

Japan International  
Cooperation Agency



Department of Environment  
Gilan Provincial Government  
Islamic Republic of Iran

# Mid-term Plan for Conservation of the Anzali Wetland for 2020 - 2030



May 2019

Anzali Wetland Ecological Management Project - Phase II



**NIPPON KOEI**

**Department of Environment  
Gilan Provincial Government  
Islamic Republic of Iran**

**Japan International  
Cooperation Agency**

**MID-TERM PLAN  
FOR CONSERVATION OF THE ANZALI  
WETLAND  
FOR 2020 – 2030**

**(Prepared under  
The Anzali Wetland Ecological Management Project - Phase II)**

**May 2019**

**NIPPON KOEI CO., LTD.**

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## Preface

The Mid-term Plan for Conservation of the Anzali Wetland for 2020 – 2030 (Mid-term Plan) was prepared as a final product of the Anzali Wetland Ecological Management Project - Phase II (Phase II Project). The Phase II Project was a 5-year technical cooperation project of the Japan International Cooperation Agency (JICA) between May 2014 and May 2019. JICA has supported Iranian government on conservation of the Anzali Wetland since 2003 through “The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland (2003-2005)” (Master Plan Study) and “Anzali Wetland Ecological Management Project (2007-2008, 2011-2012)” (Phase I Project). The Mid-term Plan will succeed the previous Master Plan for 2005 - 2019, which was prepared under the Master Plan Study. In the 1st year of the Phase II Project, actual implementation status of the Master Plan was reviewed and an Action Plan for 5 years, which is the last 5-year of the Master Plan and period of the Phase II Project, was prepared to facilitate the conservation activity of the Anzali Wetland. During the Phase II Project, various Joint Pilot Activities were implemented, which were selected among high priority activities, to learn technical aspect and PDCA cycle<sup>1</sup> for Iranian personnel who are in charge of the wetland conservation from their jurisdiction from their organizations.

Although the contents of the Mid-term Plan were discussed in the respective Technical Sub-committees (SCs) of the Anzali Wetland Management Committee (AWMC) and agreed by members of the SCs, the Mid-term Plan has not been approved for its implementation under the AWMC yet. We, JICA Expert Team, expect that the Mid-term Plan be approved by AWMC and be implemented as scheduled in the Mid-term Plan to contribute to the conservation of the Anzali Wetland. For it, it is expected that the Mid-term Plan widely be disclosed to the stakeholders of the Anzali Wetland to facilitate active and voluntary participation to the conservation activities as much as possible.

