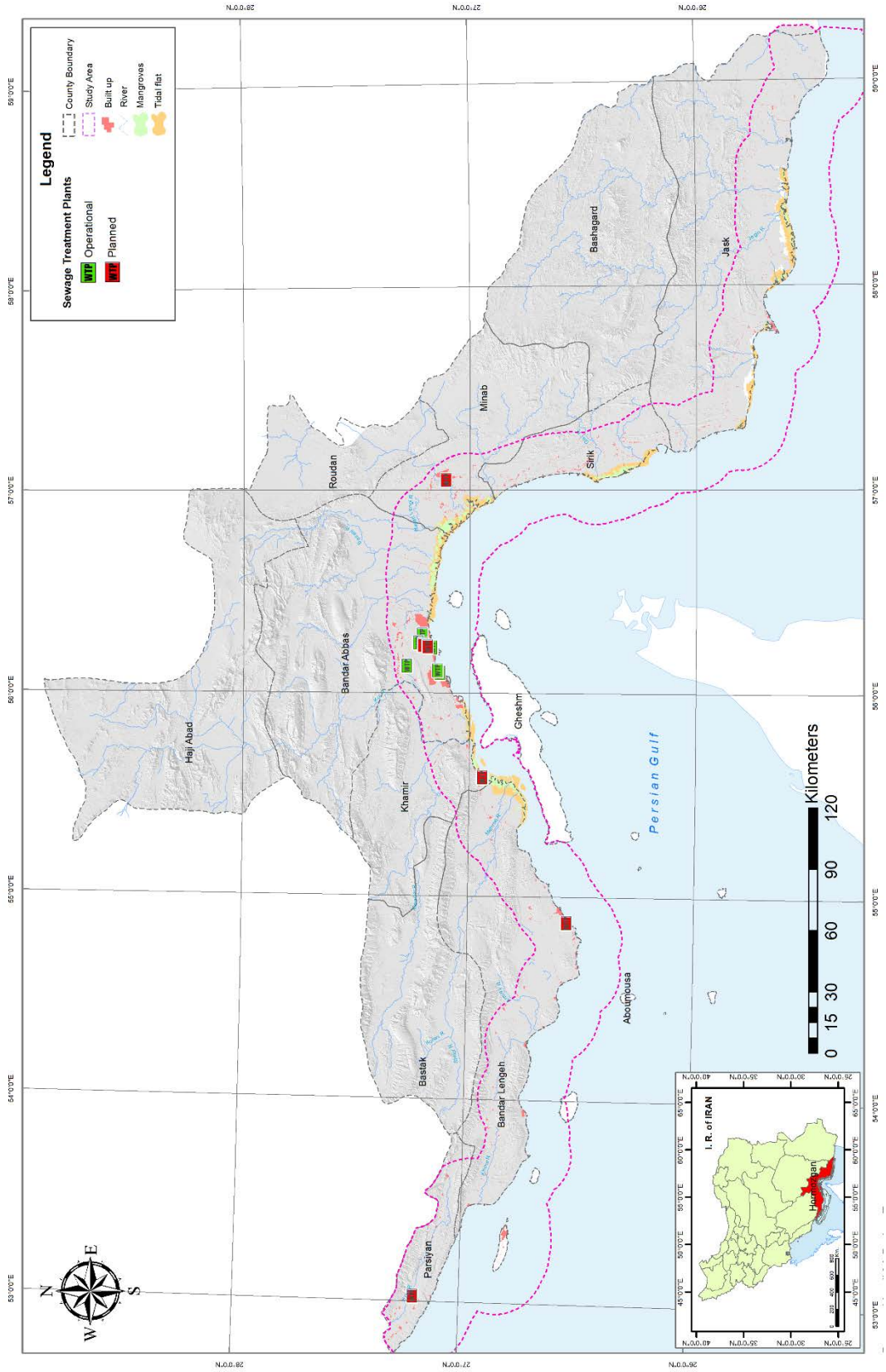


Source: JICA Project Team

**Figure 3.10.46 Location of existing and planned desalination plants in the Hormozgan coastal area**

## **(7) Sewage treatment**

Currently there is only one public sewage treatment plant in operation along the Hormozgan coastal area, which is in Bandar Abbas city. A total of six public sewage treatment plants are under planning or already under construction. Figure 3.10.47 shows the location of the existing and planned sewage treatment plants.



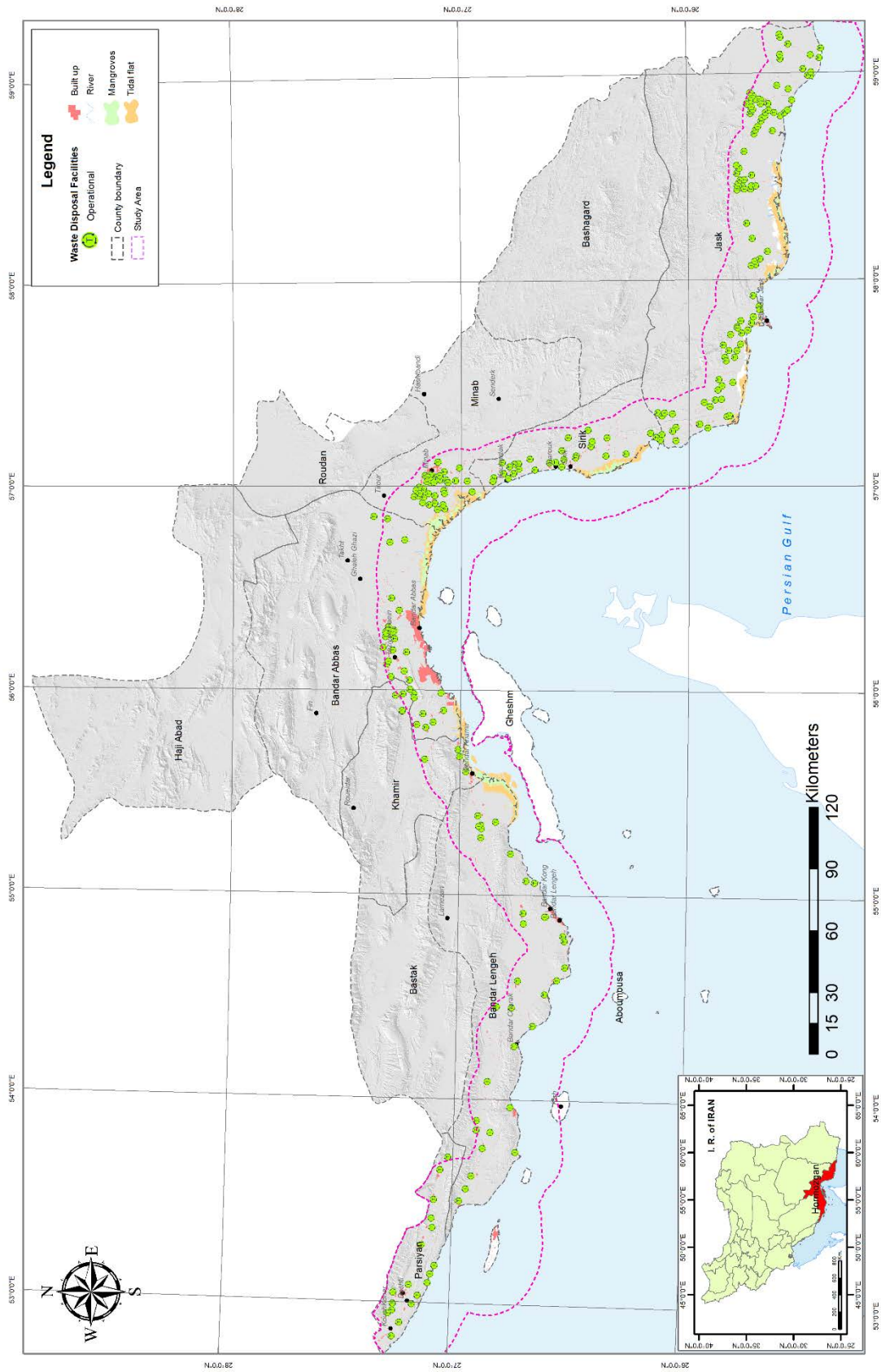
Source: JICA Project Team

**Figure 3.10.47** Location of existing and planned sewage treatment plants in the Hormozgan coastal area

## **(8) Waste management**

Domestic waste is usually collected by the local government and then disposed either in landfill, open pits or simply dumped in open spaces. Most of the landfill sites have no adequate pollution control measures in place such as leachate liners and soil capping. Furthermore, many waste disposal sites are located near the coastline or rivers, in which their wastes could easily be transported by wind or rain to the sea and end up as marine litter. Figure 3.10.48 shows the location of domestic waste disposal sites in the Hormozgan coastal area.

Large volume of industrial wastes is generated in the coastal area especially from the Bandar Abbas industrial areas. However, details on how these industrial wastes are treated and disposed could not be obtained. Dredged material from ports and shipping lanes are also a major source of waste, but details could not be obtained on how they are handled. Since Iran is a signatory of the London Protocol, management of dredged material should be strengthened including information disclosure.



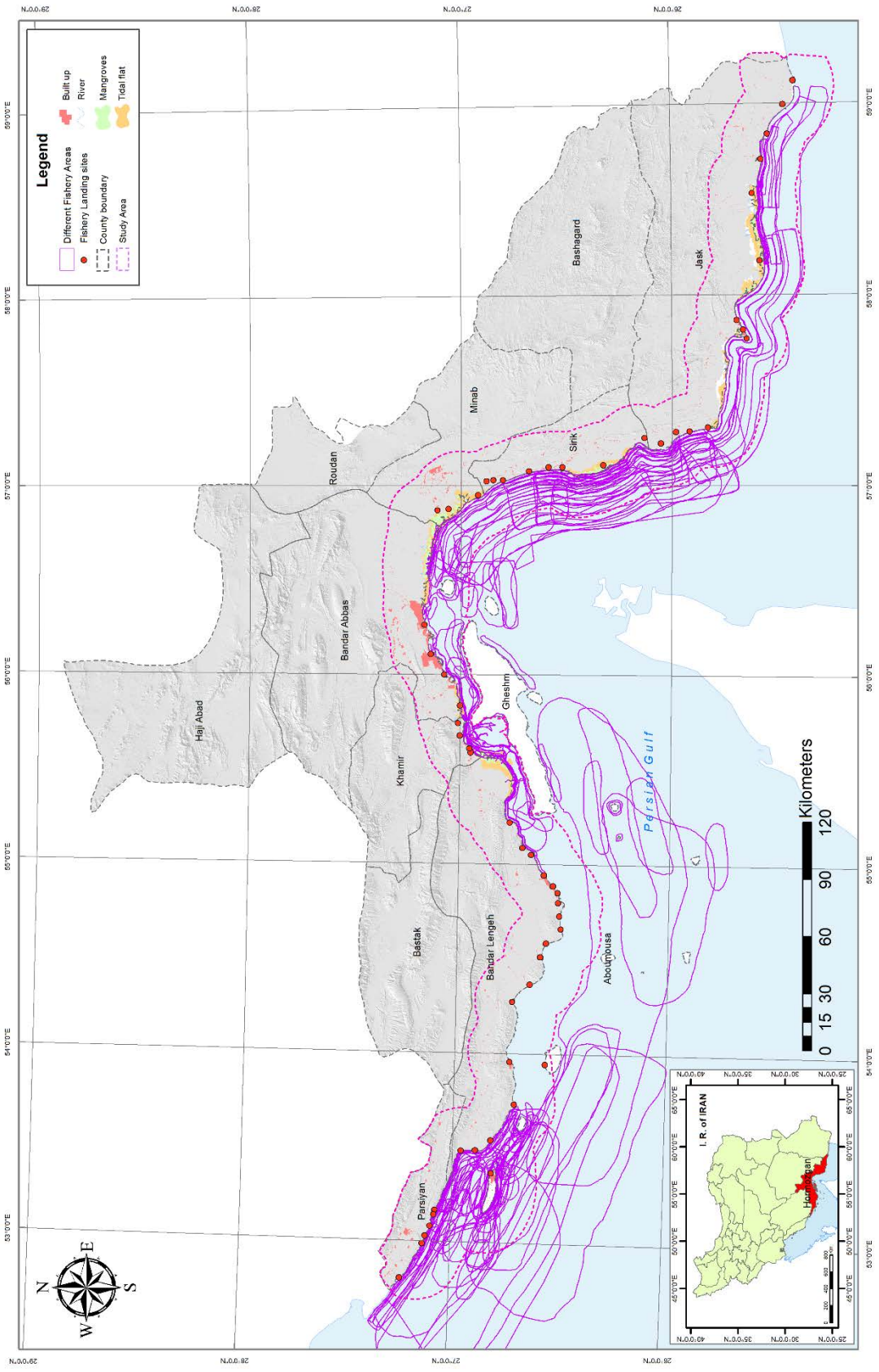
**Figure 3.10.48** Location of domestic waste disposal sites in the Hormozgan coastal area

Source: JICA Project Team

## **(9) Fisheries and aquaculture**

Fisheries in Hormozgan Province can be broadly classified into artisanal and industrial fisheries. There are more than 20,000 artisanal fishermen, and operate along most of the Hormozgan coastline including offshore waters. While they employ various fishing methods, most common are gillnet, purse seine and bottom trawling. In addition, set net (moshta) are installed along the coast from Bandar Lengeh to Bandar Abbas where waters are shallow and calm. Figure 3.10.49 shows the main fishing grounds and fish landing sites of artisanal fisheries along the Hormozgan coastal area. Industrial fishery is conducted in offshore waters and is prohibited to fish inside territorial waters or in areas less than 200 m depth.

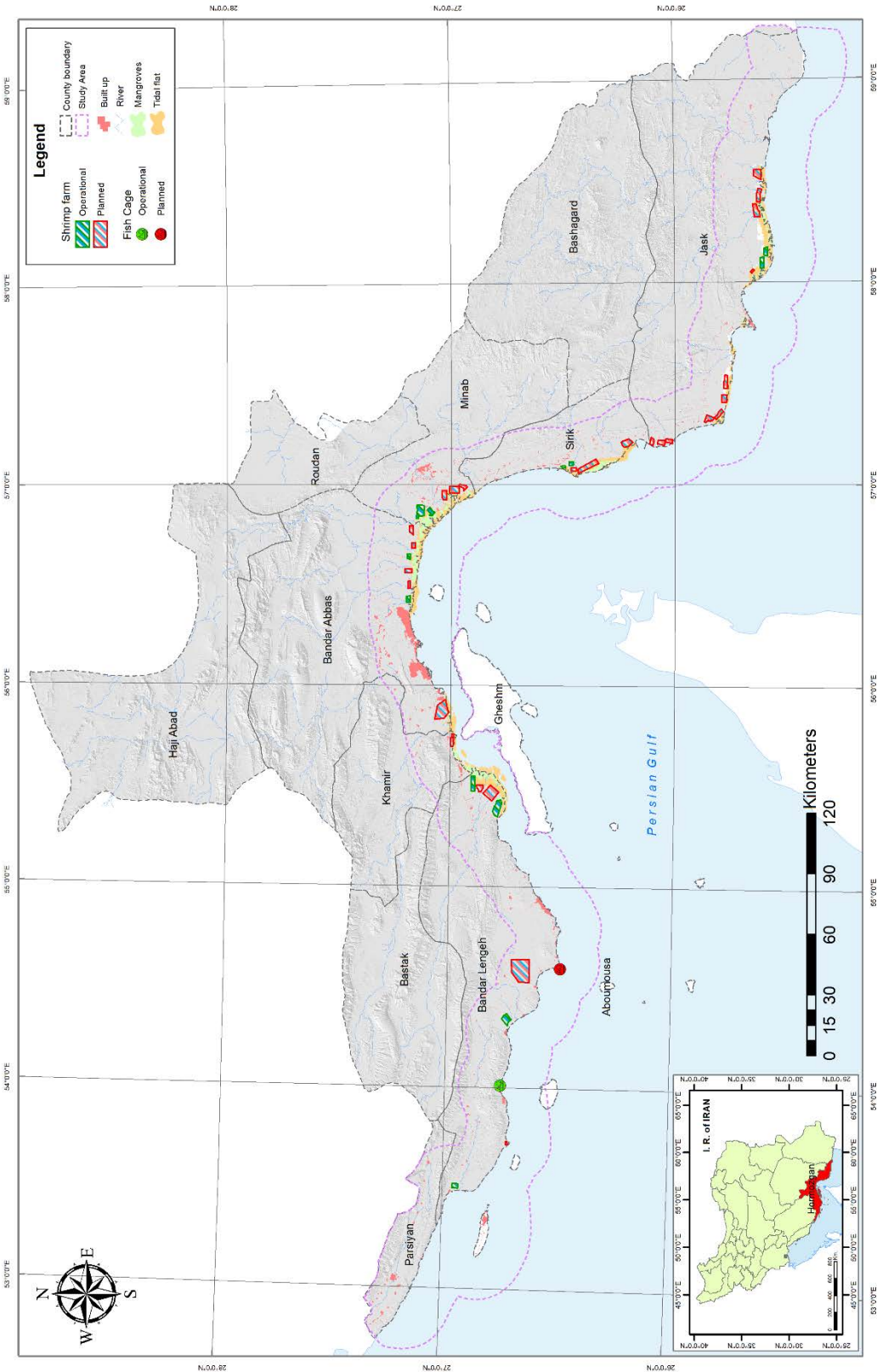
Shrimp farming is one of the most important and growing economic activities in the Hormozgan coastal area. While the current production is about 20,000 tons/year, it is planned to be increased to around 200,000 tons through expansion of existing farms and development of new farms. Figure 3.10.50 shows the location of existing and planned shrimp farms. Wastewater from shrimp farms may affect the local ecosystem, as many of the existing and planned shrimp farms are located near protected areas.



**Figure 3.10.49 Main fishing grounds of artisanal fisheries along the Hormozgan coastal area**

Source: JICA Project Team



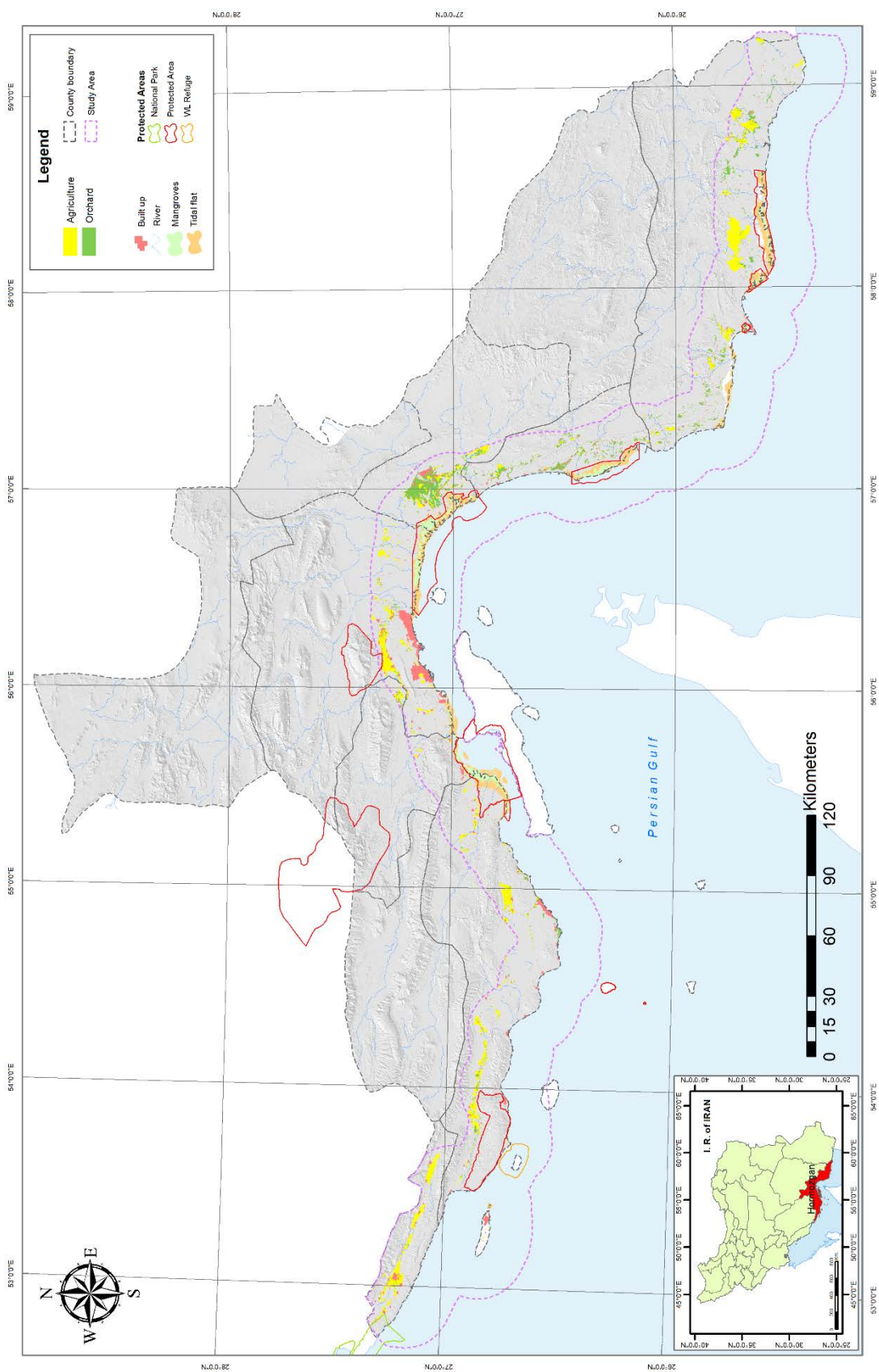


**Figure 3.10.50** Location of existing and planned shrimp farms in the Hormozgan coastal area

Source: JICA Project Team

## **(10) Agriculture**

The main agriculture areas are located inland and are relatively far from the coastline. Common crops are tomato, cucumber, eggplant, onion, dates and so on. Figure 3.10.51 shows the distribution of agriculture land in the Hormozgan coastal area.

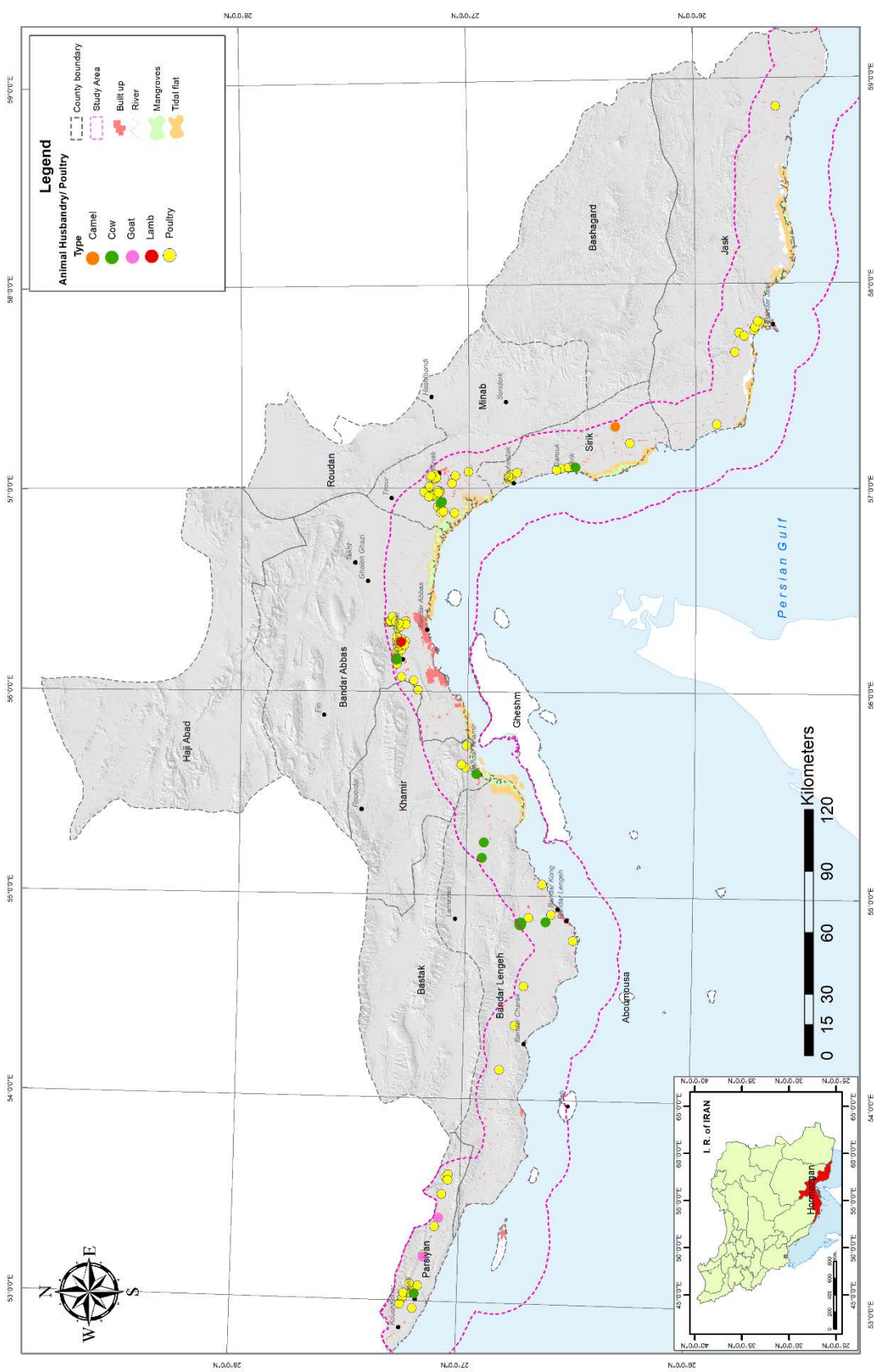


**Figure 3.10.51** Distribution of agriculture land in the Hormozgan coastal area

Source: JICA Project Team

**(11) Animal husbandry**

Animal husbandry, in particular cow and poultry, are widely operated in Hormozgan Province. Traditional animal husbandry is also common in some regions raising livestock such as goats and camels. They usually graze freely in open spaces where food is available. Some mangrove areas are used for such purposes. Figure 3.10.52 shows the livestock grazing areas used by traditional animal husbandry.

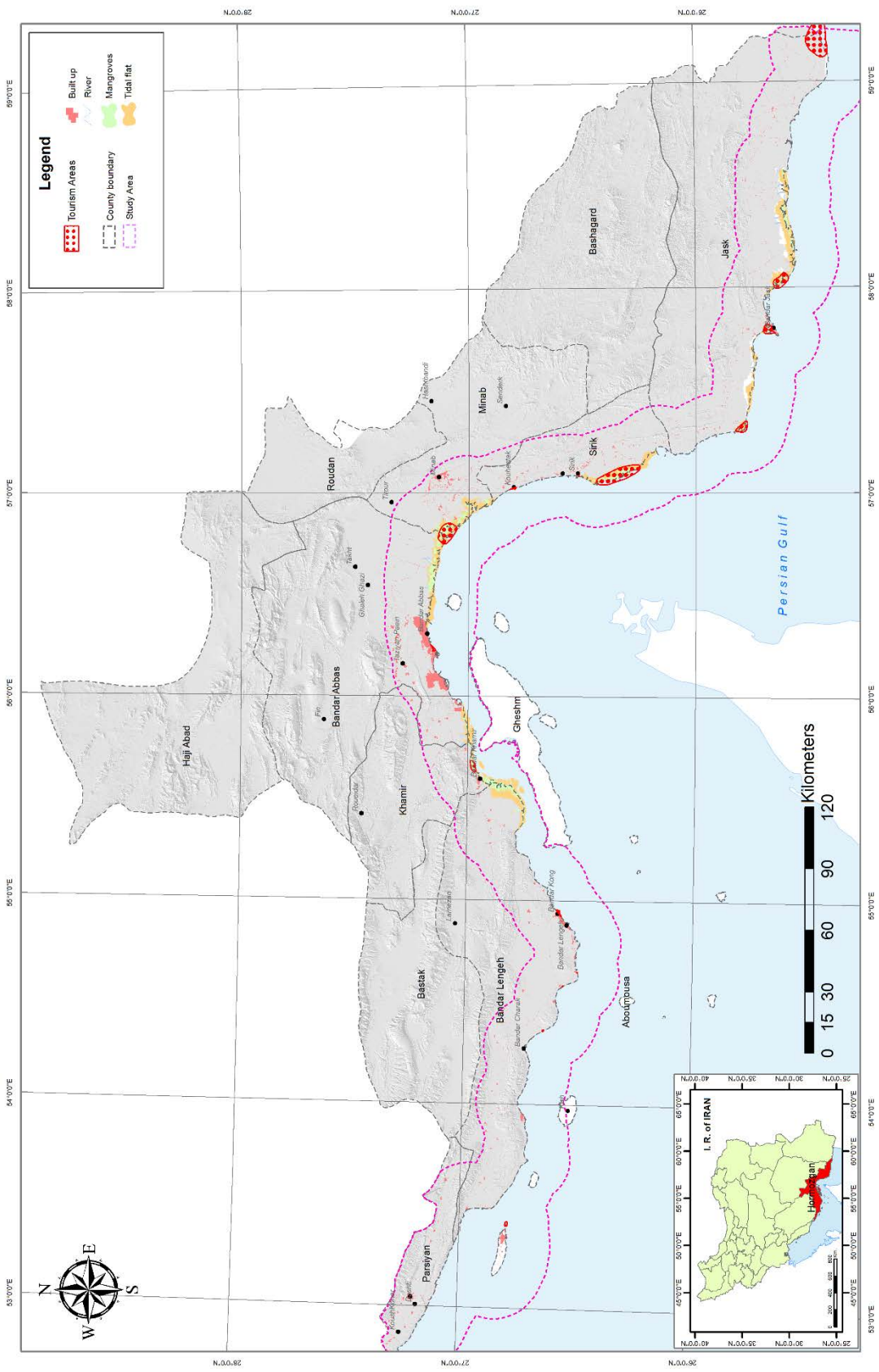


**Figure 3.10.52** Livestock grazing areas used by traditional animal husbandry

Source: JICA Project Team

## **(12) Tourism**

Ecotourism is an emerging economic activity in the coastal area, which are also promoted under the Provincial master plan. Ecotourism may have adverse impacts on the ecosystem, since most are operated within protected areas or sensitive ecosystem (e.g. mangrove and tidal flats). Figure 3.10.53 shows the location of main ecotourism areas in the Hormozgan coastal area.



**Figure 3.10.53** Location of main ecotourism areas in the Hormozgan coastal area

Source: JICA Project Team

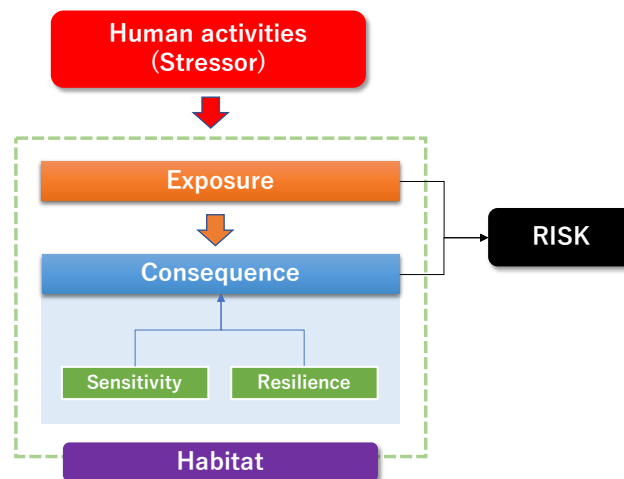
### 3.11 Risk assessment on coastal ecosystem

Risk assessment was conducted to analyze the potential threats (i.e. risks) of current (year 2019) and future (year 2030) human activities on important coastal habitats and species within the IEAs. The results were referred for example developing IEA zoning plans, and strategies and action plans for coastal conservation and management. Please refer to M/P Chapter 4 for detailed methodologies and results.

#### 3.11.1 Method of risk assessment

##### (1) Risk assessment model

Risk assessment was conducted using InVEST Habitat Risk Assessment (HRA) model<sup>2</sup>. The model evaluates the risk of human activities (the term “stressor” is used to denote human activities) to habitats as a function of the degree of “exposure” of each habitat from each stressor and the likely “consequence” of each habitat after exposure. “Consequence” is evaluated based on the “sensitivity” and “resilience” of the affected habitat. Note that the model will only calculate the risks where there is spatial overlap between the stressor’s “zone of influence” and habitat (or species) distribution. Figure 3.11.1 shows the risk assessment framework of the HRA model.



Source: JICA Project Team

**Figure 3.11.1 Risk assessment framework of the HRA model**

##### (2) Risk assessment process

Risk assessment was conducted through the process described below.

###### 1) Selection of stressors and setting their zone of influence

Based on the outputs of the socioeconomic survey and WG discussions, stressors that were considered to have risks on coastal habitats/species were selected. In total 12 stressor types were selected as follows:

<sup>2</sup> A model developed through Natural Capital Project (international project involving universities, research institutes, NGO). See [http://releases.naturalcapitalproject.org/invest-userguide/latest/habitat\\_risk\\_assessment.html](http://releases.naturalcapitalproject.org/invest-userguide/latest/habitat_risk_assessment.html) for details.



1) Wastewater from coastal industries, 2) Wastewater from coastal urban areas, 3) River discharge, 4) Marine litter from coastal urban areas, 5) Marine litter from river discharge, 6) Ship wastewater, 7) Ship underwater noise, 8) Light pollution, 9) Fishing (gill net, trawling), 10) Fishing (set net), 11) Animal grazing and 12) Tourism. The zone of influence of each stressor was subsequently set based on information and data (e.g. pollution source data, distribution data, future plans) collected through pollution and socioeconomic surveys. Figures 3.11.2 and 3.11.3 show the zone of influence set for each stressor for current and future scenarios respectively (input data of each stressor is included in Appendix 10).

## 2) Selection of habitats and species and setting their spatial distribution

Based on the outputs of the M/P ecology study and WG discussions, important coastal habitats and species that are considered to be at risk were selected. In total 7 habitats and 4 species were selected. Table 3.11.1 shows the selected habitats and species and the spatial distribution set for each habitat/species. Figures 3.11.4 and 3.11.5 show the spatial distribution of habitats and species respectively.

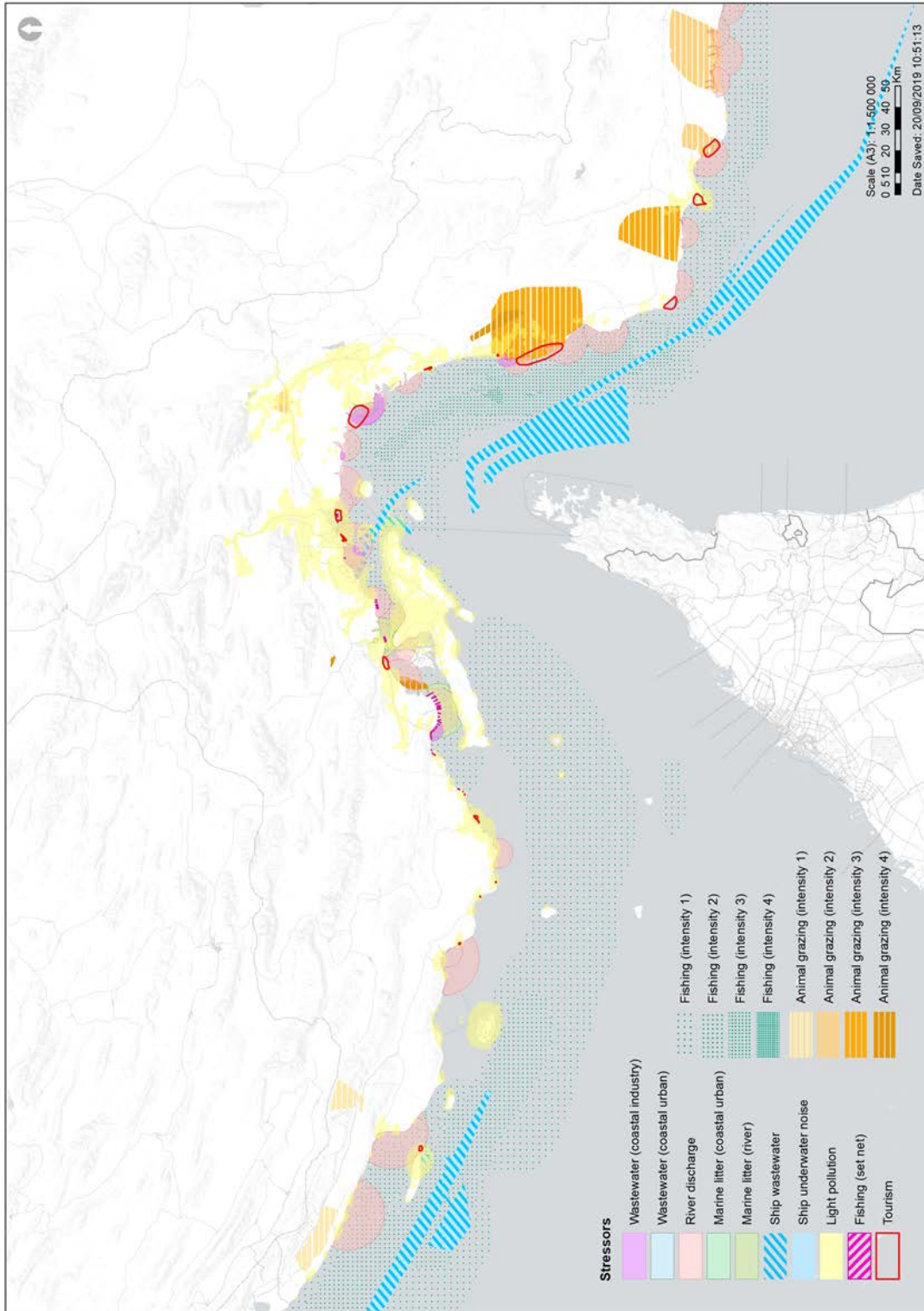
**Table 3.11.1 Selected habitats and species and their spatial distribution**

Habitat/species type		Spatial distribution
Habitat	Coral	Coral area plus 1 km buffer zone
	Seagrass	Seagrass area plus 1 km buffer zone
	Seaweed	Sargassum seaweed area plus 1 km buffer zone
	Tidal flat (sand)	All tidal flat areas
	Tidal flat (sandy-mud)	
	Tidal flat (mud)	
Mangrove	All mangrove areas	
Species	Nesting turtle	Sea turtle nesting hotspots (i.e. nesting area plus 1 km buffer zone)
	Foraging turtle	Sea turtle foraging hotspots (i.e. coral, seagrass, seaweed areas)
	Breeding birds	Bird breeding hotspot areas
	Marine mammal	Marine mammal hotspot areas

Source: JICA Project Team

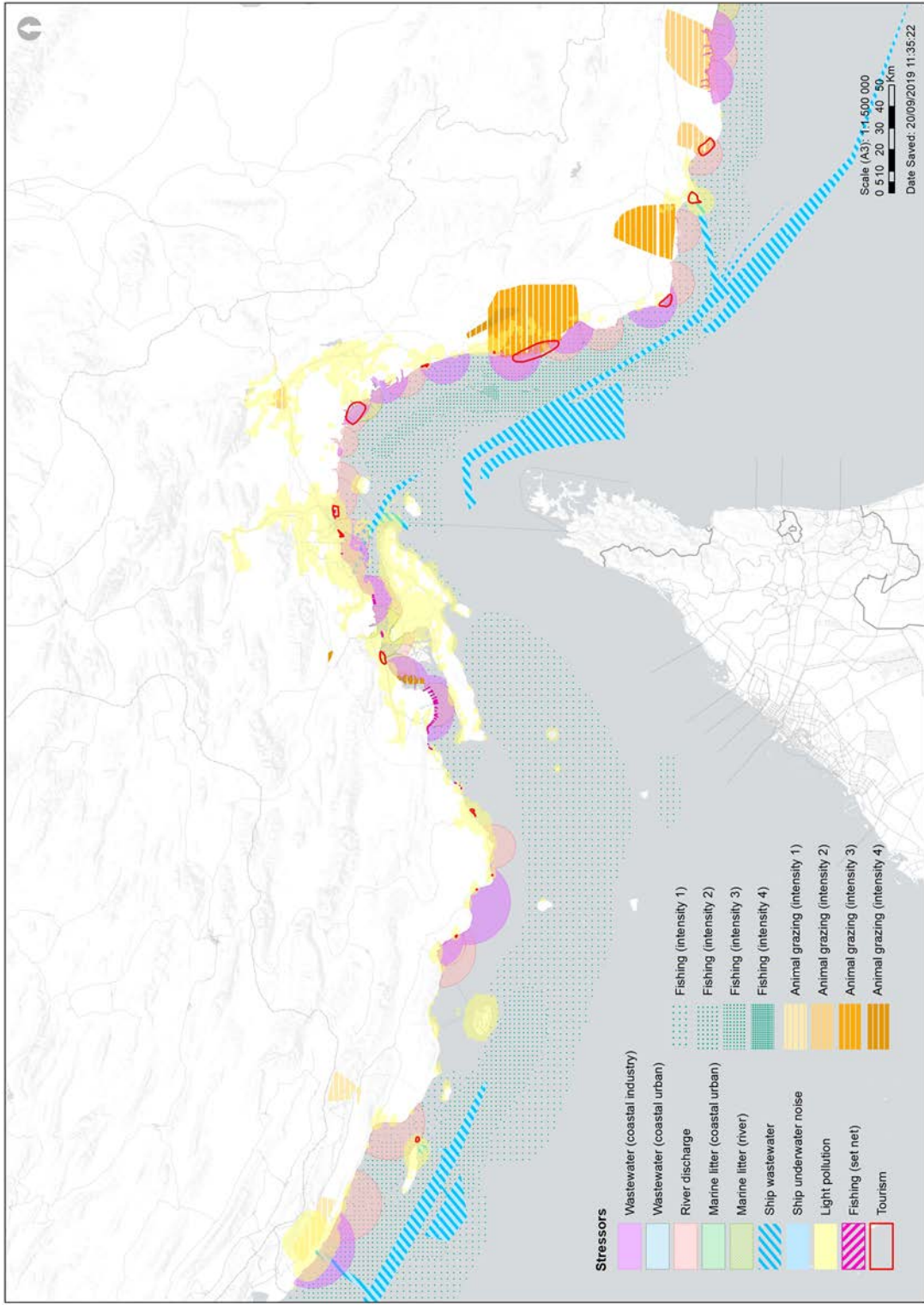
## 3) Rating of “exposure”, “sensitivity” and “resilience” criteria

For the model to calculate the risks, it is necessary to evaluate and rate the “exposure”, “sensitivity” and “resilience” for each stressor-habitat combination based on set criteria and method. The model will then calculate the risk for each stressor-habitat combination, and then added to derive the accumulative risks (see M/P Chapter 4.2.2 for rating criteria and results).



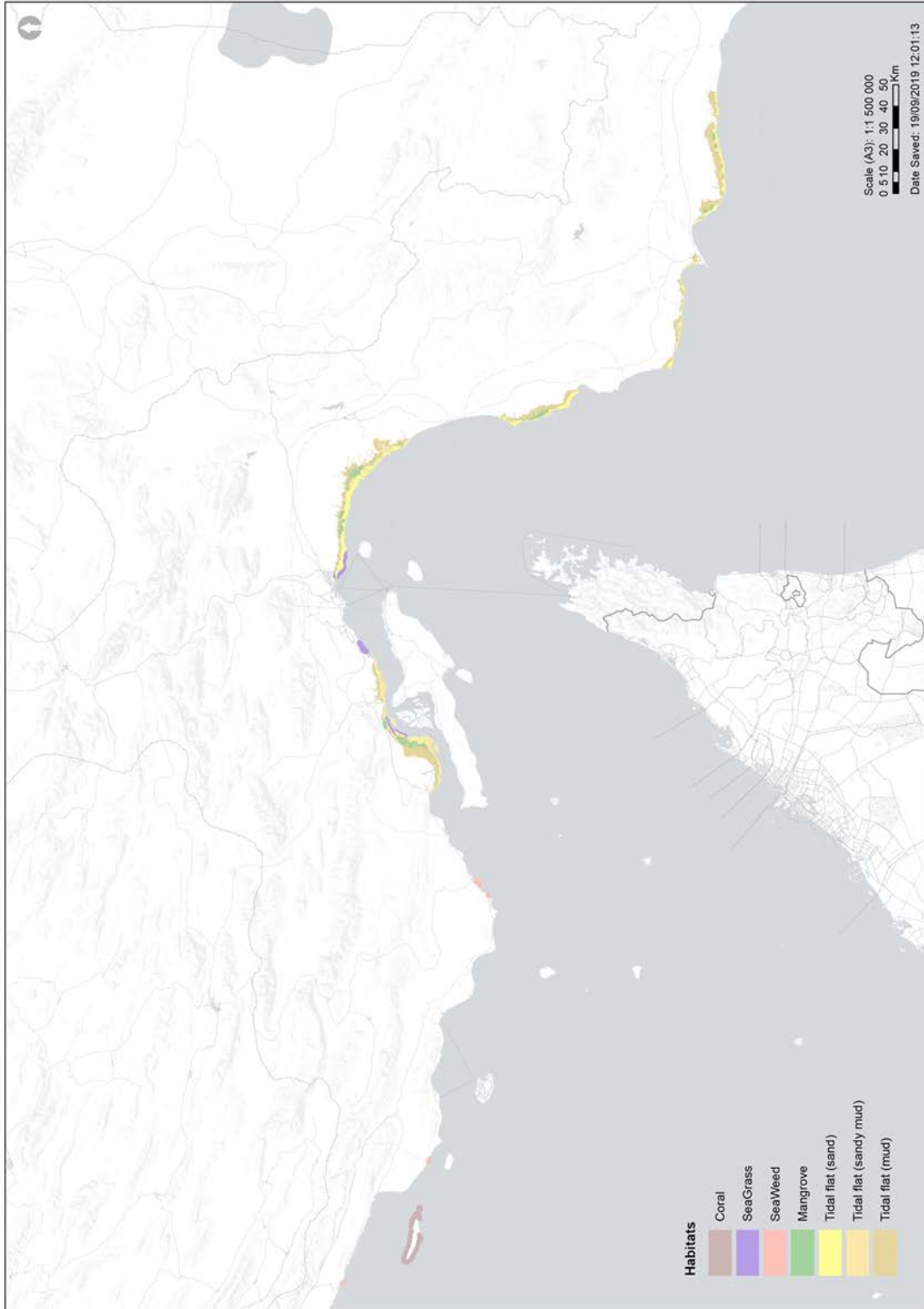
Source: JICA Project Team

**Figure 3.11.2 Zone of influence set for each stressor (current)**



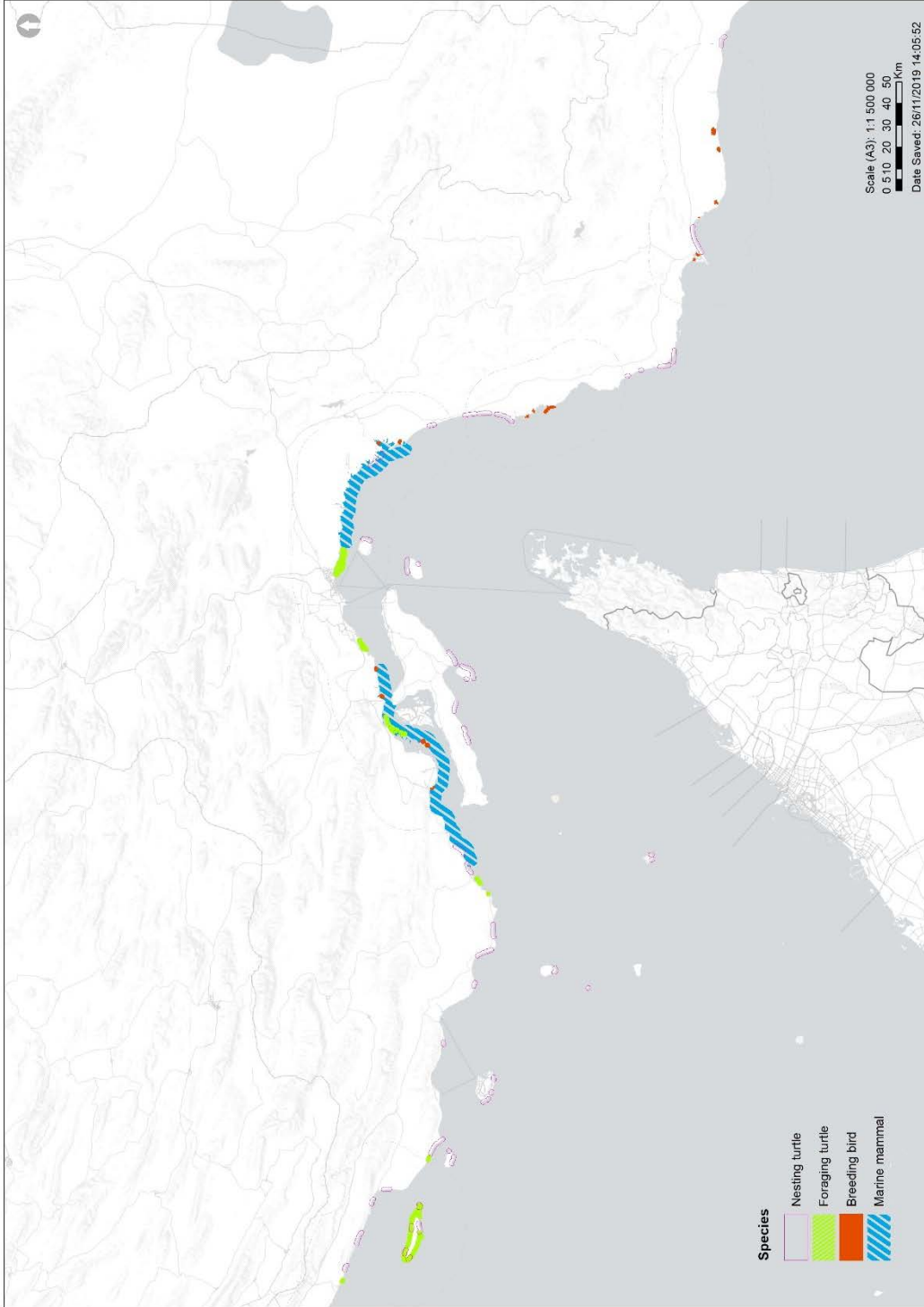
Source: JICA Project Team

Figure 3.11.3 Zone of influence set for each stressor (future)



Source: JICA Project Team

Figure 3.11.4 Spatial distribution of habitats




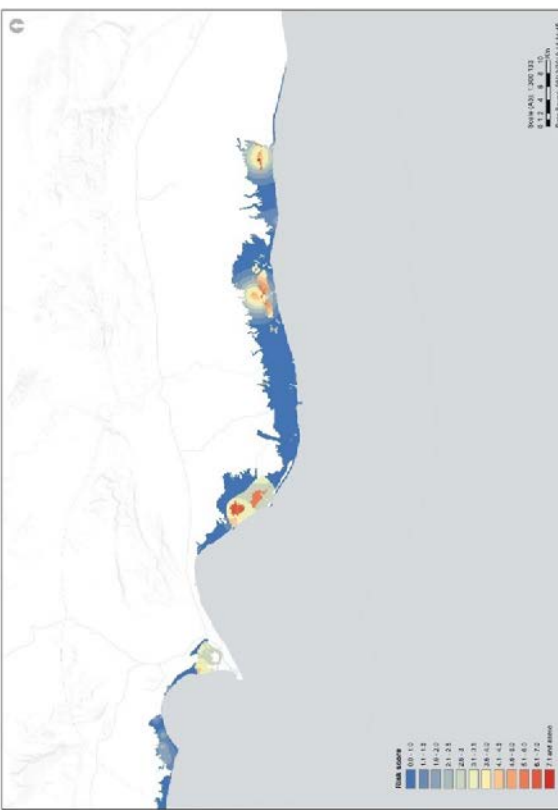
Source: JICA Project Team

Figure 3.11.5 Spatial distribution of species

### **3.11.2 Results of risk assessment**

Tables 3.11.2 to 3.11.6 summarizes the results of the risk assessment on habitats. Tables 3.11.7 to 3.11.11 summarizes the results of the risk assessment on species. Recommendations on risk minimization are also provided in the tables. Note that the tables show the accumulative risks. Risk of each stressor-habitat/species combination are provided in Appendix 10.