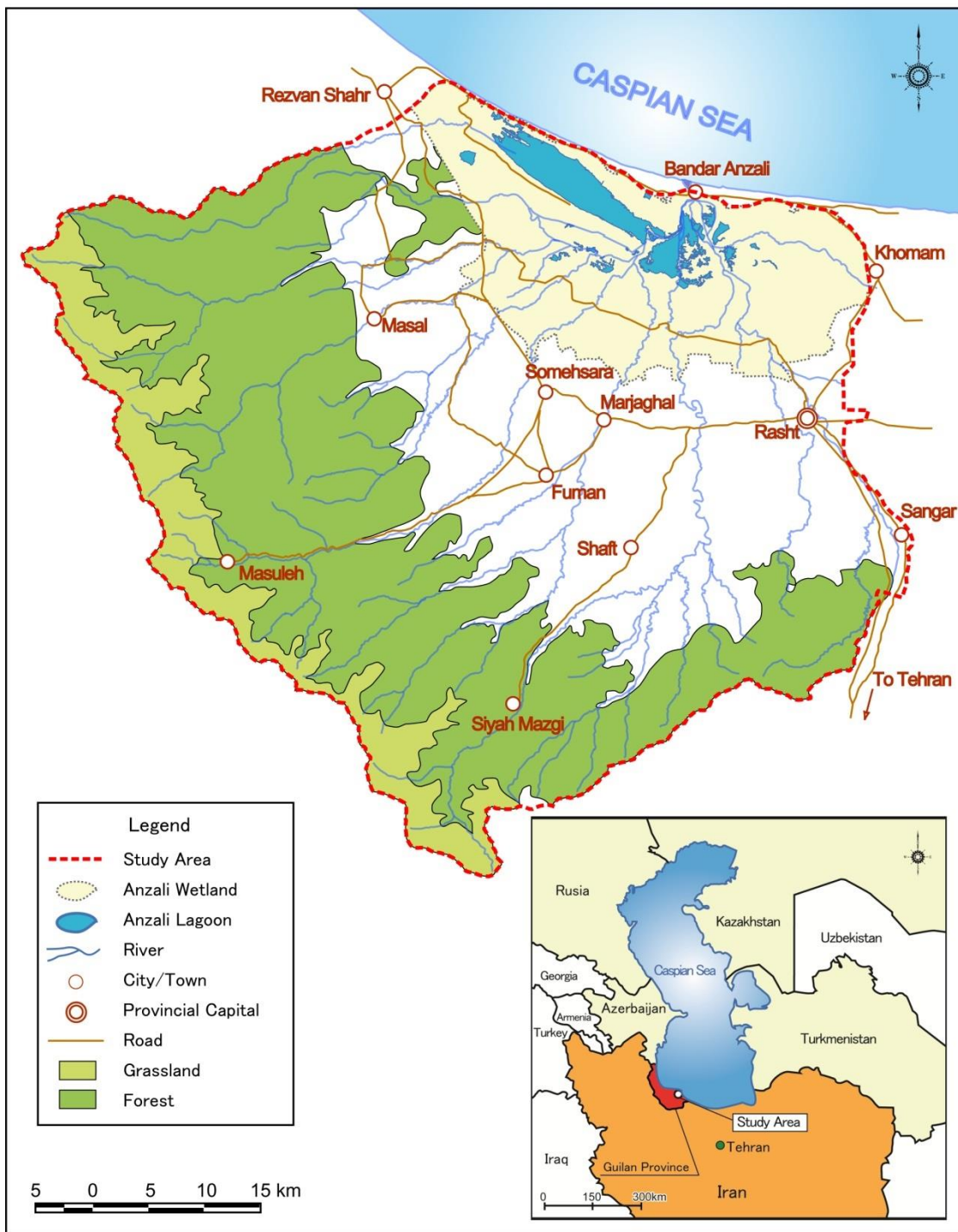
Tomoo AOKI

Chief Advisor for the Anzali Wetland Ecological Management Project - Phase II

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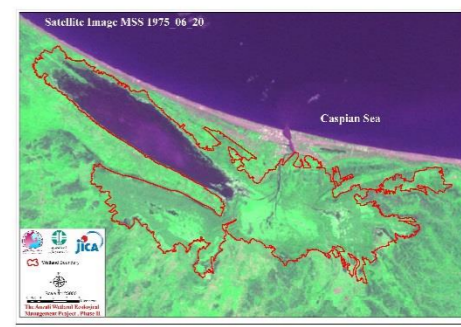
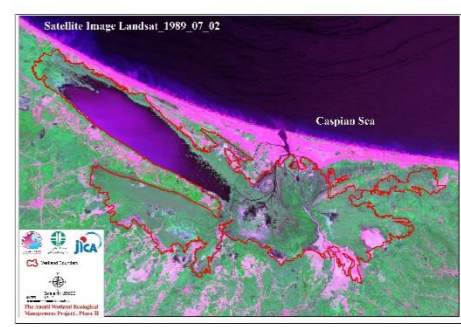
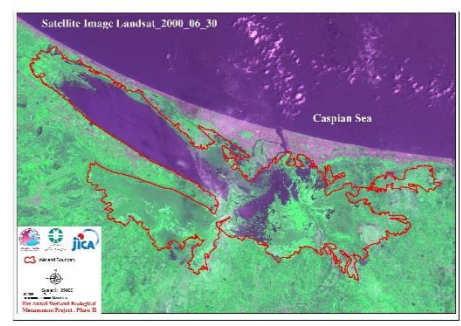