**Table 3.11.2 Risk on habitats in Jask IEA**

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>• Mangroves in East Jask PA (Khor Khalasi) are particularly at high risk due to combination of shrimp farm wastewater, animal grazing and tourism.</li> <li>• Mangroves in West Jask PA are under moderate risk due to tourism activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Risk on mangroves and tidal flats are expected to increase in the future mainly through development of new shrimp farms and intensification of tourism.</li> <li>• Tourism areas and activities should be restricted to a limited area in order to minimize tourism impacts.</li> <li>• Impacts of shrimp farm wastewater on mangrove/tidal flat (e.g. East Jask PA, Gabrik PA) should be monitored through combination of ecosystem and pollution monitoring.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>• Mangroves in the east of Gabrik PA will be under new risk due to wastewater discharge from multiple large-scale shrimp farms planned in the area.</li> <li>• Risks on mangroves in West and East Jask PA will increase mainly due to expected intensification of tourism.</li> </ul>	

Source: JICA Project Team

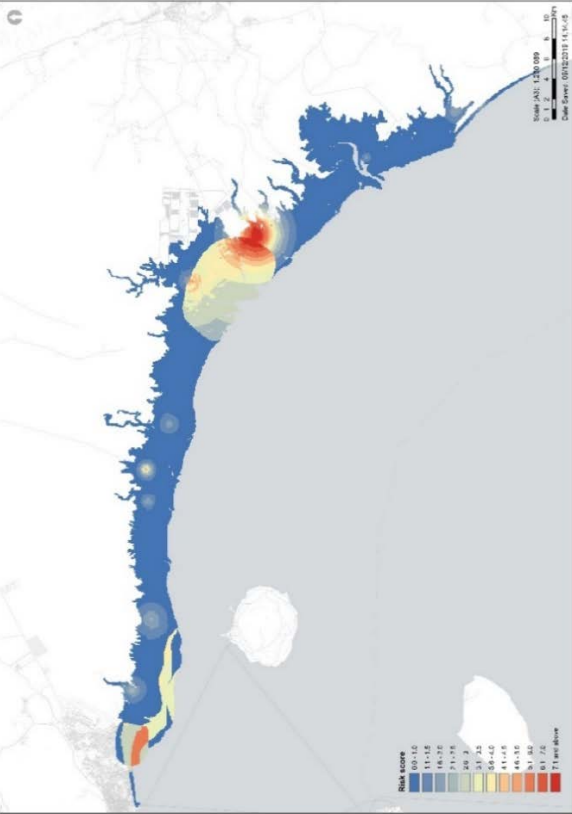
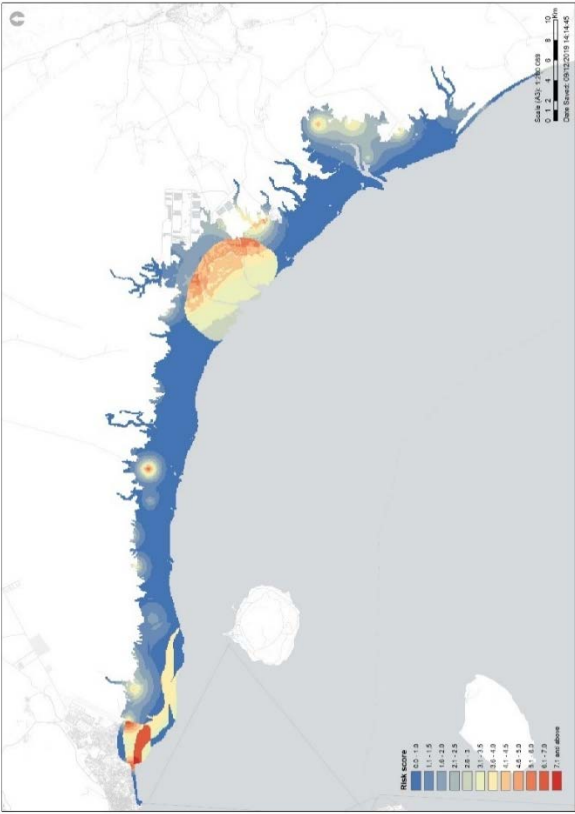
**Table 3.11.3 Risk on habitats in Gaz IEA**

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>Mangroves are under relatively high risk mainly due to animal grazing and tourism.</li> </ul>	<ul style="list-style-type: none"> <li>The area for tourism and animal grazing should be separated to minimize cumulative risks on mangrove.</li> <li>Impacts of shrimp farm wastewater on mangrove/tidal flat should be monitored through combination of ecosystem and pollution monitoring.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risks on mangrove will increase mainly through intensification of tourism.</li> <li>Tidal flats in north and south of the IEA will be under new risk due to wastewater discharge from multiple large-scale shrimp farms planned in the area.</li> </ul>	

Source: JICA Project Team

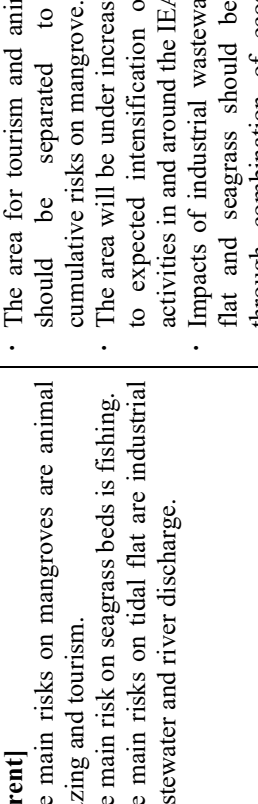
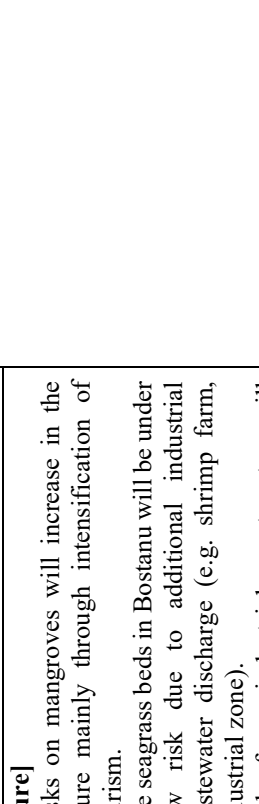


Table 3.11.4 Risk on habitats in Minab IEA

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>• Mangroves downstream of Tiab is under relatively high risk due to tourism.</li> <li>• Seagrass beds in front of Velayat Park are particularly at risk due to recreational activities in the intertidal area.</li> <li>• The risk on tidal flat is high especially downstream of Tiab, due to combination of tourism, river discharge and industrial wastewater (mainly from Tiab shrimp farm).</li> </ul>	<ul style="list-style-type: none"> <li>• Tourism areas and activities in Tiab mangrove area should be restricted to a limited area in order to minimize tourism impacts.</li> <li>• The seagrass bed west of Minab PA should be rigidly protected from human activities.</li> <li>• Recreational activities in front of Velayat Park should be more controlled in manner to protect the seagrass bed (e.g. prohibit car usage in the intertidal area).</li> <li>• Since Minab area is exposed to various human activities and will intensify in the future, environmental monitoring (pollution and ecosystem) will be important.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>• Risks on mangroves (e.g. mangrove downstream of Tiab) will increase in the future mainly through intensification of tourism.</li> <li>• Risks on seagrass beds will increase in the future mainly through intensification of tourism. There will also be additional risk from marine litter discharged from the Bandar Abbas urban area.</li> <li>• The risk on tidal flat will spread over a to wider area due to wastewater discharge from multiple large-scale shrimp farms planned in the area. Tourism will also increase the risk to a certain extent.</li> </ul>	

Source: JICA Project Team

**Table 3.11.5 Risk on habitats in Khamir IEA**

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>The main risks on mangroves are animal grazing and tourism.</li> <li>The main risk on seagrass beds is fishing.</li> <li>The main risks on tidal flat are industrial wastewater and river discharge.</li> </ul>	<ul style="list-style-type: none"> <li>The area for tourism and animal grazing should be separated to minimize cumulative risks on mangrove.</li> <li>The area will be under increasing risk due to expected intensification of industrial activities in and around the IEA.</li> <li>Impacts of industrial wastewater on tidal flat and seagrass should be monitored through combination of ecosystem and pollution monitoring.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risks on mangroves will increase in the future mainly through intensification of tourism.</li> <li>The seagrass beds in Bostanu will be under new risk due to additional industrial wastewater discharge (e.g. shrimp farm, industrial zone).</li> <li>Risk from industrial wastewater will increase significantly mainly due to additional discharge from new shrimp farms and industrial zones.</li> </ul>	

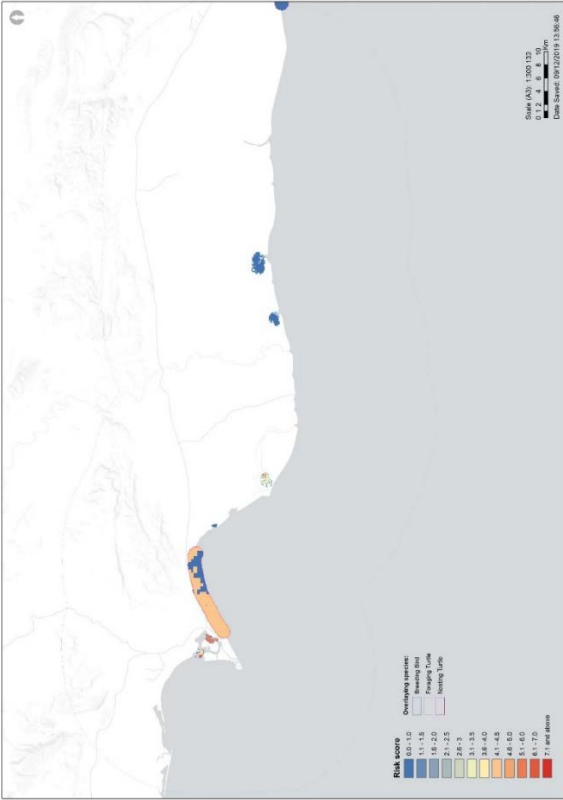
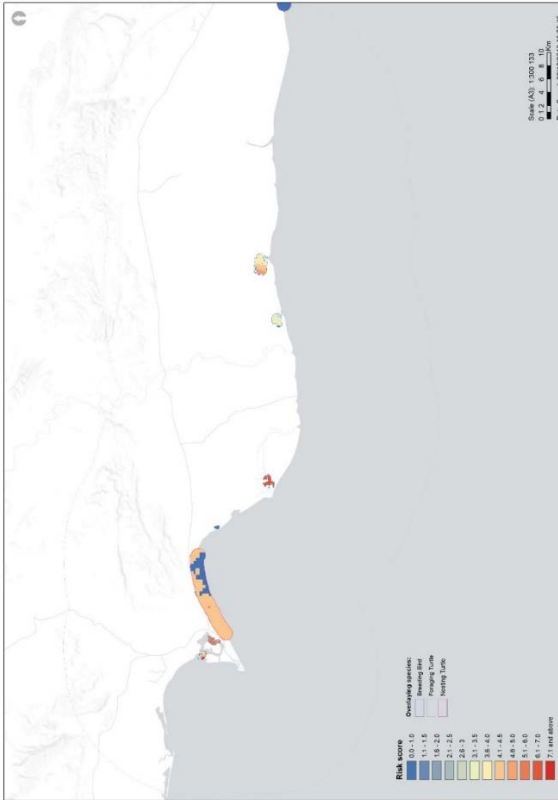
Source: JICA Project Team

Table 3.11.6 Risk on habitats in Parsian IEA

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>Risks on corals are high in the marine area between Shidvar and Lavan, and around Shidvar Island which are where there are overlap of stressors (e.g. fishing and ship wastewater, fishing and tourism).</li> <li>Seaweed beds along the Parsian coast is under moderate risk mainly from fishing.</li> </ul>	<ul style="list-style-type: none"> <li>To minimize fishing and tourism impacts, the extent of Shidvar Wildlife Refuge should be expanded to cover the coral reef area.</li> <li>Wastewater discharge from ships using Lavan port should be strictly controlled as per MARPOL regulations.</li> <li>Coral reefs of Shidvar and Lavan should be regularly monitored in combination with pollution monitoring.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risks are more or less similar between current and future.</li> </ul>	

Source: JICA Project Team

Table 3.11.7 Risk on species in Jask IEA

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>Risks on breeding birds are relatively high inside West Jask PA. This is mainly due to its proximity to Jask urban area.</li> <li>There is a moderate risk on turtles nesting along the coastline east of Jask. This is mainly due to light generated from the hinterland areas.</li> </ul>	<ul style="list-style-type: none"> <li>Major bird breeding habitats inside Jask IEA should be protected in a manner to minimize disturbances from human activities. This may be achieved for example by limiting human activities (e.g. tourism) inside bird breeding habitats. The status of breeding birds should also be monitored regularly.</li> <li>Light-intensive development or activities should be minimized especially in areas behind major turtle nesting sites. The status of turtle nesting in Jask IEA should be further studied to identify nesting areas that are of particular importance.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risks on breeding birds will increase especially in Gabrik PA and East Jask PA. This is mainly due to intensification of coastal industrial activities (e.g. shrimp farming) and tourism, which may lead to degradation of bird breeding habitats.</li> </ul>	

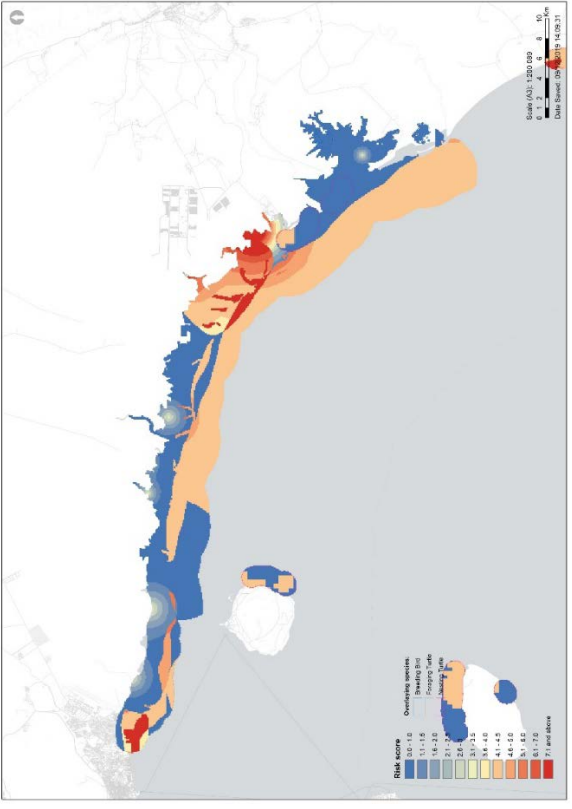
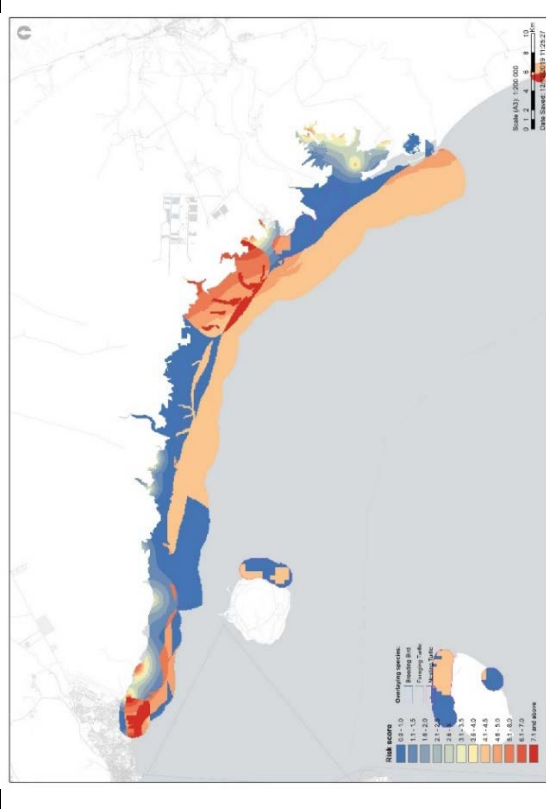
Source: JICA Project Team

Table 3.11.8 Risk on species in Gaz IEA

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>There is a moderate risk on bird breeding site (e.g. mangrove) inside Gaz PA, mainly due to combination of tourism and animal grazing.</li> <li>There is a moderate risk on turtles nesting along the north coast of Gaz. This is mainly due to light generated from hinterland areas.</li> </ul>	<ul style="list-style-type: none"> <li>Major bird breeding habitats inside Gaz IEA should be protected in a manner to minimize disturbances from human activities. This may be achieved for example by limiting human activities (e.g. tourism and animal grazing) inside bird breeding habitats. The status of breeding birds should also be monitored regularly.</li> <li>Light-intensive development or activities should be minimized especially in areas behind major turtle nesting sites. The status of turtle nesting in Gaz IEA should be further studied to identify nesting areas that are of particular importance.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risks on bird breeding site will increase mainly through intensification of coastal industrial activities (e.g. shrimp farming) and tourism, which may lead to degradation of bird breeding habitats.</li> </ul>	

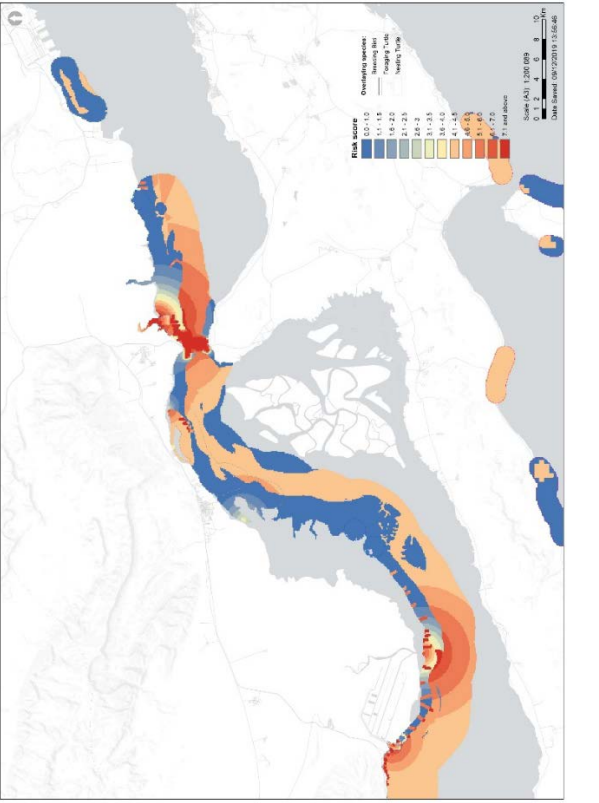
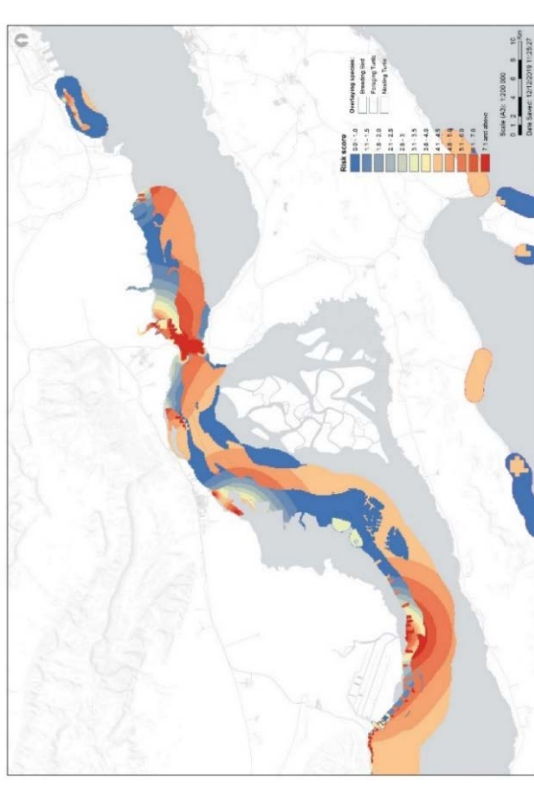
Source: JICA Project Team

Table 3.11.9 Risk on species in Minab IEA

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>Since the habitat of marine mammals extends over a wide area (e.g. subtidal area of Minab PA), marine mammals are at risk from various stressors. While the highest risk is from fishing, they are also at risk from pollution caused through wastewater discharges from industries and river.</li> <li>Foraging turtles are under risk from fishing activities and indirectly through degradation of their foraging habitat (e.g. seagrass bed west of Minab). The seagrass bed is mainly under risk from fishing and tourism.</li> <li>There is a moderate risk on turtles nesting along the sandbar near Kolahi. This is mainly due to light generated from the hinterland area with some small contribution from marine litter.</li> </ul>	<ul style="list-style-type: none"> <li>Risks on marine mammals and sea turtles should be minimized by stricter control of fishing activities in their habitats (e.g. subtidal area of Minab PA).</li> <li>The seagrass bed west of Minab PA should be more rigidly protected from human activities in order to maintain turtle foraging area.</li> <li>Light-intensive development or activities should be minimized especially in areas behind major turtle nesting sites.</li> <li>A detailed study on marine mammals and sea turtles should be implemented to identify their critical habitats.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risk on breeding birds will increase mainly through intensification of coastal industrial activities, which may lead to degradation of bird breeding habitats.</li> <li>Risk on marine mammals will increase mainly through intensification of coastal industrial activities and marine litter.</li> <li>Risk on foraging turtles will increase mainly through intensification of coastal industrial activities (e.g. shrimp farming) and marine litter.</li> <li>Risk on nesting turtles will increase mainly through intensification of marine litter.</li> </ul>	

Source: JICA Project Team

**Table 3.11.10 Risk on species in Khamir IEA**

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>Breeding birds are at risk from various stressors that may directly or indirectly affect breeding birds.</li> <li>Since the habitat of marine mammals extends over a wide area (e.g. subtidal area of Khamir PA), they are at risk from various stressors. While the highest risk is from fishing, the narrow strait between Pohl and Laft ports is particularly of high risk for marine mammals due to the additional risks from ship underwater noise. They are also indirectly at risk from wastewater discharges from industries and river.</li> <li>Foraging turtles are under risk from fishing activities and indirectly through degradation of their foraging habitat (e.g. seagrass bed). The seagrass bed is mainly under risk from fishing and tourism.</li> </ul>	<ul style="list-style-type: none"> <li>Major bird breeding habitats inside Khamir IEA should be protected in a manner to minimize disturbances from human activities. This may be achieved for example by limiting human activities (e.g. tourism) inside bird breeding habitats. The status of breeding birds should also be monitored regularly.</li> <li>Risks on marine mammals and sea turtles should be minimized by stricter control of fishing activities in their habitats (e.g. subtidal area of Khamir PA).</li> <li>The seagrass bed inside Khamir PA should be more rigidly protected from human activities in order to maintain turtle foraging area.</li> <li>A detailed study on marine mammals and sea turtles should be implemented to identify their critical habitats.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risk on breeding birds will increase mainly through intensification of coastal industrial activities, which may lead to degradation of bird breeding habitats.</li> <li>Risk on marine mammals will increase mainly through intensification of coastal industrial activities and marine litter.</li> <li>Risks on turtle foraging area will increase mainly through intensification of coastal industrial activities and marine litter.</li> </ul>	

Source: JICA Project Team

Table 3.11.11 Risk on species in Parsian IEA

Results of risk assessment (above: current, below: future)	Summary of main risks	Conclusion and recommendations
	<p><b>[Current]</b></p> <ul style="list-style-type: none"> <li>There is a high risk on bird breeding site at Shidvar Island, mainly due to combination of tourism and light pollution.</li> <li>In general, risk on foraging turtles are moderate mainly due to fishing. However, the narrow strait between Lavan and Shidvar is a high-risk area for foraging turtles due to the additional risks from ship underwater noise.</li> <li>There is a moderate risk on nesting turtles in Parsian and Lavan areas mainly due to light pollution. The nesting site in Shidvar is under higher risk due to combination of tourism and light pollution.</li> </ul>	<ul style="list-style-type: none"> <li>The turtle nesting site and bird breeding site at Shidvar Island should be rigidly protected from illegal tourism activities and also limit tourism activity during nesting/breeding season.</li> <li>The turtle nesting site in Lavan and Parsian coast should be protected from light pollution for example by minimizing light-intensive development or activities in the area behind the turtle nesting sites.</li> </ul>
	<p><b>[Future]</b></p> <ul style="list-style-type: none"> <li>Risks are more or less similar between current and future.</li> </ul>	

Source: JICA Project Team










### 3.12 Zoning plan

Zoning plans were formulated for the five IEAs, as it was considered as an effective management tool to balance human activities and environmental conservation. The zoning plan demarcates and regulates human usage of the area depending on the degree of conservation importance. While the formulated zoning plan has no legal status, it is intended to be referred for future conservation planning of the five IEAs. Please refer to Chapter 5 of the M/P for detailed methodologies and rationale of the zoning plans.

#### 3.12.1 Zoning categories and regulations

In the zoning plan, five zoning categories were established namely: 1) Sanctuary Zone, 2) Habitat/Species Protection Zone, 3) Recreation Zone, 4) Traditional Sustainable Use Zone and 5) General Use Zone. Permissible and non-permissible activities were set for each zoning category. In addition, the zoning plan includes “Land Use Recommendation Area” and “Protected Area Recommendation Area”. Table 3.12.1 shows the definition of each zoning categories and areas. Table 3.12.2 describes the regulations set for each zoning category.

**Table 3.12.1 Definition of each zoning categories and areas**

Legend	Zone category/area	Code	Definition
	Sanctuary Zone	S	An area with particularly high ecological value or vulnerability which require strict control of human activities to ensure its protection.
	Habitat/Species Protection Zone	HP	An area that supports particular species or habitats, where active control and management is required to ensure its protection.
	Recreation Zone	R	An area with high ecological value but where wise use of natural resources is promoted such as tourism and local traditional activities.
	Traditional Sustainable Use Zone	TSU	An area with relatively limited ecological value where wise and sustainable use of natural resources is promoted to ensure livelihood of local communities.
	General Use Zone	GU	An area with relatively limited ecological value, where various types of sustainable human activities are promoted.
	Land Use Recommendation Area	LURA	An area where recommendations are made in terms of adequate land use for conservation of coastal habitats. It is applied for example around important habitats where currently there no legal protection is applied (e.g. outside of protected area).
	PA Recommendation Area	PAR	An area that is considered to be worth of PA designation due to its outstanding ecological value.

Source: JICA Project Team

**Table 3.12.2 Regulations set for the five zoning categories**

		General Use Zone (GU)	Traditional Sustainable Use Zone (TSU)	Recreation zone (R)	Habitat/Species Protection Zone (HP)	Sanctuary Zone (S)
Development and facilities	Public infrastructure	Permit*1	Permit*1	Permit*1	x	x
	Industrial facilities	x	x	x	x	x
	Mineral exploration/extraction	x	x	x	x	x
	Housing	x	x	x	x	x
	Aquaculture (shrimp farm)	x	x	x	x	x
	Tourism facilities	Permit*2	x	Permit*2	x	x
	Education/research facilities	Permit*3	x	Permit*3	Permit*3	x
Traditional human activities	Subsistence farming	✓	✓*4	x	x	x
	Subsistence fishing	✓	✓*4	x	Permit*5	x
	Subsistence shellfish collection	✓	✓*4	x	Permit*4	x
	Livestock grazing	✓*6	x	x	x	x
	Tree roping / fodder collection	✓*6	✓*4	x	x	x
	Honey harvesting	✓	✓	✓*7	✓*7	x
Tourism/recreational activities	Nature observation (boat)	✓	✓	✓*9	Permit*8	x
	Nature observation (foot)	✓	✓	✓*11	Permit*10	x
	Picnic	✓	x	✓*11	Permit*11	x
	Motorised water sport	✓	x	x	x	x
	Recreational fishing	✓	x	✓*11	x	x
	Snorkling/swimming	✓	x	✓*11	✓*11	Permit*12
	Scuba diving	✓	x	✓	Permit*10	Permit*12
Access limits	Motorized vehicle	✓	✓*13	✓*13	✓*13	x
	Bicycle/foot	✓	✓	✓	✓	✓*14
	Motorized boat	✓	✓*15	✓*15	✓*15	✓*14
	Non-motorized boat	✓	✓	✓	✓	✓*14
<p>*1: Infrastructure compatible with PA objective may be permitted (access road, boat jetty/ramp)</p> <p>*2: Facilities compatible with PA objective may be permitted (lodge, boardwalk, restaurant, huts)</p> <p>*3: Facilities compatible with PA objective may be permitted</p> <p>*4: Under strict natural resource management system (monitoring, intervention)</p> <p>*5: Non-destructive fishing methods may be permitted (e.g. mushta, spear fishing, handline)</p> <p>*6: To be conducted under approved resource management plan</p> <p>*7: To be allowed with special permit</p> <p>*8: To be allowed only in designated areas with authorized guide. Speed limits to be applied Seasonal restrictions may apply</p> <p>*9: To be allowed only in designated areas. Speed limits to be applied Seasonal restrictions may apply</p> <p>*10: To be allowed only in designated areas with authorized guide. Seasonal restrictions may apply</p> <p>*11: To be allowed only in designated areas. Seasonal restrictions may apply</p> <p>*12: May be allowed for education/research purposes</p> <p>*13: Use of off-road to be prohibited</p> <p>*14: Limited to person authorized by DOE</p> <p>*15: Speed limits to be applied to motorized boats</p>						

Source: JICA Project Team

### **3.12.2 Zoning plan of IEAs**

Figures 3.12.1 to 3.12.5 show the zoning plan of the IEAs (see Appendix 11 for high resolution maps).





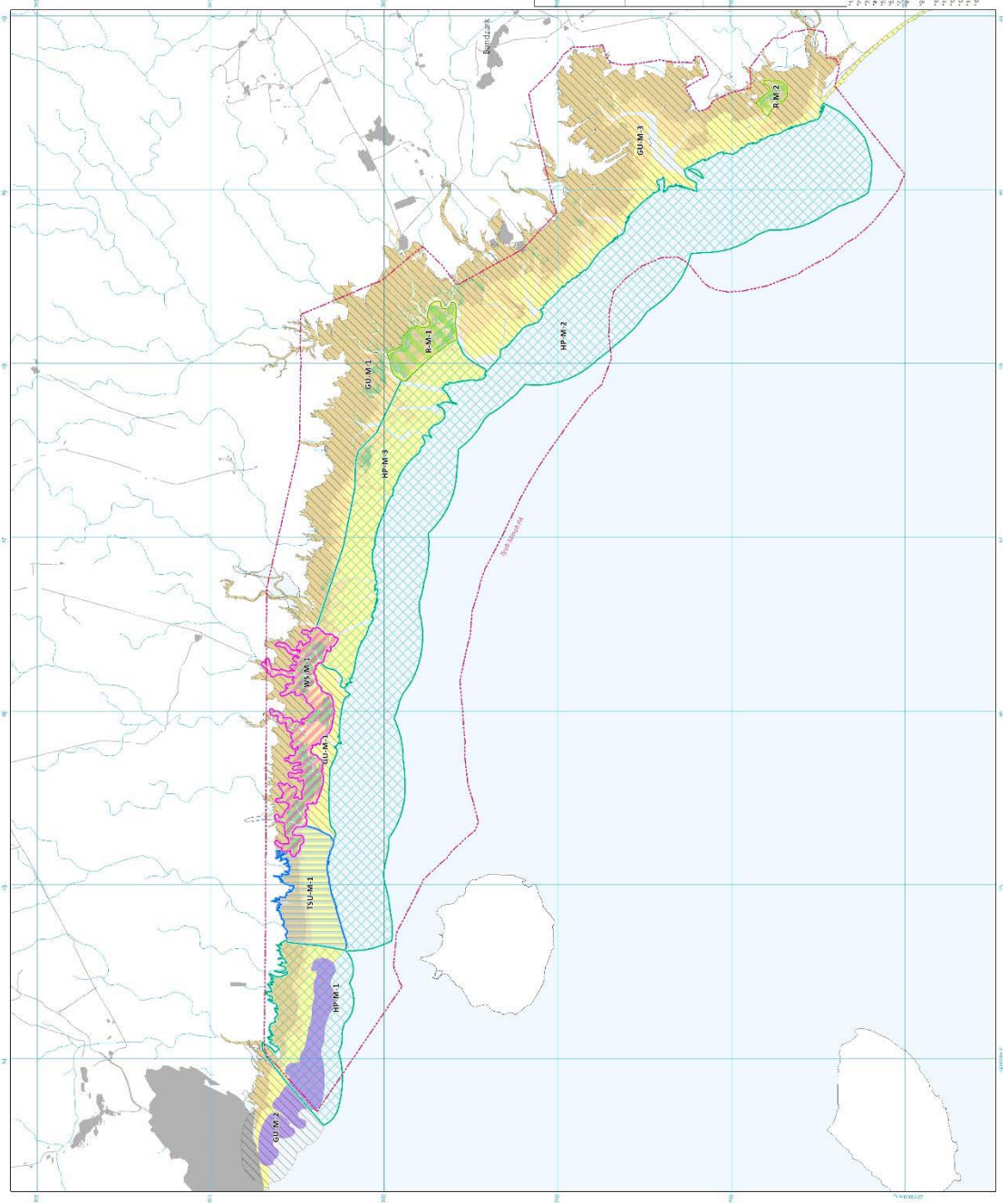
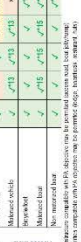
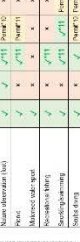
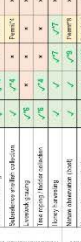
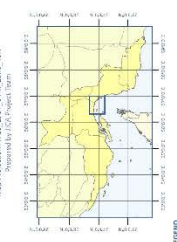
**Hormozgan Province Coastal  
Habitats Conservation Masterplan  
Zoning Plan**  
(DSIR, ver 2.0, 2018.12.10)

Minab IEA  
Overall Map

Scale (A3) : 1:200,000

0 1 2 4 6 km

Map Projection: WGS 1984 UTM\_ZONE\_20N



**Notes:**

1. The map is a preliminary zoning plan and is subject to change.
2. The map is a preliminary zoning plan and is subject to change.
3. The map is a preliminary zoning plan and is subject to change.
4. The map is a preliminary zoning plan and is subject to change.
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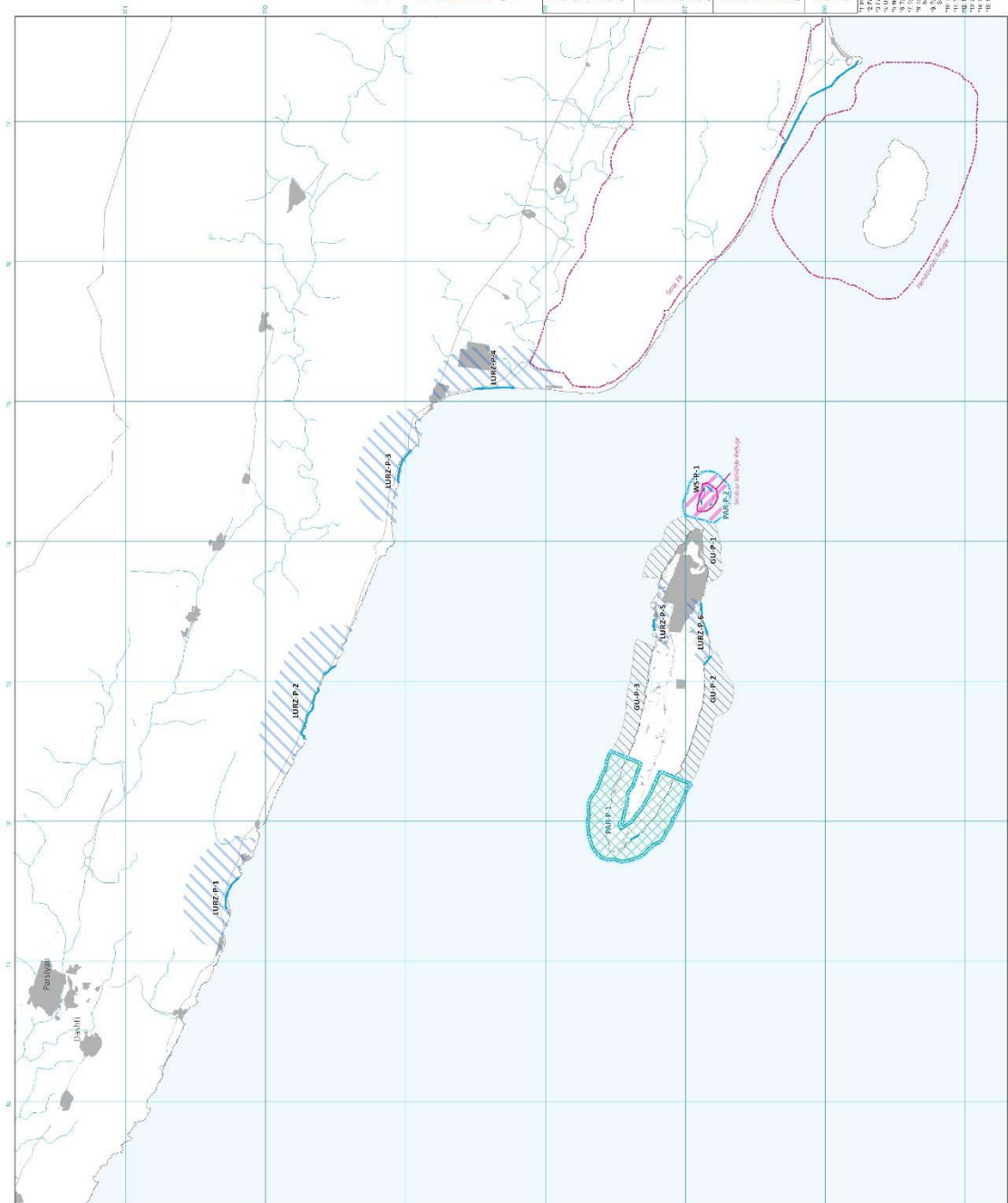
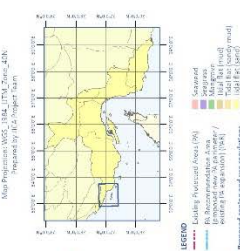
**Figure 3.12.3 Zoning plan of Minab IEA**

Source: JICA Project Team



**Hormozgan Province Coastal  
Habitats Conservation Masterplan  
Zoning Plan**  
(Draft No. 2.0 - 03/12/10)  
Parsian IEA  
Overall Map

Scale (AS) 1:250,000  
0 1 2 4 6  
km  
Map prepared by JICA Project Team  
Approved by I.C. Project Team



**LEGEND**

Building Footprint Areas (B)  
 - Building Footprint  
 - Building Footprint (shaded)  
 - Building Footprint (dotted)  
 - Building Footprint (cross-hatched)  
 - Building Footprint (diagonal lines)

Transportation  
 - Road (AS)  
 - Road (MS)  
 - Road (HS)  
 - Road (L)  
 - Road (M)  
 - Road (H)  
 - Road (L)  
 - Road (M)  
 - Road (H)

Water Bodies  
 - Water Body (AS)  
 - Water Body (MS)  
 - Water Body (HS)  
 - Water Body (L)  
 - Water Body (M)  
 - Water Body (H)

Other Areas  
 - Other Area (AS)  
 - Other Area (MS)  
 - Other Area (HS)  
 - Other Area (L)  
 - Other Area (M)  
 - Other Area (H)

**Legend for Zoning Zones**

Public Use Zone (PU)  
 - Public Use Zone (AS)  
 - Public Use Zone (MS)  
 - Public Use Zone (HS)  
 - Public Use Zone (L)  
 - Public Use Zone (M)  
 - Public Use Zone (H)

Residential Zone (R)  
 - Residential Zone (AS)  
 - Residential Zone (MS)  
 - Residential Zone (HS)  
 - Residential Zone (L)  
 - Residential Zone (M)  
 - Residential Zone (H)

Commercial Zone (C)  
 - Commercial Zone (AS)  
 - Commercial Zone (MS)  
 - Commercial Zone (HS)  
 - Commercial Zone (L)  
 - Commercial Zone (M)  
 - Commercial Zone (H)

Industrial Zone (I)  
 - Industrial Zone (AS)  
 - Industrial Zone (MS)  
 - Industrial Zone (HS)  
 - Industrial Zone (L)  
 - Industrial Zone (M)  
 - Industrial Zone (H)

Special Use Zone (S)  
 - Special Use Zone (AS)  
 - Special Use Zone (MS)  
 - Special Use Zone (HS)  
 - Special Use Zone (L)  
 - Special Use Zone (M)  
 - Special Use Zone (H)

Transition Buffer Zone (TB)  
 - Transition Buffer Zone (AS)  
 - Transition Buffer Zone (MS)  
 - Transition Buffer Zone (HS)  
 - Transition Buffer Zone (L)  
 - Transition Buffer Zone (M)  
 - Transition Buffer Zone (H)

Marine Buffer Zone (MB)  
 - Marine Buffer Zone (AS)  
 - Marine Buffer Zone (MS)  
 - Marine Buffer Zone (HS)  
 - Marine Buffer Zone (L)  
 - Marine Buffer Zone (M)  
 - Marine Buffer Zone (H)

Coastal Buffer Zone (CB)  
 - Coastal Buffer Zone (AS)  
 - Coastal Buffer Zone (MS)  
 - Coastal Buffer Zone (HS)  
 - Coastal Buffer Zone (L)  
 - Coastal Buffer Zone (M)  
 - Coastal Buffer Zone (H)

Other Areas  
 - Other Area (AS)  
 - Other Area (MS)  
 - Other Area (HS)  
 - Other Area (L)  
 - Other Area (M)  
 - Other Area (H)

**Development and Use**

Development and Use	Public Use Zone (PU)	Residential Zone (R)	Commercial Zone (C)	Industrial Zone (I)	Special Use Zone (S)	Transition Buffer Zone (TB)	Marine Buffer Zone (MB)	Coastal Buffer Zone (CB)
Public Use Zone (PU)	AS	MS	HS	L	M	H		
Residential Zone (R)	AS	MS	HS	L	M	H		
Commercial Zone (C)	AS	MS	HS	L	M	H		
Industrial Zone (I)	AS	MS	HS	L	M	H		
Special Use Zone (S)	AS	MS	HS	L	M	H		
Transition Buffer Zone (TB)	AS	MS	HS	L	M	H		
Marine Buffer Zone (MB)	AS	MS	HS	L	M	H		
Coastal Buffer Zone (CB)	AS	MS	HS	L	M	H		
Other Areas	AS	MS	HS	L	M	H		

1. The map is prepared by JICA Project Team.  
 2. The map is approved by I.C. Project Team.  
 3. The map is approved by I.C. Project Team.  
 4. The map is approved by I.C. Project Team.  
 5. The map is approved by I.C. Project Team.  
 6. The map is approved by I.C. Project Team.  
 7. The map is approved by I.C. Project Team.  
 8. The map is approved by I.C. Project Team.  
 9. The map is approved by I.C. Project Team.  
 10. The map is approved by I.C. Project Team.

Source: JICA Project Team

Figure 3.12.5 Zoning plan of Parsian IEA



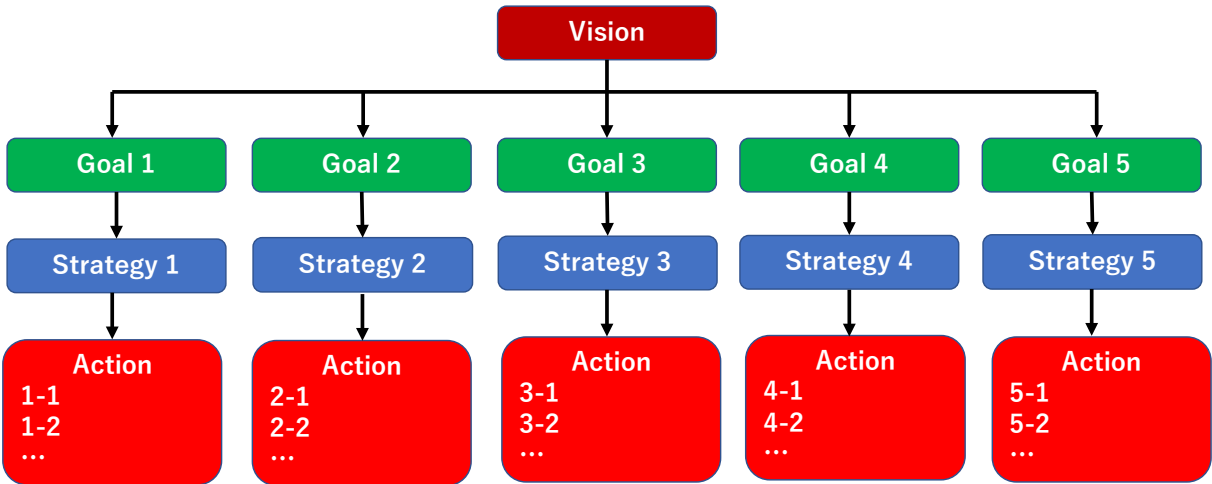
**3.13 Strategies and action plans for the conservation and management of the coastal environment**

**3.13.1 Basic framework**

Strategies and action plans for the conservation and management of the coastal environment were developed through two-years collective work of the M/P study and extensive discussions with WG members and stakeholders. The action plan was developed for the period from 2021 to 2030. More specifically, strategies and action plans were developed through the following processes:

- Setting the “vision” of the future state of the coastal environment
- Setting the “goals” necessary to realize the set vision
- Analysis of issues related to achieving the set goals
- Development of strategies and action plans to achieve each of the set goals

Figure 3.13.1 shows the basic framework of the strategies and action plans.



Source: JICA Project Team

**Figure 3.13.1 Basic framework of the strategies and action plans**

**3.13.2 Vision and goal**

As a starting point of developing the strategies and action plans, the following “vision” was set to envision the desirable state of the coastal environment in the future.

*Vision: By 2030, coastal environment is sustainably managed and protected so that future generations will continue to benefit through the various ecosystem services provided by a healthy environment.*

In order to realize the set vision, the following five goals were set:

- Goal 1:** Information on the coastal environment are appropriately managed and gaps filled so that coastal conservation and management can be planned and implemented effectively
- Goal 2:** Coastal development is conducted sustainably through effective implementation of EIA/SEA
- Goal 3:** Protected areas and important coastal habitats/species are conserved and managed under approved plans
- Goal 4:** Coastal water and sediment quality meets the Iranian standards
- Goal 5:** Coastal conservation and management are integrated with other provinces and shared with ROPME members

### 3.13.3 Issue analysis

Issues to achieve the set goals were analyzed, which are summarized in Table 3.13.1.