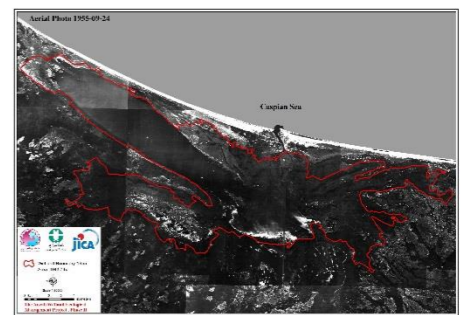
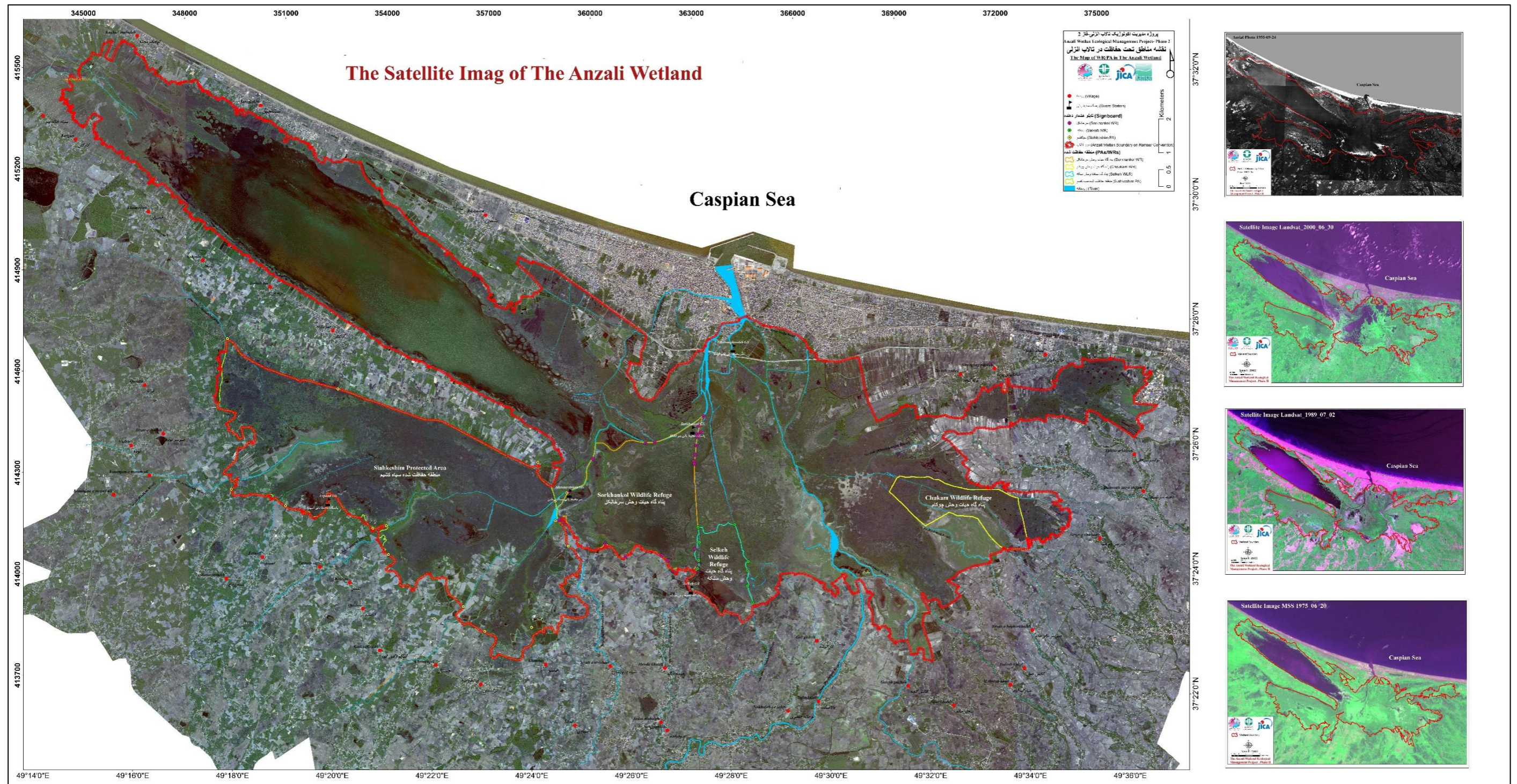
<sup>1</sup> Continuation of PDCA (Plan, Do, Check, Action) cycle is an important step to implement the adaptive management of nature of the wetland under unexpected factors such as lack of information, climate change, and any human influence.