**Table 3.13.1 Main issues to achieve the set goals**

<b>Goal 1 : Information on the coastal environment are appropriately managed and gaps filled so that coastal conservation and management can be planned and implemented effectively</b>	
Issue	Conservation planning and decision making should be based on accurate understanding of the coastal environment. However, there are still significant information and knowledge gaps. There are also no centralized and systematic data storage, sharing and management mechanisms.
<b>Goal 2 : Coastal development is conducted sustainably through effective implementation of EIA/SEA</b>	
Issue	Due to inadequate legislations, lack of capacity and awareness among developers, EIA/SEA are not implemented effectively.
<b>Goal 3 : Protected areas and important coastal habitats/species are conserved and managed under approved plans</b>	
Issue	Degradation of coastal ecosystem is prevalent in some areas due in large part to human activities. The risk of further ecosystem degradation will become higher in line with the advancement of socioeconomic development. However, current efforts on ecosystem conservation and management is insufficient, which will need to be strengthened together with capacity development.
<b>Goal 4 : Coastal water and sediment quality meets the Iranian standards</b>	
Issue	Coastal waters are heavily polluted especially near urban and major industrial areas. The risk of further pollution will become higher in line with the advancement of socioeconomic development. However, current efforts on pollution control and management is insufficient, which will need to be strengthened together with capacity development.
<b>Goal 5 : Coastal conservation and management are integrated with other provinces and shared with ROPME members</b>	
Issue	The coastal environment should be conserved and managed in an integrated manner through cooperation with other provinces and countries. However, such cooperation is currently insufficient.

Source: JICA Project Team

### 3.13.4 Strategies and action plan

Based on the issue analysis, the following strategies were formulated to achieve the five Goals:

Strategy 1: Strengthening of knowledge base and data management of the coastal environment and information sharing with the stakeholders

Strategy 2: Strengthening of EIA/SEA implementation

Strategy 3: Strengthening of conservation and management of important habitats and species with participation of local community

Strategy 4: Strengthening of pollution control and management

Strategy 5: Integration of coastal conservation and management among the southern coastal area and ROMPE members

A total of more than 40 actions were developed under the 5 strategies. Table 3.13.2 outlines the actions proposed under each strategy. Note that the actions are not only limited to provincial level activities but also includes national level activities such as improvement of the legal system.

**Table 3.13.2 Outline of the actions proposed under each strategy**

<b>Strategy 1: Strengthening of knowledge base and data management of the coastal environment and information sharing with the stakeholders</b>	
Outline	<ul style="list-style-type: none"> <li>• Development of Coastal Data Information Management System</li> <li>• Conduct research on under-studied fields and areas</li> </ul>
<b>Strategy 2: Strengthening of EIA/SEA implementation</b>	
Outline	<ul style="list-style-type: none"> <li>• Strengthening of EIA/SEA legislation</li> <li>• Development of technical guidelines</li> <li>• Capacity building</li> <li>• Implementation of public awareness activities</li> </ul>
<b>Strategy 3: Strengthening of conservation and management of important habitats and species with participation of local community</b>	
Outline	<ul style="list-style-type: none"> <li>• Development of conservation and management plans of important ecosystem and species</li> <li>• Development of management plans of protected areas and consider designation of new protected areas.</li> <li>• Strengthening of control of invasive species</li> <li>• Development of ecosystem management guidelines</li> <li>• Implementation of ecosystem restoration projects (corals and seagrass)</li> <li>• Study on HAB warning system</li> <li>• Strengthening of ecosystem monitoring</li> <li>• Capacity building</li> <li>• Implementation of environmental education and public awareness activities</li> </ul>
<b>Strategy 4: Strengthening of pollution control and management</b>	
Outline	<ul style="list-style-type: none"> <li>• Strengthening of pollution control legislations (e.g. establishment of environmental standards, effluent discharge license scheme, standardization of sampling and analysis method)</li> <li>• Strengthening of pollution monitoring and inspection</li> <li>• Development of pollution source inventory</li> <li>• Study on Total Pollution Load Control System</li> <li>• Capacity building</li> </ul>
<b>Strategy 5: Integration of coastal conservation and management among the southern coastal area and ROMPE members</b>	
Outline	<ul style="list-style-type: none"> <li>• Development of M/P of other coastal area provinces</li> <li>• Information sharing and cooperation with ROPME members</li> </ul>

Source: JICA Project Team

Table 3.13.3 lists the actions proposed under each strategy and implementing organizations (refer to Chapter 6.4 of the M/P for more details of each action).

**Table 3.13.3 List of actions proposed under each strategy**

Strategy	Action	Implementing organization
Strategy 1: Strengthening of knowledge base and data management of the coastal environment and sharing with stakeholders	1-1: Development of Coastal Data Information Management System	M: DOE HQ/Hormozgan
	1-2: Conduct research on under-studied fields and areas	M: DOE HQ/Hormozgan
Strategy 2: Strengthening of EIA/SEA implementation	2-1: Strengthening of EIA/SEA legislation	M: DOE HQ
	2-2: Development of general EIA/SEA and sector-specific EIA guidelines	M: DOE HQ S: : MRUD, PMO, MOE, MOJA, MIMT, MOP
	2-3: Capacity building for EIA/SEA	M: DOE HQ
	2-4: Promotion of EIA as key tool for achieving sustainable development	M: DOE HQ/Hormozgan S: MRUD, PMO, MOE, MOJA, MIMT, MOP
Strategy 3: Strengthening of conservation and management of important habitats and species with participation of local community	3-1: Protection of threatened habitats and species	
	3-1-1: Update of protected species list	M: DOE HQ/Hormozgan S: IFO, Research institute
	3-1-2: Development of coral management plan and implementation of coral restoration pilot project	M: DOE HQ/Hormozgan S: IFO, Research institute
	3-1-3: Development of seagrass management plan and implementation of seagrass restoration pilot project	M: DOE HQ/Hormozgan S: IFO, Research institute
	3-1-4: Development of mangrove/tidal flat management plan	M: DOE HQ/Hormozgan S: NRWGO, IFO, ICHHTO
	3-1-5: Update of sea turtle management plan	M: DOE HQ/Hormozgan S: IFO, ICHHTO
	3-1-6: Development of marine mammal management plan	M: DOE HQ/Hormozgan S: IFO, ICHHTO
	3-1-7: Study approaches to implement M/P spatial zoning plan	M: DOE HQ/Hormozgan S: MRUD, ICHHTO, IFO, PMO, MOJA, RWC
	3-1-8: Development of management plans of protected areas	M: DOE Hormozgan S: MRUD, ICHHTO, IFO, PMO, MOJA, RWC
	3-1-9: Expand and upgrade protected areas to contribute to the NBSAP National Target 19 (5% of coastal and marine area)	M: DOE HQ/Hormozgan S: MRUD, ICHHTO, IFO, PMO, MOJA, RWC
	3-1-10: Study potential areas for PSSA designation	M: DOE HQ/Hormozgan S: PMO
	3-1-11: Control and management of invasive species	M: DOE HQ/Hormozgan S: NRWGO, IFO, PMO
	3-1-12: Development of coastal ecosystem management guidelines	M: DOE HQ S: MRUD, ICHHTO, IFO, PMO
3-1-13: Capacity building for ecosystem management	M: DOE HQ	

Strategy	Action	Implementing organization
Strategy 4: Strengthening of pollution control and management	3-2: Strengthening of coastal ecosystem monitoring	
	3-2-1: Development of ecosystem monitoring plan and guideline	M: DOE HQ/Hormozgan
	3-2-2: Capacity building for ecosystem monitoring	M: DOE HQ
	3-2-3: Implementation of ecosystem monitoring	M: DOE HQ/Hormozgan
	3-2-4: Study on HAB warning system	M: DOE HQ/Hormozgan S: IFO
	3-3: Strengthening of environmental awareness and education activities	M: DOE HQ/Hormozgan S: MOEd
	4-1: Strengthening of pollution control legislations	
	4-1-1: Establishment of environmental quality and effluent discharge standards for the coastal area	M: DOE HQ S: MOE, MOJA, MOHME
	4-1-2: Development of national Action List related to London Protocol	M: DOE HQ S: PMO
	4-1-3: Establishment of standard sampling and analysis method	M: DOE HQ S: MOSRT, NSO
	4-1-4: Establishment of effluent discharge license scheme	M: DOE HQ S: MIMT, MOJA
	4-2: Strengthening of pollution monitoring of the coastal area	
	4-2-1: Development of pollution monitoring plan and guideline	M: DOE HQ/Hormozgan
	4-2-2: Strengthening of capacity for pollution monitoring	M: DOE HQ/Hormozgan
4-2-3: Implementation of pollution monitoring	M: DOE Hormozgan	
4-3: Strengthening of inspection activities		
4-3-1: Development of inspection plan and guideline	M: DOE HQ/Hormozgan S: MIMT, MOJA, MOHME	
4-3-2: Capacity building for inspection activities	M: DOE HQ	
4-3-3: Implementation of inspection	M: DOE Hormozgan	
4-3-4: Development of pollution source inventory	M: DOE HQ/Hormozgan	
4-4: Study on Total Pollution Load Control System	M: DOE HQ/Hormozgan	
4-5: Development of incentive mechanism to improve environmental compliance	M: DOE HQ/Hormozgan S: MIMT, MOJA, MOHME	
4-6: Supervision of M/P for sewerage and sewage treatment system	M: DOE HQ/Hormozgan	
4-7: Supervision of M/P for waste management	M: DOE HQ/Hormozgan	
5-1: Development of M/P of each southern coastal area provinces	M: DOE HQ, DOE province S: PBO province	
5-2: Information sharing and cooperation with ROPME members	M: DOE HQ/Hormozgan	
Strategy 5: Integration of coastal conservation and management among the southern coastal area and ROMPE members		

M: Main implementing organization, S: Supporting organization

Source: JICA Project Team

### 3.14 Implementation framework

#### 3.14.1 Implementation structure

Implementation of the action plan will require the participation of wide range of stakeholders from national to provincial levels, including government organizations, NGOs and research institutes. Effective approaches were discussed at length among the WG members, and was concluded to establish a specialized unit provisionally termed “Coastal Conservation and Management Task Force (hereinafter termed “Task Force”)”, which will consist of all relevant stakeholders (e.g. provincial government, local government, NGO, research institutes, university) with PBO Hormozgan acting as the head and DOE as the secretariat. The Task Force will stand under the “Infrastructure, Land Use Planning and Environment Committee (ILUPEC)<sup>3</sup>” of “Planning and Development Council (PDC)<sup>4</sup>” of Hormozgan Province. The Task Force will have among others the following main roles:

- Development of annual implementation and budget plans of the action plan
- Development of evaluation indicators for action plan performance
- Evaluation of progress and outputs of the action plan and consider necessary adjustments or improvements
- Maintain knowledge database accessible by the partner stakeholders.

Table 3.14.1 shows the expected members of the Task Force and their roles. The Task Force and its members will be officialized by PDC.

**Table 3.14.1 Expected members of the Task Force and their roles**

Organization	Role
Provincial Planning Deputy Governor	Supervisor
Planning and Budget Organization	Head
Department of Environment	Secretariat
Ministry of Jihad Agriculture	Planning, implementation, supervision
Natural Resource Watershed Management Organization	Planning, implementation, supervision
Iranian Fisheries Organization	Planning, implementation, supervision
Ministry of Road & Urban Development	Planning, implementation, supervision
Port & Maritime Organization	Planning, implementation, supervision
Housing Foundation	Planning, implementation, supervision
Ministry of Energy	Planning, implementation, supervision
Regional Water Company	Planning, implementation, supervision
Ministry of Industry, Mine & Trade	Planning, implementation, supervision
Ministry of Petroleum	Planning, implementation, supervision
Ministry of Education	Planning, implementation, supervision
Cultural Heritage, Handicraft & Tourism Organization	Planning, implementation, supervision
County & Municipality Councils	Planning, implementation, supervision

<sup>3</sup> Provincial committee responsible for considering infrastructure, land use and environmental issues.

<sup>4</sup> Council responsible for preparation and management of provincial development plans. It is headed by the governor and members include deputy governor, county governor, and representatives from government organizations and universities. The Council will authorize the M/P.

Organization	Role
NGOs	Planning, implementation, supervision
Free Zone Organization	Planning, implementation, supervision
University	Planning, implementation, supervision

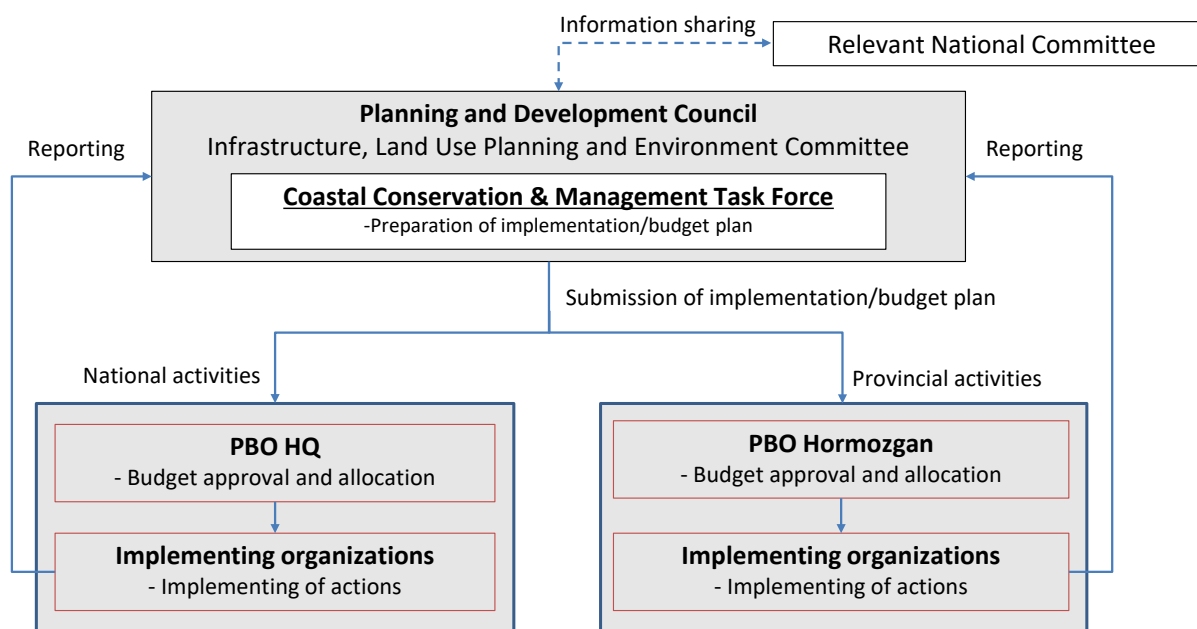
Source: JICA Project Team

### 3.14.2 Implementation process

The action plan will be implemented under the concept of PDCA (Plan, Do, Check, Action) cycle. The implementation process will in general be as follows:

- ① The Task Force will submit the annual implementation and budget plans to ILUPEC.
- ② ILUPEC will review and finalize the annual implementation and budget plans and submit to PDC.
- ③ Once PDC approves, the annual implementation and budget plans will be submitted to PBO (provincial activities to PBO Hormozgan and national activities to PBO HQ)
- ④ Once PBO approves, the budget will be allocated to respective implementing organizations
- ⑤ The implementing organizations will implement the action plan and report the outputs to the Task Force
- ⑥ The Task Force will review and evaluate the outputs and prepare the annual implementation and budget plans for the ensuing year
- ⑦ The outputs will be shared with other relevant national committees to avoid overlap or conflict in the activities.

Figure 3.14.1 shows the implementation framework of the action plan.



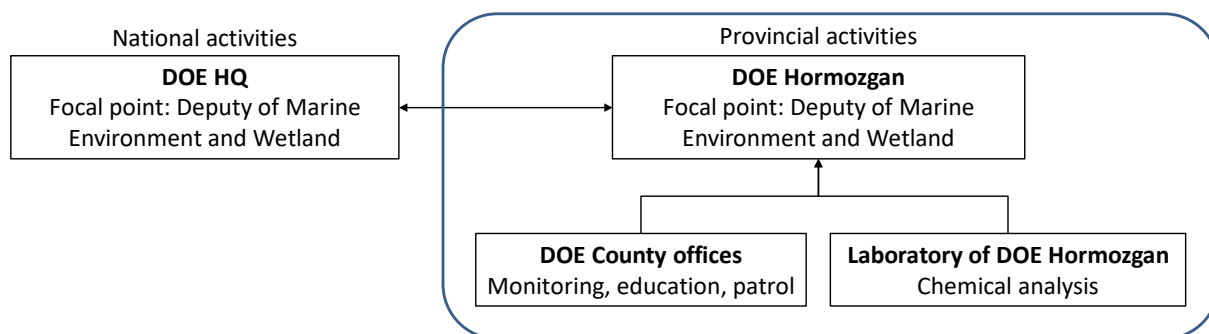
Source: JICA Project Team

**Figure 3.14.1 Implementation framework of the action plan**



### 3.14.3 Implementation structure of DOE

Since DOE will have a major role in the implementation of the action plan including as a secretariat of the Task Force, it will be necessary to fully utilize their human and institutional resources within the HQ and provincial offices. Institutional and human capacity development will also be necessary. Figure 3.14.2 shows the implementation structure within DOE.



Source: JICA Project Team

**Figure 3.14.2 Implementation structure within DOE**

Roles of the DOE organizations and capacity development requirements are explained in the ensuing sections.

#### (1) DOE HQ

The Deputy of Marine Environment and Wetland will be the main implementation unit within DOE HQ. The other four deputy departments will also support and implement the actions as necessary. Table 3.14.2 shows the main roles of DOE Deputy departments. Since the Deputy of Marine Environment and Wetland has limited human resource, it is proposed to recruit a permanent marine conservation expert that will be responsible for assisting and coordinating the tasks of the Task Force such as drafting of implementation and budget plans, evaluation of progress/outputs based on set indicators, facilitation of meetings and so on. The expert will also supervise the activities of DOE Hormozgan.

**Table 3.14.2 Main roles of DOE Deputy departments**

Organization	Main roles
Deputy of Marine Environment and Wetland	<ul style="list-style-type: none"> <li>• Focal point of DOE HQ.</li> <li>• Coordination, planning and implementation of the national-level actions.</li> <li>• Supervising the activities of DOE Hormozgan.</li> </ul>
Deputy of Natural Environment and Biodiversity	<ul style="list-style-type: none"> <li>• Support and implement actions related to protected area management, wildlife conservation etc.</li> </ul>
Deputy of Human Environment	<ul style="list-style-type: none"> <li>• Support and implement actions related to EIA, waste management etc.</li> </ul>
Deputy of Public Education and Participation	<ul style="list-style-type: none"> <li>• Support and implement actions related to environmental education, public awareness etc.</li> </ul>
Deputy of Managerial Development, Legal and Parliament	<ul style="list-style-type: none"> <li>• Drafting of bills</li> <li>• Drafting of budget for implementation</li> <li>• Recruitment of human resources</li> </ul>

Source: JICA Project Team

## (2) DOE Hormozgan

In DOE Hormozgan there is no department in the Deputy level dedicated to coastal area conservation and management, and responsibilities are shared between different bureaus. This current structure is considered insufficient in implementing the provincial-level actions, as there will be various new and additional activities DOE Hormozgan will be responsible to plan and implement. The M/P therefore proposes to establish a new Deputy (provisionally termed Deputy of Marine Environment and Wetland Hormozgan) dedicated to coastal conservation and management, which will have similar roles to the Deputy of Marine Environment and Wetland of HQ such as coordination, planning and implementation of the provincial-level actions. Under the new Deputy, it is proposed to establish three bureaus. Table 3.14.3 describes the main roles of the three bureaus and required expertise.

**Table 3.14.3 Main roles of the three bureaus under the Deputy of Marine Environment and Wetland Hormozgan**

Organization	Main roles	Required expertise
Bureau of Ecosystem Conservation and Management	<ul style="list-style-type: none"> <li>• Planning and management of coastal ecosystem.</li> <li>• Protection and management of endangered species.</li> <li>• Monitoring of coastal ecosystem.</li> <li>• Implementation of research.</li> <li>• Management of database.</li> </ul>	<ul style="list-style-type: none"> <li>• Marine conservation expert</li> <li>• GIS/database expert</li> </ul>
Bureau of Pollution Monitoring	<ul style="list-style-type: none"> <li>• Planning and implementation of pollution monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Marine pollution expert</li> </ul>
Bureau of Coastal Wetlands	<ul style="list-style-type: none"> <li>• Management of coastal wetlands including protected areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Wetland management expert</li> </ul>

Source: JICA Project Team

The experts required for the Deputy of Marine Environment and Wetland Hormozgan will as a first option, be recruited from the other Deputy and Bureaus within DOE Hormozgan. However, it is at least required to recruit a permanent GIS/database expert as such staff is currently not available within DOE Hormozgan.

## (3) Laboratory of DOE Hormozgan

The DOE laboratories in Hormozgan will be responsible for the chemical analysis of pollution monitoring and inspection. However, the technical and human capacity of the laboratories will need to be strengthened as proposed in the M/P.

## (4) DOE County Office in Hormozgan

The county offices will have major supporting roles in implementing the action plan. Main roles are such as follows:

- Supporting of pollution and ecosystem monitoring and inspection
- Supporting of research activities
- Supporting of environmental education and awareness programs
- Patrolling of protected areas

### **3.15 Implementation schedule and cost**

#### **3.15.1 Implementation schedule**

Table 3.15.1 shows the implementation schedule of the actions covering the period from 2021 to 2030. Generally, the first few years will focus on strengthening the foundation required for effective conservation and management (e.g. research, improvement of legislations, development of plans and guidelines, capacity building).

**Table 3.15.1 Implementation schedule of the action plan (2021-2030)**

Action	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1.1 Development of Coastal Data Information Management System	Development									
1.2 Conduct research on under-studied fields and areas	Sonar	Sea turtle	Mammal							
2.1 Strengthening of EIA/SEA legislation										
2.2 Development of general EIA/SEA and sector-specific EIA guidelines										
2.3 Capacity building for EIA/SEA										
2.4 Promotion of EIA/SEA as key tool for achieving sustainable development										
3.1 Protection of threatened habitats and species										
3.1.1 Update of protected species list										
3.1.2 Development of coral management plan and implementation of coral restoration pilot project		Pilot project								
3.1.3 Development of seagrass management plan and implementation of seagrass restoration pilot project					Pilot project					
3.1.4 Development of mangrove/tidal flat management plan										
3.1.5 Update of sea turtle management plan										
3.1.6 Development of marine mammal management plan										
3.1.7 Study approaches to implement M/P spatial zoning plan										
3.1.8 Development of management plans of protected areas										
3.1.9 Expand and upgrade protected areas to achieve the NBSAP National Target 19										
3.1.10 Study potential areas for PSSA designation										
3.1.11 Development of invasive species management plan										
3.1.12 Development of ecosystem management guidelines										
3.1.13 Capacity building for ecosystem management										





### 3.15.2 Implementation cost

Table 3.15.2 shows the estimated implementation cost of the actions (see Appendix 12 for cost breakdown). Table 3.15.3 shows the annual implementation cost of the actions.