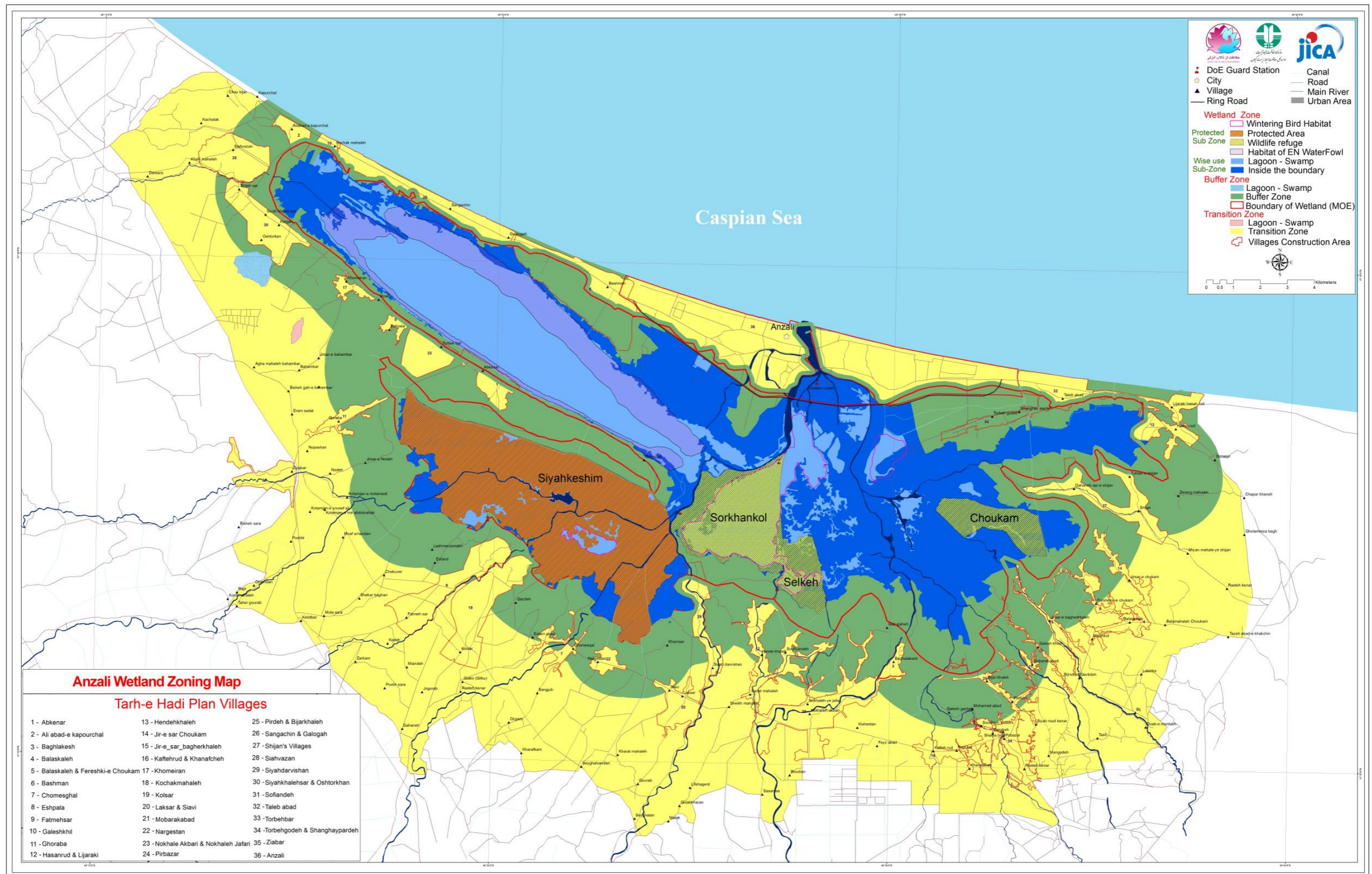
**Location of the Anzali Wetland and its Watershed**