**Table 3.15.2 Implementation cost of the actions**

Strategy	Action	Cost (US\$)
Strategy 1: Strengthening of knowledge base and data management of the coastal environment	1-1: Development of Coastal Data Information Management System	546,000
	1-2: Conduct research on under-studied fields and areas	1,136,000
Strategy 2: Strengthening of EIA/SEA implementation	2-1: Strengthening of EIA/SEA legislation	65,000
	2-2: Development of general EIA/SEA and sector-specific EIA guidelines	97,000
	2-3: Capacity building for EIA/SEA	218,000
	2-4: Promotion of EIA as key tool for achieving sustainable development	75,000
Strategy 3: Strengthening of conservation and management of important habitats and species with participation of local community	3-1: Protection of threatened habitats and species	-
	3-1-1: Update of protected species list	28,000
	3-1-2: Development of coral management plan and implementation of coral restoration pilot project	1,482,000
	3-1-3: Development of seagrass management plan and implementation of seagrass restoration pilot project	1,352,000
	3-1-4: Development of mangrove/tidal flat management plan	17,000
	3-1-5: Update of sea turtle management plan	17,000
	3-1-6: Development of marine mammal management plan	17,000
	3-1-7: Study approaches to implement M/P spatial zoning plan	237,000
	3-1-8: Development of management plans of protected areas	137,000
	3-1-9: Expand and upgrade protected areas to contribute to the NBSAP National Target 19 (5% of coastal and marine area)	55,000
	3-1-10: Study potential areas for PSSA designation	32,000
	3-1-11: Control and management of invasive species	32,000
	3-1-12: Development of coastal ecosystem management guidelines	78,000
	3-1-13: Capacity building for ecosystem management	337,000
	3-2: Strengthening of coastal ecosystem monitoring	-
	3-2-1: Development of ecosystem monitoring plan and guideline	20,000
	3-2-2: Capacity building for ecosystem monitoring	155,000
	3-2-3: Implementation of ecosystem monitoring	909,000
	3-2-4: Study on HAB warning system	1,874,000
	3-3: Strengthening of environmental awareness and education activities	170,000
Strategy 4: Strengthening of pollution control and management	4-1: Strengthening of pollution control legislations	-
	4-1-1: Establishment of environmental quality and effluent discharge standards for the coastal area	70,000
	4-1-2: Establishment of permit system related to London Protocol	65,000
	4-1-3: Establishment of standard sampling and analysis method	95,000
	4-1-4: Establishment of effluent discharge license scheme	65,000
	4-2: Strengthening of pollution monitoring of the coastal area	
	4-2-1: Development of pollution monitoring plan and guideline	20,000
	4-2-2: Strengthening of capacity for pollution monitoring	555,000
	4-2-3: Implementation of pollution monitoring	1,320,000
	4-3: Strengthening of inspection activities	-
	4-3-1: Development of inspection plan and guideline	20,000
	4-3-2: Capacity building for inspection activities	192,000

Strategy	Action	Cost (US\$)
	4-3-3: Implementation of inspection	320,000
	4-3-4: Development of pollution source inventory	117,000
	4-4: Study on Total Pollution Load Control System	177,000
	4-5: Development of incentive mechanism to improve environmental compliance	79,000
	4-6: Supervision of M/P for sewerage and sewage treatment system	-
	4-7: Supervision of M/P for waste management	-
	Strategy 5: Integration of coastal conservation and management among the southern coastal area and ROMPE members	5-1: Development of M/P of each southern coastal area provinces
5-2: Information sharing and cooperation with ROPME members		140,000
<b>Total</b>		<b>13,671,000</b>

Source: JICA Project Team

**Table 3.15.3 Annual implementation cost of the actions (Thousand US\$)**

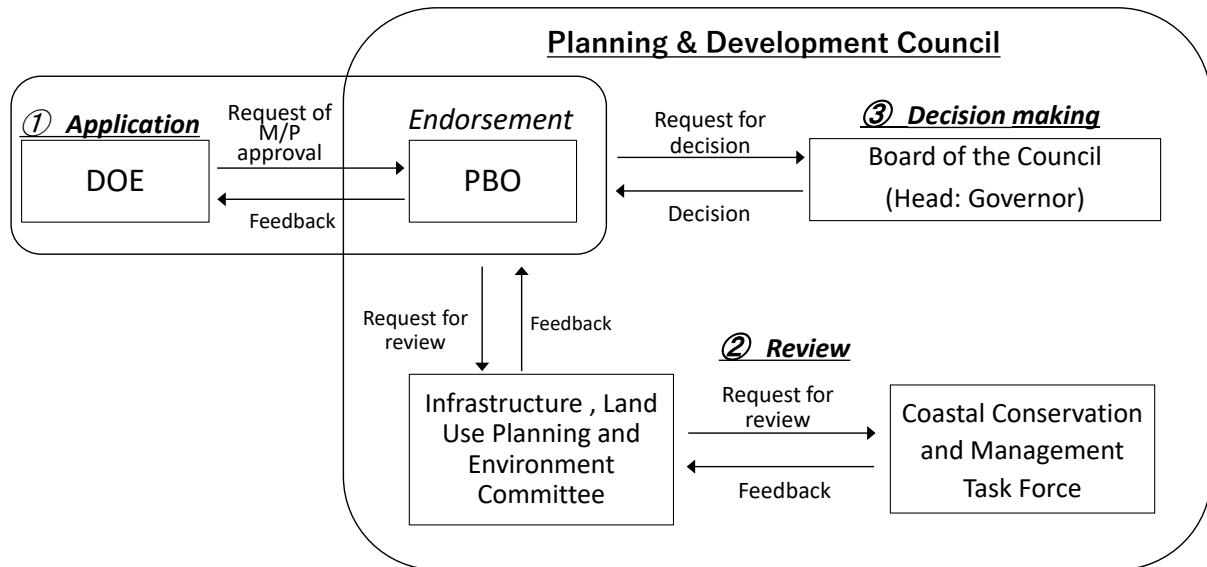
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
<b>Annual cost</b>	1,446	1,980	2,576	2,159	2,045	1,167	824	741	361	367	13,671

Source: JICA Project Team



### 3.16 Supporting of M/P approval

The M/P is planned to be approved at both provincial and national levels. PDC will be the approving authority at the provincial level and Supreme Council of Spatial Planning at the national level. Figure 3.16.1 shows the approval process of M/P at provincial level.



Source: JICA Project Team

**Figure 3.16.1 Approval process of M/P at provincial level**

DOE submitted the draft M/P to PDC in March 2020. DOE then made a presentation of the M/P to PDC in May 2020. The M/P is now under review by PDC.

### 3.17 Other activities

#### 3.17.1 Formulation of ecosystem monitoring plan

Regular monitoring is essential for conservation and management of ecosystem. However, apart from annual bird census, DOE currently does not implement regular ecosystem monitoring in Hormozgan. The M/P therefore proposes to plan and implement ecosystem monitoring under Action 3-2. Table 3.17.1 shows the draft ecosystem monitoring plan. Since ecosystem monitoring will be a long-term commitment, the monitoring plan should be designed in a manner so that it can be sustainably implemented.

**Table 3.17.1 Draft ecosystem monitoring plan**

	Method	Parameter	Frequency	Location
Coral	Quadrat survey	Coverage, species, bleaching, associated benthos etc.	1/year	Shidvar/Lavan
	Water quality data logger	Water quality (Temp., salinity, pH, DO, turbidity, chlorophyll-a)	Continuous	
Seagrass	Quadrat survey	Coverage, species, associated benthos etc.	1/year	Khamir, Bostanu, Minab
Mangrove/tidal flat	Satellite image analysis	Area distribution	1/year	Khamir, Minab, Gaz, Jask
	Field measurement	Tree growth, associated benthos etc.	Every 2 year	
Sea turtle	Field observation	Nesting population, hatching success etc.	1/year	Major nesting sites
Dolphin	Boat survey	Species, population etc.	1/year (initial 5 years)	Khamir, Minab
Bird	Point survey	Species, population (wintering birds)	1/year (Dec.-Jan.)	Khamir, Minab, Gaz, Jask
	Point survey	Species, population (migratory birds)	1/year (Mar-June)	
	Area search (e.g. with drone)	Species, population (breeding birds)		

Source: JICA Project Team

### 3.17.2 Formulation of pollution monitoring plan

DOE does not conduct regular pollution monitoring of coastal waters. Some that have been conducted are within a limited area and period and their methodologies are not consistent. Sediment quality is a good indicator of pollution, but such monitoring is also not regularly implemented. The M/P therefore proposes to plan and implement seawater/sediment monitoring under Action 4-2. Table 3.17.2 shows the draft pollution monitoring plan.

The monitoring plan was formulated for conservation of ecosystem and living environment. While the monitoring parameters were primarily selected based on the results of pollution survey, the parameters should be adjusted in accordance to the environmental standards to be established under Action 4-1 of the M/P. Monitoring frequency for water quality was set as 4/year to consider seasonal variation.

**Table 3.17.2 Draft pollution monitoring plan**

	Parameter	Frequency	No. of sites
Seawater quality*	Temp., salinity, pH, turbidity, oil, DO, COD, TOC, TN, TP, fecal coliform, heavy metals (Cd, Cr <sup>+6</sup> , As)	4/year	23
Wastewater quality	Same as seawater quality	4/year	14
Sediment quality	Water content, particle size, TPH, heavy metals (Cu, As, Ni, Cr), PCBs, pesticides	1/year	23

\*: Surface and bottom layers

Source: JICA Project Team

Monitoring sites were selected by considering areas of high pollution risk, conservation hotspot and so on. Tables 3.17.3 and 3.17.4 list the locations of the proposed monitoring sites and rationale of site selection. Figures 3.17.1 and 3.17.2 show the locations of the proposed monitoring sites. It is preferable to continue monitoring at the same sites.

**Table 3.17.3 Locations of the proposed monitoring sites and rationale of site selection  
(seawater and sediment)**

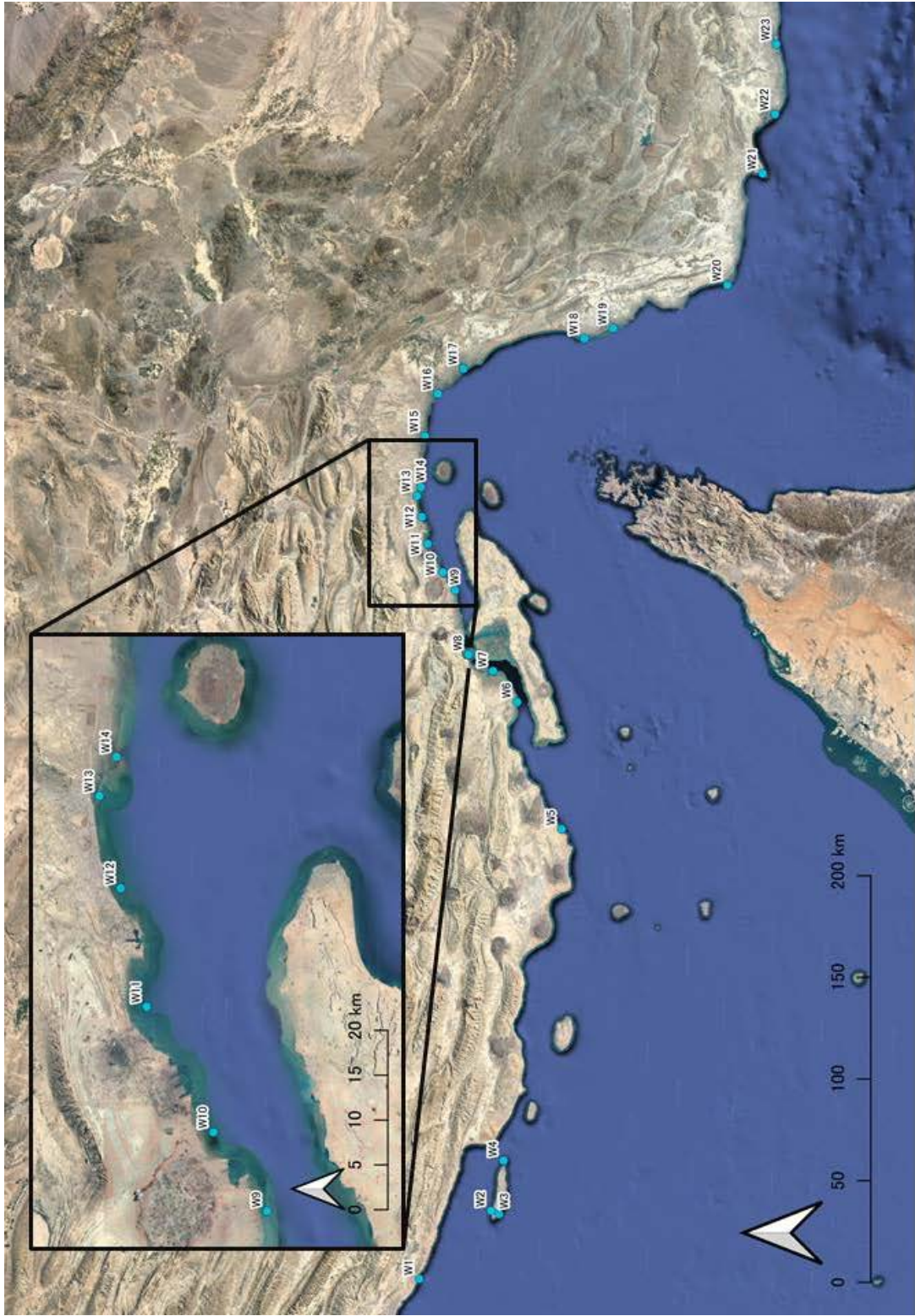
Site	Location		Rationale
	Latitude	Longitude	
W1	27°10'9.03"N	52°53'18.80"E	• Pollution risk will increase in the future due to SEZ development
W2	26°51'7.30"N	53°11'25.69"E	• Hotspot of coral and sea turtle
W3	26°49'2.95"N	53°10'31.51"E	• Hotspot of coral and sea turtle
W4	26°47'50.68"N	53°24'44.01"E	• Hotspot of coral and sea turtle • Inside protected area
W5	26°32'26.99"N	54°52'37.39"E	• Hotspot of seaweed • Near urban area (Bandar Lengeh)
W6	26°44'14.44"N	55°26'18.92"E	• Pollution risk will increase in the future due to shrimp farm development • Hotspot of tidal flat/mangrove and dolphins • Inside protected area
W7	26°50'37.28"N	55°34'33.26"E	• Hotspot of tidal flat/mangrove, birds and dolphins • Inside protected area
W8	26°57'5.14"N	55°38'54.53"E	• Hotspot of tidal flat/mangrove, seagrass and dolphins • Inside protected area
W9	27° 0'41.90"N	55°55'58.57"E	• High pollution risk area due to industrial park, desalination plant and shipbuilding yard • Hotspot of dolphins
W10	27° 3'54.75"N	56° 0'42.89"E	• Hotspot of seagrass
W11	27° 7'56.02"N	56° 8'16.15"E	• High pollution risk area due to heavy industry and port
W12	27° 9'29.56"N	56°15'23.65"E	• High pollution risk area due to urban wastewater
W13	27°10'46.31"N	56°20'56.59"E	• Near recreation zone • Hotspot of seagrass
W14	27° 9'45.03"N	56°23'17.91"E	• Hotspot of seagrass and birds
W15	27° 8'41.28"N	56°36'48.02"E	• Hotspot of tidal flat/mangrove, birds and dolphins
W16	27° 5'14.04"N	56°48'0.59"E	• High pollution risk area due to shrimp farm wastewater • Hotspot of tidal flat/mangrove, birds and dolphins
W17	26°58'25.01"N	56°54'42.71"E	• Pollution risk will increase in the future due to shrimp farm development • Hotspot of tidal flat/mangrove, birds and dolphins • Near urban area
W18	26°26'25.67"N	57° 2'41.13"E	• Pollution risk will increase in the future due to shrimp farm development • Hotspot of tidal flat/mangrove and birds
W19	26°18'47.48"N	57° 5'23.17"E	• Hotspot of tidal flat/mangrove and birds • Inside protected area
W20	25°48'31.07"N	57°16'49.89"E	• Pollution risk will increase in the future due to development of heavy industries
W21	25°39'14.04"N	57°46'26.56"E	• Pollution risk will increase in the future due to urban development and population growth
W22	25°35'56.07"N	58° 2'9.43"E	• Hotspot of tidal flat/mangrove and birds • Inside protected area • High pollution risk area due to shrimp farm wastewater
W23	25°35'35.80"N	58°20'42.83"E	• Hotspot of tidal flat/mangrove and birds • Inside protected area • High pollution risk area due to shrimp farm wastewater

Source: JICA Project Team

**Table 3.17.4 Locations of the proposed monitoring sites and rationale of site selection  
(wastewater)**

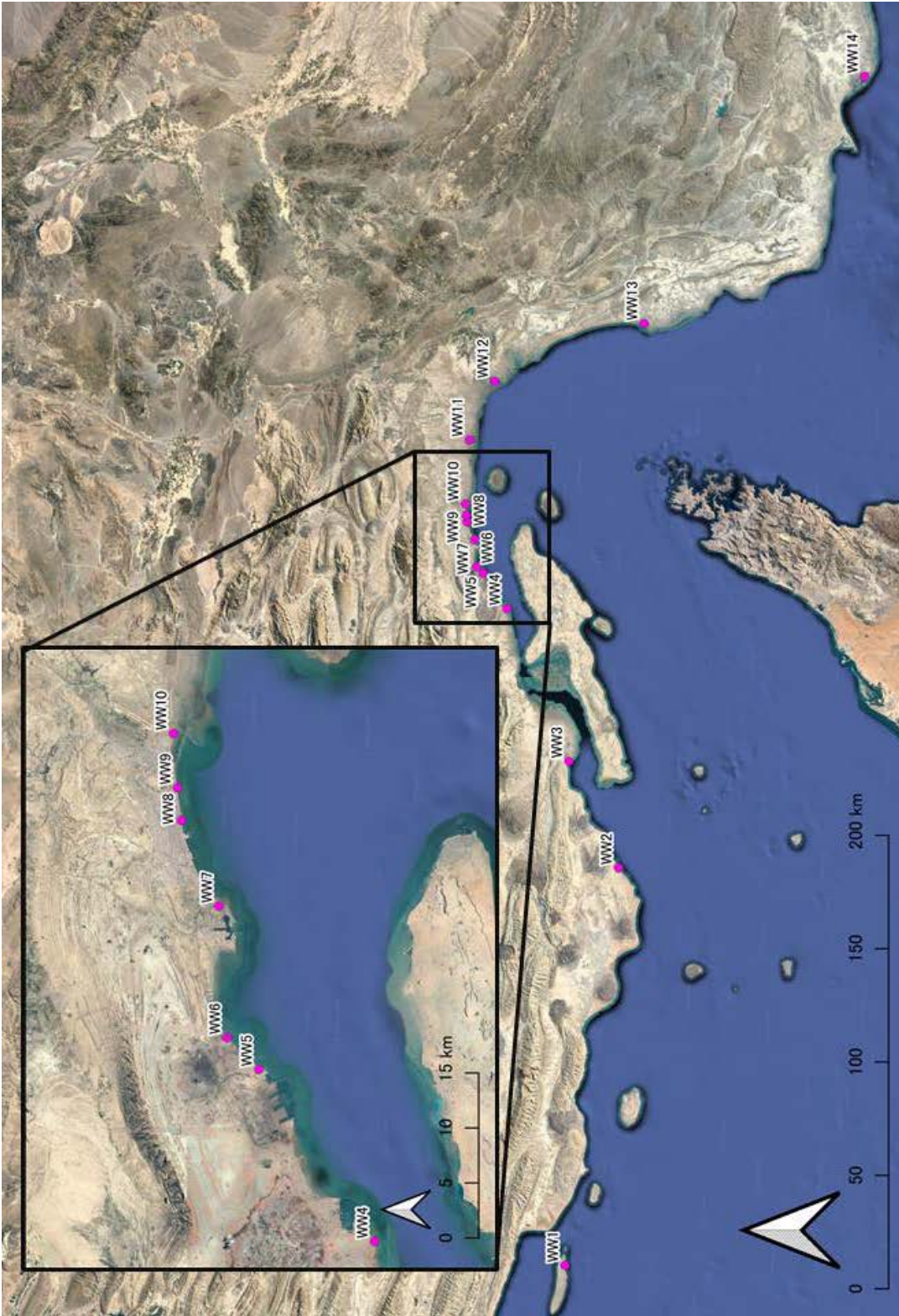
Site	Location		Rationale
	Latitude	Longitude	
WW1	26°47'30.74"N	53°20'46.77"E	Wastewater discharge site of oil refinery (high water temp. recorded in the pollution survey)
WW2	26°34'45.93"N	54°55'18.03"E	Wastewater discharge site of desalination plant (high salinity recorded in the pollution survey)
WW3	26°46'34.95"N	55°20'39.49"E	Wastewater discharge site of shrimp farm (high salinity and turbidity recorded in the pollution survey)
WW4	27° 1'18.53"N	55°56'56.46"E	Wastewater discharge site of industrial park and new desalination plant (high water temperature recorded in the pollution survey)
WW5	27° 6'58.70"N	56° 5'22.62"E	Wastewater discharge site of heavy industry area (high Cr <sup>+6</sup> recorded in the pollution survey)
WW6	27° 8'32.21"N	56° 6'56.48"E	Wastewater discharge site of power plant (high water temp. and TPH recorded in the pollution survey)
WW7	27° 8'55.76"N	56°13'22.99"E	Wastewater discharge site of urban sewage (high turbidity, COD and coliform bacteria recorded in the pollution survey)
WW8	27°10'45.44"N	56°17'35.31"E	Wastewater discharge site of urban sewage (high COD and coliform bacteria recorded in the pollution survey)
WW9	27°10'57.75"N	56°19'10.85"E	Wastewater discharge site of urban sewage (high coliform bacteria recorded in the pollution survey)
WW10	27°11'10.12"N	56°21'51.17"E	Wastewater discharge site of urban sewage (high coliform bacteria recorded in the pollution survey)
WW11	27°10'11.32"N	56°37'4.63"E	Wastewater discharge site of shrimp farm
WW12	27° 4'9.98"N	56°50'58.77"E	Wastewater discharge site of shrimp farm
WW13	26°28'42.30"N	57° 4'45.67"E	Wastewater discharge site of shrimp farm (high turbidity recorded in the pollution survey)
WW14	25°36'17.16"N	58° 3'31.71"E	Wastewater discharge site of shrimp farm (high salinity recorded in the pollution survey)

Source: JICA Project Team



**Figure 3.17.1** Location of the proposed monitoring sites (seawater and sediment)

Source: JICA Project Team



Source: JICA Project Team

Figure 3.17.2 Location of the proposed monitoring sites (wastewater)

### 3.17.3 Review of environmental standards

Action 4-1-1 of the M/P proposes to establish environmental and effluent discharge standards for coastal waters. Meantime, DOE is in the process of developing seawater quality standards for different water use categories namely: protected area, coral reef/mangrove, aquaculture, ecotourism, residential/agriculture/small-scale industry and port/industry. Following are issues that have been identified as per review of the draft standard:

- Currently, coral reef and mangrove are categorized within the same water use category. However, these ecosystems should be separated as they have different water quality requirements.
- It is not appropriate to apply a uniform water quality standard for all protected areas, as protected areas may be comprised from different ecosystem types and hence have different water quality requirements.
- Currently, the same turbidity standards are applied to all water use category. However, this is not appropriate as sensitivity to turbidity differ with ecosystem type (e.g. coral is more sensitive to turbidity compared to mangrove).

While there are various approaches for setting standards, the recommended approach will be to refer to existing standards of other countries. For future reference, the JICA Project Team prepared a comparison table of the water and sediment quality standards set by other countries, which is attached as Appendix 13.

### 3.17.4 Emergency contingency plans

#### (1) Oil spill

In case of oil spill incidents in Iranian waters, the government will respond in accordance to the National Oil Spill Contingency Plan (NOSCP). The NOSCP stipulates the responding agency in accordance to the scale of oil spill (e.g. spill volume and range) as shown in Table 3.17.5. Apart from small-scale spill, PMO is the main responding agency.

**Table 3.17.5 Responding agency in accordance to the scale of oil spill**

Scale of oil spill	Volume of oil spill	Range of oil spill	Responding agency
Tier 1 (small)	< 50 ton	Local level	Polluter
Tier 2 (medium)	50-500 ton	Regional level	Regional PMO
Tier 3 (large)	> 500 ton	International level	PMO with MEMAC* assistance

\*MEMAC (Marine Emergency Mutual Aid Centre): ROMPE organization tasked for oil spill response

Source: NOSCP

Under the NOSCP, working groups will be established consisting of relevant government organizations including DOE. The main responsibilities of DOE are impact assessment and monitoring of oil spills. Table 3.17.6 shows guidelines that are relevant to impact assessment of oil spills.

**Table 3.17.6 Guidelines relevant to impact assessment of oil spills.**

<b>Guideline</b>	<b>Publisher</b>	<b>Contents</b>
Guidelines on Biological Impacts of Oil Pollution (2008)	IPIECA	Explains short- and long-term biological effects of oil pollution.
Sensitivity Mapping for Oil Spill Response (2012)	IMO/IPIECA	Describes how to assess and develop oil spill sensitivity map

IPIECA: International Petroleum Industry Environmental Conservation Association

Source: JICA Project Team

In Hormozgan, oil spills from fishing boats and oil-smuggling vessels are an emerging issue, which in some cases have affected protected areas. Hence, oil spill response will be an important component to consider when developing management plan of protected areas as proposed in Action 3-1-8 of the M/P.

## **(2) Red tide and harmful algae bloom (HAB)**

While red tide/HAB is frequent in Hormozgan coastal area, the most damaging incident was by the bloom event of a dinoflagellate (*Cochlodinium polykrikoides*) during 2008-2009. The bloom devastated coastal marine ecosystems causing massive kills of marine organisms, and severely damaged aquaculture/fishing industries. To minimize risk of future damage, the M/P (Action 3-2-4) proposes to consider HAB warning system, which is a system to monitor, forecast and alert HAB occurrence to coastal users.

### **3.17.5 Side-scan sonar survey**

Habitat distribution is not well understood especially along the mainland subtidal areas where waters are often turbid, hence making surveys difficult with conventional approaches (e.g. satellite image analysis or diving surveys). As an alternative approach, the JICA Project Team planned to conduct side-scan sonar survey, which can detect and map subtidal habitats even under turbid conditions. Unfortunately, the survey was cancelled due to political unrest in the region. The JICA Project Team instead prepared manual/video instruction of the side-scan sonar survey, which can be referred for future implementation as proposed in Action 1-2 of the M/P (the manual/video is attached as Appendix 14). The manual/video explains the basic process involved in surveying and mapping underwater habitat using side-scan sonar.