**Satellite Image of the Anzali Wetland**





**Zoning Map of the Anzali Wetland**



**The Islamic Republic of Iran**  
**Anzali Wetland Ecological Management Project - Phase II**

**Mid-Term Plan for Conservation of the Anzali Wetland for 2020 – 2030**

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**List of Abbreviations**

ALOS	Advanced Land Observing Satellite data
AWEE	Anzali Wetland Environmental Education
AWNS	Anzali Wetland Naturel School
AWVC	Anzali Wetland Visitor Center
AWMC	Anzali Wetland Management Committee
AWMO	Anzali Wetland Monitoring Office
BACI	Before-After, Control-Impact
BOD	Biochemical Oxygen Demand
CBET	Community Based Ecotourism
CEPA	Communication, Education, Participation and Awareness
COD	Chemical Oxygen Demand
COP	Conference of the Parties
C/P	Counterpart
CSL	Caspian Sea Level
DO	Dissolved Oxygen
DOE	Department of Environment
DSS	Dahanesar Sheijan (name of a village)
EE	Environmental Education
EO	Educational Organization
GCHHTO	Gilan Cultural Heritage, Handicraft and Tourism Organization
GRWC	Gilan Regional Water Company
GSs	guard stations
GWEPS	Gilan Women against Environmental Pollution Society
GWWC	Gilan Water and Wastewater Company
GWYES	Gilan Women and Youths Environmentalist Society
HQ	Headquarters
ICHHTO	Iran Cultural Heritage, Handicraft and Tourism Organization
IRR	Iranian Rial
JBK	Jirsar Bagherkhaleh (name of a village)
JCC	Joint Coordinating Committee
JET	JICA Expert Team
JICA	Japan International Cooperation Agency
JPA	Joint Pilot Activity
JPY	Japanese Yen
IWC	International Waterbird Census
KIWC	Kushiro International Wetland Center
MM	Minutes of Meeting
MOFA	Ministry of Foreign Affair
MOJA	Ministry of Jihad-e-Agriculture
MO	Meteorology Organization
MOE	Ministry of Energy
MPO	Managing and Planning Organization
MPSIAC model	Modified Pacific Southwest Inter-Agency Committee model
MRMO	City Municipalities and Rural Management Organization
NCDC	NOAA's National Climatic Data Center
NGO	Non-governmental Organization
NIWAI	National Inland Water and Aquaculture Institute
NRWGO	Natural Resources and Watershed Management General Office
NWWC	National Water and Wastewater Company
T-N	Total Nitrogen
T-P	Total Phosphorus
PA	Protected Area
PBO	Planning and Budget Organization
PDM	Project Design Matrix
PMO	Ports and Maritime Organization
PO	Plan of Operation

PTT	Platform Transmitter Terminal
RAM	Ramsar Advisory Mission
R/D	Record of Discussion
RIS	Ramsar Information Sheet
RWWC	Rural Water and Wastewater Company
SC	Sub-committee
SEI	Sarzamin-e -ideal ma Environmental Institute
STC	Steering Committee
STP	Sewage Treatment Plant
TAA	Tour Agents Association
TBM	Temporary Benchmark
TGA	Tour Guides Association
USD	United States Dollar
WEC	Wetland Ecosystem Conservation
WM	Waste Management
WMC	Waste Management Committee
WMO	Waste Management Organization
WRs	Wildlife Refuges
WRMC	Water Resource Management Company
WS	Workshop
WSM	Watershed Management
WWD	World Wetland Day