## 4. ACTIVITIES OF OUTPUT 3

**Output 3: Sharing of knowledge and experience gained during the Project with other three southern coastal provinces of Iran and other stakeholders such as ROPME member states**

### 4.1 Master Plan formulation guideline

As per Action 5-1 of the M/P, DOE is planning to formulate M/P for the other coastal provinces. Based on the knowledge and experiences acquired through the formulation of Hormozgan M/P, the JICA Project Team prepared “Master Plan Formulation Guideline”, which is intended to be used by experts of DOE and relevant organizations of the other provinces in the process of preparing their respective M/P (the guideline is attached as Appendix 15).

The guideline explains the formulation process through eight basic steps, and provides examples from the Hormozgan M/P. The guideline also introduces other guidelines useful for the M/P formulation.

### 4.2 Knowledge sharing plan

#### 4.2.1 Objective

The knowledge acquired through the M/P formulation and future implementation will be shared continuously with stakeholders of other provinces and ROPME members. A knowledge sharing plan was prepared focusing on sharing the M/P formulation method and implementation outputs.

In order to formulate the M/P of the other provinces, it is important to gain the understanding and cooperation of the local community and stakeholder organizations. Knowledge sharing is therefore targeted for multiple stakeholders including local community, companies and provincial government. The implementation outputs of the Hormozgan M/P will also be shared so that stakeholders can actually see the benefits of the M/P.

ROPME is in the process of developing Ecosystem Based Management Strategy (EBM Strategy) for the ROPME sea area. Knowledge sharing will therefore focus mainly on information that are useful for the formulation and implementation of EBM Strategy (e.g. Zoning plan of the Hormozgan M/P).

#### 4.2.2 Knowledge sharing plan and implementation structure

Table 4.2.1 shows the knowledge sharing plan and its implementation structure. The knowledge sharing plan should be implemented in coordination with the awareness raising activities planned under Action 3-3 and 5-2. Although the Marine Environment and Wetland Deputy of DOE HQ will be the main implementation body, resources of other DOE departments (e.g. environmental education and public relation) should also be utilized to enhance the effectiveness of knowledge sharing activities.

**Table 4.2.1 Knowledge sharing plan of M/P formulation and implementation**

Objective	Target	Contents	Implementation body (DOE)	Implementation period	Approx. cost (USD)
Sharing of M/P formulation method	DOE/organizations of other provinces	<ul style="list-style-type: none"> <li>Posting of M/P formulation guideline on DOE website</li> <li>Sharing of M/P formulation method through holding of workshops</li> </ul>	Marine Environment and Wetland Deputy	2021-2022	10,000 (cost of workshop)
	ROPME members	<ul style="list-style-type: none"> <li>Sharing of M/P formulation method during ROPME seminars and workshops</li> </ul>	Marine Environment and Wetland Deputy	2021-	-
Sharing of M/P implementation outputs	DOE/organizations of other provinces	<ul style="list-style-type: none"> <li>Posting of annual report of M/P activities on DOE website</li> <li>Holding of seminars (every 2 years)</li> </ul>	Marine Environment and Wetland Deputy	2022-	-
	Companies of Hormozgan and other provinces	<ul style="list-style-type: none"> <li>Distribution of brochures with main focus on pollution control (every 2 years)</li> <li>Invitation to seminars</li> </ul>	<ul style="list-style-type: none"> <li>Marine Environment and Wetland Deputy</li> <li>DOE Hormozgan</li> </ul>	2022-	5,000 (cost of brochure)
	Local community of Hormozgan and other provinces	<ul style="list-style-type: none"> <li>Posting of annual report (for general public) of M/P activities on DOE website</li> <li>Invitation to seminars</li> <li>Distribution of brochures to local government, religious institution and NGOs (every 2 years)</li> <li>Dissemination through media (e.g. newspaper, TV)</li> </ul>	<ul style="list-style-type: none"> <li>Marine Environment and Wetland Deputy</li> <li>DOE Hormozgan</li> </ul>	2022-	5,000 (cost of brochure)
	ROPME members	<ul style="list-style-type: none"> <li>Dissemination through ROPME seminars and workshops</li> <li>Dissemination through international conferences such as CBD and Ramsar Convention</li> </ul>	Marine Environment and Wetland Deputy	2022-	10,000 (cost of participation)

Source: JICA Project Team

### 4.3 Knowledge sharing seminar

A seminar/workshop was planned to be held for sharing the knowledge acquired through the M/P formulation with DOE and stakeholders of other provinces. However, the seminar/workshop were not held due to Corona-related travel restrictions. Instead, the JICA Project Team prepared training program and materials for M/P formulation, which can be used by the C/P in future seminar/workshop (training materials are attached as Appendix 16). The training program is planned for 3 days. Table 4.3.1 shows the main contents of the training program.

**Table 4.3.1 Training program for M/P formulation**

	<b>Contents</b>
Day 1	<ul style="list-style-type: none"><li>➤ To learn the general process of M/P formulation</li><li>➤ To learn pre-planning activities required for the M/P formulation</li><li>➤ To analyze the stakeholders of M/P formulation</li><li>➤ To analyze the environmental issues in the province</li></ul>
Day 2	<ul style="list-style-type: none"><li>➤ To learn the general process of risk assessment and spatial zoning</li><li>➤ To learn the general process of developing action plan</li><li>➤ To learn the necessary activities and organizational framework for M/P implementation</li><li>➤ To discuss issues for M/P formulation in the province</li></ul>
Day 3	<ul style="list-style-type: none"><li>➤ To learn initiatives of other countries in relation to ecosystem conservation and pollution control</li></ul>

Source: JICA Project Team

### 4.4 Dissemination at international conferences

The outputs of this Project were planned to be disseminated at international conferences (e.g. CBD and Ramsar), but were not possible due to Corona-related travel restrictions. Instead, the JICA Project Team prepared dissemination materials (posters and brochure), which can be used by the C/P in future conferences (the dissemination materials are attached as Appendix 17).

## 5. ACTIVITIES OF OUTPUT 4

<b>Output 4: Recommendation of measures to improve existing environmental regulatory and policy framework.</b>
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This Chapter reviews and analyzes the gaps of existing environmental legislations and institutions, and provides recommendations for improvement from the perspective of implementing coastal environmental conservation.

### 5.1 Iran's legal system

The structure of Iran's legal system is similar to most countries consisting of the constitution, laws, decrees, orders and so on. However, Iran's legal system is unique in respect that laws must be in accordance with the Islamic law. Any bills that are passed by the Parliament are scrutinized by the Guardian Council, which consists of religious scholars appointed by the Supreme Leader and jurists introduced by the Head of Judiciary. In case of conflict between the Guardian Council and the Parliament, the Expediency Council is vested with the responsibility for resolving the conflict, which its members are appointed by the Supreme Leader.

### 5.2 Environmental legislations and institutions

#### 5.2.1 Evolvement of Iranian environmental policy

Environmental conservation started to become an issue in Iran in the 1950s from concerns on extinction of wildlife by over-hunting. In 1956, the Hunting Centre was established to supervise and conserve important habitats and control hunting. In 1967, the Act of Hunting and Fishing was enacted, establishing DOE and Supreme Council of Environment (SOE) in 1971. In 1974, the Act of Environmental Protection and Improvement (AEPI) was enacted, which is the fundamental law on environmental conservation. After the Islamic revolution, the Constitution was amended in 1979, in which Article 50 lays out the basic principal behind environmental conservation. Other environmental acts have been enacted since then such as laws on water pollution control, waste management and wetland conservation. The Supreme Leader announced in 2015, 15 general policies on environmental conservation, which are the guiding principal on recent environmental policy making.

#### 5.2.2 Legislative framework

Environmental legislations related to coastal environmental conservation are outlined below (unofficial English translation of Iranian laws are attached as Appendix 18):

##### (1) Constitution

Article 50 of the Constitution prohibits all activities that may result in irreparable damage to the environment. It is the fundamental legal statement concerning the protection of the environment.

## **(2) Environmental conservation**

The Act of Environmental Protection and Improvement (1974, amended in 1992) is the main law for environmental conservation. It stipulates the responsibilities of DOE and SCE in relation to pollution control, protected areas, environmental education and so on. Detailed rules are stipulated under Regulations for Environmental Protection and Improvement (1976), which for example includes regulations for protected areas.

## **(3) Territorial water and coastal area**

The Act on the Marine Areas of the Islamic Republic of Iran in the Persian Gulf and the Gulf of Oman (1993) stipulates the territorial waters of Iran. The breadth of the territorial sea is 12 nautical miles measured from the baseline. The baseline of Persian Gulf and the Gulf of Oman is stipulated in Decree No. 2/250-67 (1973).

Article 2 of the Act for Emerged and Coastal Land (1975) defines the width of the coastal area of the Persian Gulf and the Gulf of Oman, which is 2 km inland from the highest tide line. Article 2 of the act also defines the width of coastal strip which is 60 m inland from the highest tide line. The coastal strip is state land, and individuals do not have the right to own these areas.

## **(4) Water pollution control**

Article 9 of the AEPI prohibits any action causing environmental pollution. The Fair Water Distribution Law (1983), stipulates types of pollution sources and obligations of businesses on water pollution control and treatment. The Regulations on Water Pollution Prevention (1994) stipulates important water pollution control measures such as establishment of water quality standards (Article 5), implementation of inspection (Article 10) and penalties against polluters (Article 22). Note that water quality standards are not yet established for seawater.

According to Regulation for Self-monitoring for Environmental Pollution (2015), prescribed factories are required to self-monitor their wastewater and report the results to DOE.

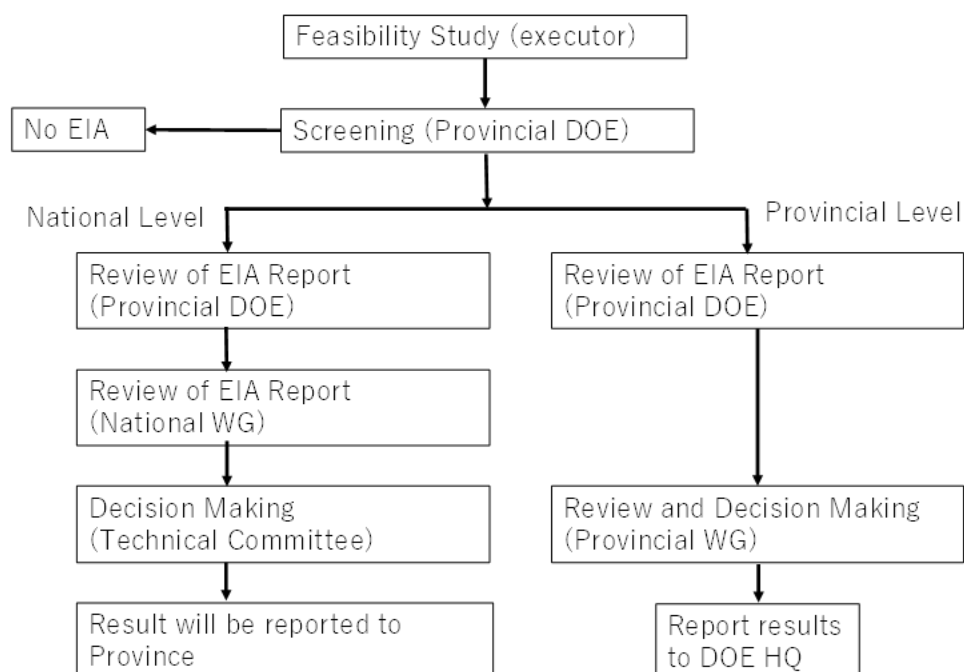
## **(5) Environmental impact assessment (EIA)**

Currently there is no EIA specific law, and instead, the principal legal basis of EIA is the 5-year National Development Plan (5NDP). EIA was initially stipulated under Article 82 of the 2<sup>nd</sup> 5NDP, and subsequently EIA procedure was formulated in the same year through Decree 138 (12/04/1994). As per Decree 138, DOE has jurisdiction over EIA, under the supervision of the SCE. The EIA system has been subject to several modifications in accordance to subsequent 5NDPs. Table 5.2.1 shows EIA related regulations set under the 5<sup>th</sup> 5NDP. Figure 5.2.1 shows the EIA procedure.

**Table 5.2.1 EIA regulations set under the 5<sup>th</sup> 5NDP**

Regulation	Content
SCE decision (No.214287/T45880, 20/7/1390)	<ul style="list-style-type: none"> <li>• Prescribes projects subject to EIA (51 projects)</li> <li>• Structure of EIA report is stipulated</li> </ul>
Cabinet decision (3/11/1390)	<ul style="list-style-type: none"> <li>• EIA procedure is stipulated</li> </ul>
Cabinet decision (Decree No.75609/5102, 11/6/1394)	<ul style="list-style-type: none"> <li>• Prescribes projects subject to evaluation by provincial environmental departments</li> </ul>
Cabinet decision (15/4/1395)	<ul style="list-style-type: none"> <li>• Amendment of EIA working group member</li> <li>• Amendment of evaluation period of EIA working group</li> <li>• The roles of executor on the implementation of the EIA report is specified</li> </ul>
Cabinet decision (24/12/1395)	<ul style="list-style-type: none"> <li>• Amendment of screening criteria</li> <li>• Five projects subject to EIA is added (total 56 projects)</li> </ul>

Source: JICA Project Team



Source: JICA Project Team

**Figure 5.2.1 EIA procedure in Iran**

## (6) Strategic environmental assessment (SEA)

The necessity of SEA was first stipulated in Article 184 of the 5<sup>th</sup> 5NDP and SEA regulation was subsequently established in 2012. As per the regulation, SCE will determine the projects subject to SEA. The 6<sup>th</sup> 5NDP (Article 38) also stipulates the necessity of SEA for policies and development programs.

## (7) Protected area

As per Article 3 of the AEPI, the SCE has the authority to designate areas for conservation within the four conservation categories namely: National Park, Natural Monument, Wildlife Refuge and Protected

Area. Table 5.2.2 describes the objective and regulations set for each category as stipulated under the Regulations of AEPI.

**Table 5.2.2 Objectives and regulations of protected areas**

Protected area	Objective	Regulations
National Park	Conservation of outstanding natural environment and flora/fauna.	<ul style="list-style-type: none"> <li>- Prohibition of hunting</li> <li>- Prohibition of activities that causes damage to vegetation and ecosystem such as animal grazing, tree cutting, plant collection.</li> <li>- Prohibition of renewal or extension of exploration and exploitation licenses for mining.</li> <li>- Entry into the areas with exception of public roads is subject to the permission of DOE.</li> <li>- Educational and research activities and ecotourism are allowed subject to the permission of DOE.</li> </ul>
Natural Monument	Conservation of rare flora/fauna, exceptional landscape, old trees etc.	<ul style="list-style-type: none"> <li>- Prohibition of activities that causes damage to vegetation and ecosystem such as animal grazing, tree cutting, plant collection.</li> <li>- Prohibition of renewal or extension of exploration and exploitation licenses for mining.</li> <li>- Entry into the areas with exception of public roads is subject to the permission of DOE.</li> <li>- Sustainable non-commercial activities are allowed</li> </ul>
Wildlife Refuge	Conservation and restoration of wildlife habitats	<ul style="list-style-type: none"> <li>- Entry into the areas with exception of public roads is subject to the permission of DOE.</li> <li>- Prohibition of activities that causes damage to vegetation and ecosystem such as animal grazing, tree cutting, plant collection.</li> <li>- Controlled tourism is allowed providing that it is compatible with conservation objectives.</li> </ul> <p>*: Authorized industrial and mining projects are exempted from the provisions.            *: Livestock grazing is allowed subject to the provisions forest department.            *: Livestock grazing without a license is prohibited.            *: Hunting and fishing require license from DOE.</p>
Protected Area	Conservation and restoration of flora and fauna	Similar to Wildlife Refuge. However, certain level of tourism and economic activities are permitted under the comprehensive management plan of the region.

Source: Regulation of the Act of Environmental Protection and Improvement

## **(8) Wildlife protection**

The Act of Hunting and Fishing (1967, amended in 1996) is the main law related to wildlife protection. As per Article 3, SCE is responsible for designation of protected species. Fines will be charged in case of damage to protected species. For coastal species, marine mammals, sea turtles, sharks, birds and corals are protected under the Act.

## **(9) Fisheries and aquaculture**

The Act of Protection and Exploitation of Fisheries Resources (1995) is the main law related to fisheries and aquaculture. Iran Fishery Organization (IFO) is the main management authority, and its responsibilities are stipulated under Article 3 of the Act, which among others include research, resource

management, improvement of habitats, fisheries promotion and issuing of licenses for fisheries and aquaculture operation. Industrial fishery is prohibited in coastal waters as per Article 10 of the Act.

#### **(10) Waste management**

The basic law for waste management is the Act of Waste Management (2004). The Act stipulates waste types, organizational responsibilities, penalties on offences and so on. As per Article 2, waste is categorized into five types: 1) general waste, 2) medical waste, 3) special waste<sup>5</sup>, 4) agricultural waste and 5) industrial waste. Municipalities and rural government bodies are responsible for waste management of its jurisdiction apart from industrial and special waste. As per Article 11, DOE is one of the regulatory organizations and is responsible for supervision and developing standards for waste management. As per Article 12, the Ministry of Interior is responsible for developing waste disposal sites.

The Regulations for Waste Management (2004) stipulates the organizational responsibilities for waste management, rules on extended producer responsibility and so on. As per Article 35 of the Regulation, ship garbage and dredged material are subject to the provisions of respective international conventions (i.e. MARPOL and London Protocol).

#### **(11) Wetland conservation**

The Act for Protection, Recovery and Management of Wetlands (2017) prohibits any activities which leads to irreversible degradation and pollution of wetlands. The Act prohibits transferring invasive fauna/flora to wetlands, which is designated by DOE. A total of 14 species are currently designated but most are inland species.

The Regulation for Non-recoverable Pollution and Degradation of Wetlands (2017) stipulates the establishment of National Headquarter for Coordination and Management of Wetlands, which determines necessary wetland conservation activities.

#### **(12) International conventions**

Table 5.2.3 lists the international conventions ratified by Iran in relation to coastal environmental conservation.

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<sup>5</sup> Wastes requiring special handling due to containing at least one of the following hazardous properties: poisonous, pathogenesis, explosiveness, inflammability or corrosiveness.



**Table 5.2.3 International conventions related to coastal environmental conservation**

<b>Convention</b>	<b>Outline</b>	<b>Year of ratification</b>
Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution	The Convention aims to protect the marine environment from pollution. ROPME was established under the Convention. Four protocols are established under the convention in relation to pollution prevention from oil, exploration/exploitation of continental shelf, land-based sources and hazardous wastes. Protocol concerning the conservation of biological diversity and establishment of protected areas is currently under consideration.	1978
Ramsar Convention	The aim of the Convention is the conservation and wise use of wetlands. There are 25 Ramsar sites in Iran, in which four are located in Hormozgan coastal area. Although the Convention recommends to prepare management plan for each wetland, currently there is no authorized plan in Hormozgan.	1975
Convention on Biological Diversity	The UN Convention aims to protect biodiversity from the perspective of species, genetics and ecosystem. Member countries are required to prepare and implement National Biodiversity Strategy and Action Plan (NBSAP). Iran has developed NBSAP covering the period between 2016-2030.	1996
MARPOL Convention	The IMO Convention aims to prevent pollution from ships, both accidental and from routine operations. It consists of six annexes which regulates pollution from oil (Annex I), noxious liquid substances (Annex II), harmful substances (Annex III), sewage (Annex IV), garbage (Annex V) and emissions (Annex VI). The Persian Gulf is designated as “Special Area”, where higher level of protection is applied than other sea areas.	Annex I, II, V: 2002 Annex III, IV, VI: 2009
1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	The IMO Protocol aims to prevent marine pollution from dumping of waste. The Protocol prohibits the dumping of any wastes or other matter with the exception of those listed in its Annex such as dredged material and sewage sludge. However, dumping of such wastes should be only permitted under strict compliance with the provisions of the Protocol. While DOE is the authorizing agency in Iran, the permit system is not yet officially established.	2015
Ballast Water Management Convention	The IMO Convention aims to minimize transfer of harmful aquatic organisms and pathogens through control and management of ships’ ballast water. The Convention requires all ships to implement a ballast water management plan. ROPME through a circular (MEPC59/INF.3) has required all vessels entering the ROPME Sea Area (RSA) to exchange their ballast waters en route at a distance of at least 200 nautical miles from the nearest land and a depth of at least 200 meters.	2011
International Convention on the Control of Harmful Anti-Fouling Systems on Ships	The IMO Convention aims to regulate the use of harmful anti-fouling systems on ships. It prohibits the use of organotin compounds in anti-fouling paints.	2011
International Convention on Oil Pollution Preparedness, Response and Co-operation	The IMO Convention aims to establish measures for dealing with pollution incidents. In Iran, PMO is the main authority to respond against oil spill incidents.	1998
Convention on the International Trade in Endangered Species of Wild Flora and Fauna	The Convention regulates international trade of wild animals and plants. In Iran, penalties are applied to violators under the Hunting and Fishing Act.	1976

Source: JICA Project Team

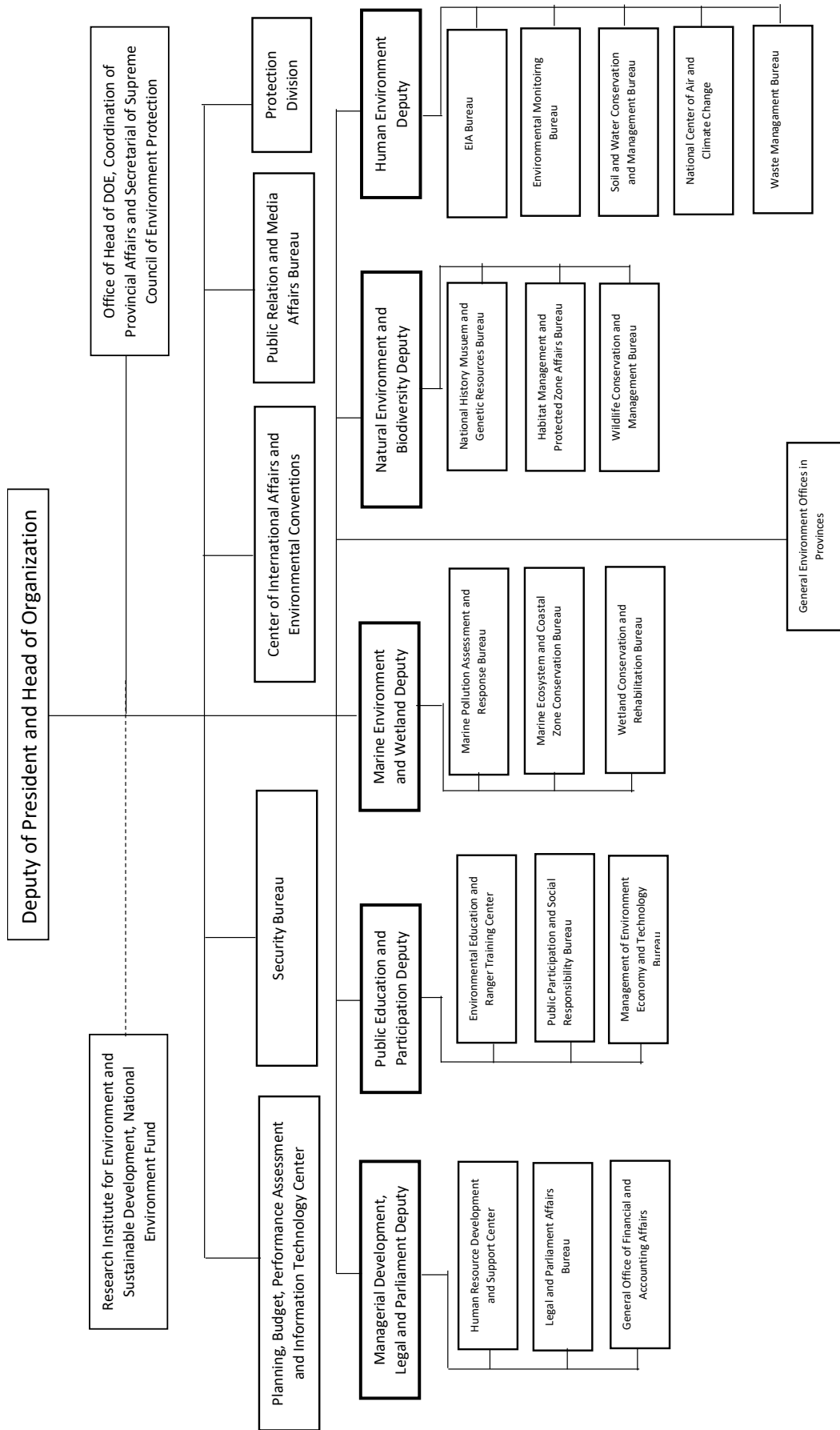
### **5.2.3 Institutional framework**

Following are brief descriptions of the institutions related to coastal environmental conservation:

#### **(1) DOE**

DOE was established in 1971 under the Presidential Office headed by the Deputy of President. DOE is responsible for environmental policy formulations and their implementation such as protected area management, environmental conservation and improvement, wildlife protection, pollution control and so on.

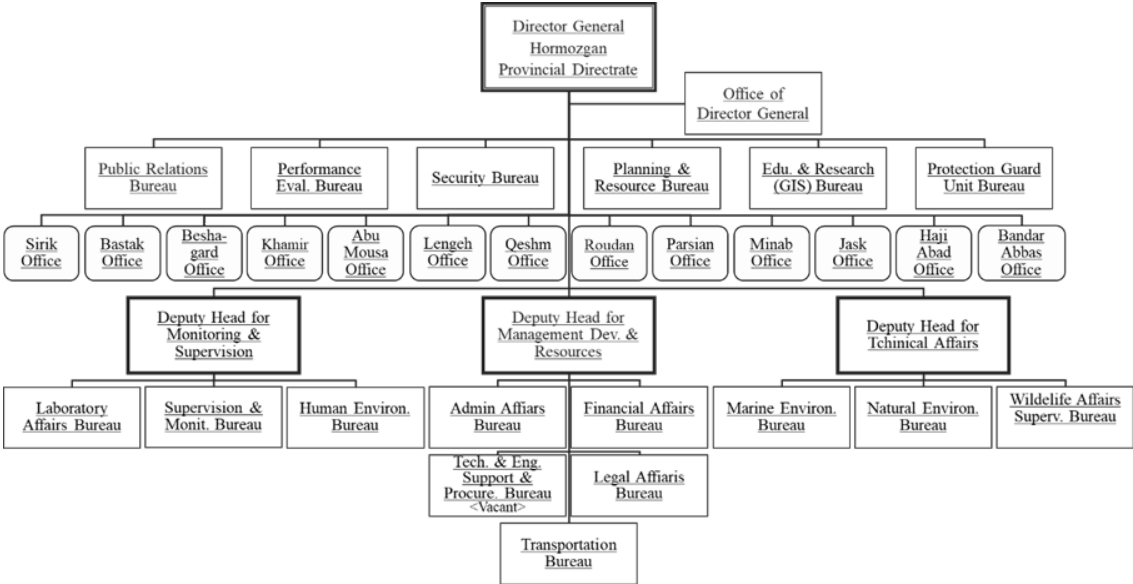
DOE HQ consists of five executive deputy departments. Deputy of Marine Environment and Wetland is the main Deputy responsible for coastal environmental conservation and management. Figure 5.2.2 shows the organizational structure of DOE HQ.



Source: JICA Project Team

**Figure 5.2.2 Organizational structure of DOE HQ**

DOE has offices in each province, in which they implement provincial level activities under the supervision of the HQ. DOE Hormozgan has three executive deputy departments. Unlike DOE HQ, in DOE Hormozgan there is no department dedicated to coastal area conservation and management, and responsibilities are shared between different deputy departments. There are also regional offices in each provincial district and they for example patrol protected areas. In Hormozgan, there are two DOE laboratories but their analysis capacity is limited. Figure 5.2.3 shows the organizational structure of DOE Hormozgan.



Source: JICA Project Team

**Figure 5.2.3 Organizational structure of DOE Hormozgan**

**(2) Supreme Council of Environment (SCE)**

SCE is the country's highest decision-making body on environmental matters. SCE is headed by the President and consists of the following members: Head of DOE; Ministers of MOJA, MIMT, MRUD, MOHME; Head of PBO; and four authorities recommended by the Head of DOE.

**(3) Planning and Budget Organization (PBO)**

PBO is responsible for strategic planning of the country's development and preparation of national budget. PBO also has offices in each province. PBO Hormozgan prepared Spatial Master Plan of Hormozgan Province (target year: 2036).

**(4) Other government organizations**

Table 5.2.4 lists other government organizations their main responsibilities.

**Table 5.2.4 Lists other government organizations their main responsibilities**

<b>Organization</b>	<b>Main responsibilities</b>
Ministry of Agriculture-Jihad (MOJA)	Responsible for management and development of rural areas, primary industries such as agriculture and fisheries, and preservation of land and watershed.
Iranian Fishery Organization (IFO)	It is a subsidiary body of MOJA. It is responsible for management and promotion of fisheries and aquaculture, and preservation and research of fishery resources. IFO has plans for large-scale development of mariculture in Hormozgan.
Natural Resources and Watershed Management General Office (NRWGO)	It is a subsidiary body of MOJA. It is responsible for management of forest and watershed, preservation of soil and natural resources. They conduct mangrove plantation in Hormozgan.
Ministry of Industry, Mine and Trade (MIMT)	Responsible for development of industrial and mining sectors. It issues permits for industry and mining operation.
Ministry of Energy (MOE)	Responsible for supply of water, electricity, energy, wastewater treatment, protection of natural resources and promotion of public health. Hormozgan Regional Water Company, a subsidiary of MOE, supplies domestic water in Hormozgan.
Iranian Cultural Heritage, Handicrafts and Tourism Organization (ICHHTO)	Responsible for preservation and promotion of cultural heritage, tourism and handicrafts. They developed National Strategy for Development of Nature-based Tourism in Iran (2014), which promotes ecotourism with local community participation.
Ministry of Science, Research and Technology (MOSRT)	Supports universities and research institutes for basic and applied research. Iranian National Institute for Oceanography and Atmospheric Science (INIOAS) was established in 2013 under the support of MOSRT, which conducts oceanographic research in Persian Gulf.
Ministry of Petroleum (MOP)	Responsible for developing oil and gas reserves and management of oil and gas industries. There are four public corporations under MOP, which operates in the field of extraction and refining and petrochemical production.
Ministry of Roads and Urban Development (MRUD)	Responsible for transport and urban development and urban planning. It developed Makran Region Development Master Plan covering the period up to 2031.
Ports and Maritime Organization (PMO)	It is a subsidiary body of MOJA. It is responsible for management of port and maritime sector and prevention of pollution from ships. It developed Integrated Coastal Zone Management Plan for the Hormozgan province.

Source: JICA Project Team

### **(5) Local government**

The local government system of Iran comprises of five administrative division, namely, province, county, district, rural district and village. A capital city is designated for each county. Each administrative division has a Council, which supervises their regional activities under national policies. Council members are locally elected based on the Law on the Organization, Duties and Elections of Islamic Councils of the Country.

The Act of Permanent Decree of National Development stipulates the power of the provincial government. Within the provincial government, the Planning and Development Council develops various policies for the province. In Hormozgan, the Planning and Development Council consists of four committees. The “Infrastructure, Land Use Planning and Environment Committee”, is mainly responsible for environmental matters.

## (6) Research institute and university

In Hormozgan Province, the Persian Gulf and the Oman Sea Research Institute (PGOSERI) is the main research institute related to marine environment and it is established under IFO. Hormozgan University and Islamic Azad University also conducts researches in the field of marine environment.

## (7) NGO

Table 5.2.5 is a list of environmental NGOs active in Hormozgan Province.

**Table 5.2.5 Environmental NGOs in Hormozgan Province**

NGO	Activities
Hormozgan Friendly New Idea	Mainly active in the field of sea turtle conservation such as protection of eggs and public awareness.
Mashgh Afarinesh	Main activities are mangrove plantation and public awareness.
Preservation for Sea Mammal	Main activities are conservation of marine mammals and coral reefs.
Hefazat az Sangfarshhaye Marjani	Main activities are conservation of marine mammals and coral reefs.

Source: JICA Project Team

## 5.3 Gap analysis and recommendations

Following provides the results of gap analysis of the existing environmental legislations and institutions and recommendations for improvement, which is based on extensive discussions at the WG meeting.

### 5.3.1 Legislations

#### (1) The Act of Environmental Protection and Improvement

##### Gaps

The Act nor the Regulation often do not provide detailed provisions on the actual approaches and methods to achieve environmental conservation, especially in regards to ecosystem. Therefore, coastal ecosystem is often not conserved and managed in a systematic manner. For example, it is common to implement ecosystem conservation under a management plan, but the act does not have such provisions. The Act also does not include provisions for ecosystem monitoring which is a fundamental requirement for ecosystem conservation.

##### Recommendation

The following improvements are recommended to enhance coastal environmental conservation:

- The act should have provisions to develop management plans for important ecosystems and species.
- The act should have provisions to implement ecosystem monitoring.

Actions 3-1 and 3-2 of the M/P proposes to develop management plan and implement ecosystem monitoring. To ensure their implementation, amendment of the act is desirable.

## **(2) The Act for Hunting and Fishing**

### **Gap**

As per Article 29 of the Act, this Act does not apply to fishing in waters of the Persian Gulf/Gulf of Oman. Instead fishing in the Persian Gulf/Gulf of Oman is controlled under other relevant fisheries acts. This implies that the list of protected species and their damage fines set under Article 3 of the Act do not apply to fishermen in Persian Gulf/Gulf of Oman, despite fishermen being one of the major threats to the listed species.

### **Recommendation**

In order for the Act to be more effective in achieving its objective, it is recommended to apply the damage fines for protected species to all commercial fishermen including those operating in Persian Gulf/Gulf of Oman. However, important fisheries resources (e.g. commercial shark species) may be exempted providing that they are fished under approved resource management plan. The list of protected species should be updated regularly based on IUCN Red List and latest researches.

## **(3) The Act for Conservation, Restoration and Management of the Country's Wetlands (2017)**

### **Gap**

As per Article 4 of the Act, entities who damage wetlands, will be subject to a fine in accordance to the degree of damage done. While the amount of fine will be determined by the court, DOE will initially estimate the damage based on the method and rates set in the Regulation. However, the method/rates are set basically based on physical damage and does consider damage to the ecosystem as a whole. Article 4 of the Act also requires entities who damage wetlands to “compensate” the damage. However, the act does not specifically state the definition of “compensation”, which can be a source of confusion and dispute with the violator. The list of invasive species prescribed under the Act does not include coastal species.

### **Recommendation**

To enable appropriate assessment of wetland damage, it is recommended to develop a guideline for wetland damage assessment taking into consideration ecosystem damage. The act should also clearly state the definition of “compensation”, and subsequently develop a guideline for wetland compensation methods. Development of these guidelines are proposed under Action 3-1-12 of the M/P.

Coastal species should be added to the list of invasive species, which are proposed under Action 3-1-11 of the M/P.

## **(4) EIA**

### **Gap**

Currently EIA is practiced based on the decrees and cabinet decisions made under the 5NDP. Following are some of the main issues of current EIA system:

- The current EIA legislation is insufficient against EIA offenders as there are no clear sanctions and penalties for any deficiencies by developers. Accordingly, many projects have commenced without EIA approval.
- There are deficiencies in screening and scoping, public participation, alternative consideration, and EIA audit.
- Some high-risk projects are missing from the list of projects that are subject to EIA such as sea dredging/dumping, ship recycling yard and urban development.
- There is no requirement to publish decisions concerning EIA.

Although an EIA bill was submitted to the parliament in 2015, it was withdrawn due to concerns that it will hinder development.

### **Recommendation**

For effective implementation of EIA, it is desirable to establish an EIA specific law that is in line with international standards. For this it is important to gain the understanding of developers that EIA is an effective tool for achieving sustainable development, and is not necessarily to halt development. Improvement of the EIA system is proposed under Action 2-1 of the M/P.

### **(5) The Act of Fair Water Distribution (1983)**

#### **Gap**

As per Article 5 of the Regulation, DOE is responsible for developing water quality standards. Although standards have been developed for inland waters, there are no water quality and discharge standards for coastal waters yet.

### **Recommendation**

To improve pollution control of the coastal area, standards for seawater and wastewater discharge should be urgently established. Sediment quality standards should also be established, which is a good indicator of pollution. Sampling and analysis methods should also be standardized. These activities are proposed under Action 4-1 of the M/P.

### **(6) 5-year National Development Plan (5NDP)**

#### **Gap**

Article 38 of the 6<sup>th</sup> 5NDP (2017-2021) focuses on environmental conservation which among others include SEA/EIA implementation, wetland conservation, integrated waste management, wastewater treatment and forest management. The Article however does not mention conservation of coastal environment.

### **Recommendation**

The coastal environment will be under increasing threat from rapid economic development. NBSAP aims to sustainably manage coastal ecosystem and designate 5% of the marine/coastal area as protected



area by 2030. The M/P is also planned in line with NBSAP goals. In order to realize these NBSAP and M/P goals, it is recommended to incorporate as a national policy “comprehensive coastal environmental conservation” into the 7<sup>th</sup> 5NDP.

### **5.3.2 Institutions**

#### **(1) General**

##### **Gap**

In order to effectively conserve the coastal environment, it is important that relevant stakeholders and government organizations are comprehensively involved and cooperate throughout the process. However, realizing such unified cooperation is not straight forward as government organizations are often highly sectionalized and hence tend to focus on their own interests only.

##### **Recommendation**

Conservation of coastal environment should preferably be planned and implemented by local stakeholders as they are usually the ones that are most knowledgeable and aware of the local situation. Implementation of the various M/P actions will involve various tasks such as coordination, consensus building, budgeting and planning. Considering such challenges, it is recommended to establish under the current provincial institutional framework a new organization specifically tasked to plan and implement the M/P actions.

#### **(2) DOE**

##### **Gap**

While DOE will play a central role in the implementation of the M/P actions, their current institutional capacity is limited. For example, DOE Hormozgan currently does not have a specialized department for coastal environmental conservation, and also have limited equipment and human resources. This is mainly because coastal conservation works were relatively limited in the past. The Deputy of Marine Environment and Wetland of DOE HQ may also face some difficulties in committing sufficient number of staffs for the M/P implementation, as the department has limited human resource and will have other national commitments.

##### **Recommendation**

In order to effectively implement the M/P, it is necessary to strengthen the institutional capacity of DOE. On the other hand, the current policy of the Iranian government is to gradually downsize the government through for example enhancement of private sector outsourcing. Therefore, institutional capacity building should first focus on strengthening the capacity of existing DOE staff. However, this approach may not be enough considering that various new activities are planned in the M/P. Hence options for recruiting new coastal environment experts should also be considered. Procurement of survey and lab equipment will also be necessary to implement the monitoring and inspection activities proposed in the M/P.

## **6. COMMON ACTIVITIES**

### **6.1 Database**

A GIS database was developed which stores the data/information collected through the Project. Table 6.1.1 shows the structure of the database. The entire database is stored inside DVD-2.

**Table 6.1.1 Structure of GIS database**

	Category	Sub-category	Data type	Data fields
Ecosystem	Protected area	Protected area_National	Polygon	Name, Designation year, Designation category, Area (sqkm)
		Ramsar sites	Polygon	Name, Designation year, Area (sqkm)
		Geopark sites	Polygon	Name, Designation year, Area (sqkm)
		IBA sites	Polygon	Name, Area (sqkm), IBA criteria
	Habitat map	Habitat_Distribution_Composite	Polygon	IEA name, Habitat Type, Area (sqkm)
		Hotspot_Composite	Polygon	-
	Coral	Coral_Survey_winter	Point	Study_site_ID, Study date, Temp (C), Depth (m), Substratum type, Live coral coverage (%), Dead coral coverage (%), No. of coral species, No. of fish spp., No. of benthos spp.
		Coral_Survey_summer	Point	Study_site_ID, Study date, Temp (C), Depth (m), Substratum type, Live coral coverage (%), Dead coral coverage (%), No. of coral species, No. of fish spp., No. of benthos spp.
		Coral_Habitat_winter	Polygon	Total coral coverage (%), Dead coral coverage (%), Live coral coverage (%), Area (sqkm)
		Coral_Hotspot	Polygon	Coral criteria count (1-3)
Tidal flat/Mangrove	Tidal flat_Survey	Point	Study_site_ID, Substratum type, No. of benthos spp.	
	Tidal flat_Habitat	Polygon	Substratum type (sandy, sandy-mud, mud), Area (sqkm)	
	Mangrove_Survey	Point	Study_site_ID, Coverage of <i>Avicennia marina</i> (%), Coverage of <i>Rhizophora mucronata</i> (%), Max tree height (m), Average DBH (cm), No. of benthos spp.	
	Mangrove_Habitat	Polygon	Mangrove type ( <i>Avicennia</i> , <i>Rhizophora</i> ), Area (sqkm)	
	Tidal flat/Mangrove_Hotspot	Polygon	Habitat count (1-6)	
	Creek_Survey	Point	Study_site_ID, Total no. of creek spp.(Fish)	
Seagrass	Seagrass_Survey_winter	Point	Study_site_ID, Study date, Temp (C), Depth (m), Substratum type, Seagrass coverage (%), Seagrass spp., No. of benthos spp.	
	Seagrass_Habitat_winter	Polygon	Seagrass type ( <i>Halophila</i> , <i>Halodule</i> ), Seagrass coverage (%), Area (sqkm)	
Seaweed	Seagrass_Hotspots	Polygon	-	
	Seaweed_Survey_winter	Point	Study_site_ID, Study date, Temp (C), Depth (m), Substratum type, No. of seaweed spp., No. of benthos spp.	
	Seaweed_Habitat_winter	Polygon	Area (sqkm), Seaweed type (Sargassum, others)	
	Seaweed_Hotspots	Polygon	-	
Marine mammal	Marine mammal density	Raster	Density (per unit Area)	

	Category	Sub-category	Data type	Data fields
		Marine mammal sightings	Point	Species name, Date of sighting, Group size, No. of calves, Behaviour
		Marine mammal_Hotspots	Polygon	-
Turtle		Turtle nesting site	Line	Length (km), Species name, Info source
		Turtle sightings	Point	Species name, Species wise frequency of occurrence, Species wise frequency of dead turtles, Date of sighting, Info source
Bird		Turtle_Hotspots	Polygon	Hotspot category (nesting, foraging)
		Endangered bird sites	Point	Species name, IUCN status
		Bird breeding sites	Point	Species name
		Bird_Hotspots	Polygon	Hotspot category (endangered, breeding, wintering)
Pollution		Wastewater quality	Point	Survey period, Sampling date, Sampling depth (m), Analysis results
		Seawater quality	Point	Survey period, Sampling date, Sampling depth (m), Analysis results
		Sediment quality	Point	Survey period, Sampling date, Sampling depth (m), Analysis results
Socioeconomic		Industrial	Point	Type (camel, cow, goat, lamb, poultry)
		Traditional (grazing area)	Polygon	-
		Shrimp farm_Existing	Polygon	Current area (sqkm), Planned area (sqkm), Current production capacity (ton/year), Planned production capacity (tons/year)
		Shrimp farm_Planned	Polygon	Area (sqkm)
		Fish cage_Existing	Point	-
		Fish cage_Planned	Point	-
		Artisanal	Polygon	Fishing method
		Landing site	Point	Name
		Moshta	Line	-
		Tourism sites	Polygon	-
Agriculture		Agricultural areas	Polygon	Type (agriculture, orchard), Area (sqkm)
		Oil and gas extraction	Polygon	Type (gas field, oil field)
			Point	Type (gas well, oil well)
			Line	Pipeline
		Mining	Point	Type (gypsum, lime stone, etc.)
		Petrochemical_Refinery_Existing	Point	Name, Type (oil, gas), Area (sqkm), Product, Established year, Current production capacity (barrel/day), Planned production capacity (barrel/day)
Industry		Petrochemical_Refinery_Planned	Point	Name, Type (oil, gas), Area (sqkm), Product, Planned production capacity (barrel/day)
		Manufacturing_Metal	Polygon	Name, Product, Current production capacity (ton/year)

	Category	Sub-category	Data type	Data fields
		Manufacturing_Shipbuilding	Polygon	Name, Area (sqkm)
		Manufacturing_Industrial park_Existing	Point	Name, Product, Current area (sqkm), Planned area (sqkm)
		Manufacturing_Industrial park_Planned	Point	Name, Product, Planned area (sqkm)
		Manufacturing_SEZ_Existing	Polygon	Name, Type, Current area (sqkm), Planned area (sqkm)
		Manufacturing_SEZ_Planned	Polygon	Name, Type, Planned area (sqkm)
		Port_Existing	Point	Name, Type (commercial, passenger etc)
		Port_Planned	Point	Name, Type (commercial, passenger etc)
		Ship traffic	Polygon	-
		Power plant_Existing	Point	Name, Type, Area (sqkm), Production capacity (MW)
		Power plant_Planned	Point	Name, Type, Area (sqkm), Production capacity (MW)
		Desalination plant_Existing	Point	Name, Current production capacity (m3/day), Planned production capacity (m3/day)
		Desalination plant_Planned	Point	Name, Planned production capacity (m3/day)
		Sewage treatment plant_Existing	Point	Name, Current treatment capacity (m3/day)
		Sewage treatment plant_Planned	Point	Name, Planned treatment capacity (m3/day)
		Waste disposal site	Point	Type
	Population	City/Village	Point	Name, Type, Population
	Administrative boundary	Province/County/District	Polygon	Name, Type, Area (sqkm)
	Land use		Polygon	Class, Area (sqkm)
Risk assessment		Risk assessment result	Raster	Risk score
		Risk assessment result	Raster	Risk score
Zoning plan		Zoning boundary	Polygon	Zoning Name, Classification, Code, Area
Natural condition		River	Line	Name, Length (km)
		River basin	Boundary	Name, Area (sqkm)

Source: JICA Project Team

**6.2 Promotion activities**

Various promotion materials (e.g. brochure, poster, video) of this Project were prepared and shared with stakeholders during events and meetings. Table 6.2.1 shows the outline of the promotion materials (data of the materials are attached as Appendix 19). DOE also often invited the media during WG meetings and also disseminated important outcomes through DOE’s website.

**Table 6.2.1 Outline of promotion materials**

Promotion material	Objective and target
Introductory brochure of the Project	To inform the government organizations about the Project and enhance their participation.
Poster introducing the Project activities	To inform the public about the Project. Used in environmental events.
Video introducing the Project activities and coastal environment of Hormozgan	To promote the Project and coastal environment conservation. Used in seminars and environmental events.
Brochure summarizing the M/P outputs	To inform government organizations about the M/P outputs.

Source: JICA Project Team

**6.3 Training in Japan**

Initially, training in Japan was planned three times. However, the 2<sup>nd</sup> and 3<sup>rd</sup> training courses were not implemented due to Corona-related travel restrictions.

The 1<sup>st</sup> training course was conducted from August 26<sup>th</sup>-September 3<sup>rd</sup> 2019. The main objective was to introduce Japanese policies and measures on coastal ecosystem conservation. A total of 10 trainees participated coming from DOE, Hormozgan government and PBO.

The 2<sup>nd</sup> and 3<sup>rd</sup> training courses were planned to introduce coastal conservation measures in Japan, which are related to the action plan of the M/P. Since these training courses were cancelled, WEB-based training course was implemented during September 7-9, 2020 focusing mainly on ecosystem conservation and pollution control. The presentation materials used in all the training courses are attached as Appendix 20.

**6.4 Technical transfer (apart from training in Japan)**

Training course on InVEST risk assessment was conducted for the DOE experts in HQ and Hormozgan. The training focused on learning the basic process of InVEST HRA model. The training material is attached as Appendix 21

**6.5 Seminar**

A seminar was held on December 4<sup>th</sup>, 2019 at Bandar Abbas to explain and discuss the draft M/P to the stakeholders. The seminar mainly focused on the action plan and implementation structure, and the participants expressed their support for future implementation. There were around 50 participants, consisting of deputy governor of Hormozgan, provincial government organizations, municipality, university, research institute and council members. The minutes of the seminar is attached as Appendix 22.

## **7. CONCLUSION AND RECOMMENDATION**

Degradation of coastal ecosystem is becoming more prevalent in Hormozgan as confirmed through the Project. For example, degradation of coral reef is significant, which in combination with global warming affects, may further reduce or even become extinct in the future without some active intervention. Tidal flats and mangrove forests are also being affected through human activities and intrusion of invasive species. These are worrying trends as such impacts were observed even in protected areas. While good environmental quality is fundamental for sustaining ecosystem health, significant water and sediment pollution were confirmed especially around urban areas. Pressures on the coastal environment will certainly increase in the future through for example population growth, urban and industrial development, in which rural areas are no exception.

Although DOE has been implementing coastal conservation activities to some extent, their activities have been rather limited partly due to lack of institutional and human capacity and budget, as well as deficiencies in some of the related laws and regulations. While conservation activities should be implemented by engaging related stakeholders, such cooperation between stakeholders have been limited thus far.

Considering these issues, the M/P proposes actions necessary for the sustainable conservation and management of the Hormozgan coastal environment including its implementation structure. While DOE will play a central role in the implementation, it will be a huge challenge to implement from both technical and financial aspects considering that there are more than 40 actions and in which many of them will be new initiatives in Iran. Therefore, in order to ensure that the action plan will be implemented as scheduled and effectively, JICA's continuous support is very much needed.

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