## **1. History**

The Anzali Wetland covers an area of 195 km<sup>2</sup> in Gilan Province of Iran on the southern coast of the Caspian Sea. It is internationally known as an important wetland for migratory birds and was registered as a Ramsar site in June 1975 in accordance with the Convention on Wetlands, called the Ramsar Convention. However, due to mainly excessive hunting in the Anzali Wetland and the other various issues about changing the ecological characteristics, the Ramsar Convention decided to designate the Anzali Wetland as a wetland on the Montreux Record because conservation of the Anzali Wetland was deemed a priority issue. The Iranian Government has been actively promoting conservation and wise use of the Anzali Wetland within its national policy for environmental conservation.

Recognizing such status of the Anzali Wetland, the Government of Iran requested the Government of Japan to conduct a comprehensive study for the conservation of the Wetland. From 2003 to 2005, the Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran was conducted by JICA, including: 1) the preparation of a comprehensive Master Plan for the conservation of the Wetland; 2) the execution of pilot activities; and 3) capacity development of concerned agencies and the staff for the management of wetlands.

As the following step of the preparation of Master Plan, the Government of Iran requested the Government of Japan to undertake a technical cooperation “Anzali Wetland Ecological Management Project (hereinafter referred to as “Phase I Project”)” to realize some of key measures from the Master Plan such as the establishment of institutional mechanism for conservation and the framework of detailed zoning including regulations from 2008-2010, 2011-2012.

In accordance with the achievement of Phase I Project, the Anzali Wetland Ecological Management Project - Phase II (hereinafter referred to as “Phase II Project” or “the Project”) was requested from GOI to the Government of Japan. The project was implemented based on the Record of Discussions (R/D), which was agreed and signed on 15th December 2013 among Gilan Province, DOE, and JICA. The purpose of the Phase II Project was “An integrated and adaptive wetland management system of the Anzali Wetland with effective involvement of all stakeholders and appropriate scientific data and information is established.” In order to realize the project purpose, three outputs are set; 1) The Capacity of the Anzali Wetland Management Committee is enhanced, 2) Mechanism to select and implement high priority activities and methodologies for wetland conservation based on biological and fiscal data through Joint Pilot Activities (JPAs) is established, and 3) Knowledge and experience are shared domestically and internationally. In accordance with the R/D for Phase II Project, a Mid-term Plan for Anzali Wetland Conservation between 2020 and 2030 (Mid-term Plan) would be prepared on necessary actions to be implemented for conservation of the Anzali Wetland for 10 years after completion of the project based on results, knowledge, lessons-learned of the project including experiences of the JPAs.

## **2. Policy**

As results of many Iranian efforts and Japanese cooperation, some of the situations of the Anzali Wetland have been improved in fact. On the other hand, there are still many things to be solved. In addition, monitoring and management should be continued for long time as all activities baseline. Based on the above-mentioned background, this mid-term plan is formulated based on the following policies.

### **(1) Following the Ramsar Convention**

The Anzali Wetland is designated as the Ramsar Site. The Mid-term Plan follows the resolutions, handbooks etc. of the Ramsar Convention as much as possible.

### **(2) Ecosystem Approach and Watershed Approach**

The Mid-term Plan follows Ecosystem Approach and Watershed Approach.

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

The watershed approach is recognized as a holistic approach to ecosystem management. It is necessary to consider not only actual wetland but also whole watershed of the wetland to protect and conserve the ecological characteristics of the Anzali Wetland. The watershed approach is very effective to conserve the Anzali Wetland from various viewpoints such as ecological network conservation, sedimentation control, water resource management, sewage management and waste management.

### **(3) Setting long-term directions**

In preparation of the Mid-term Plan, as a first step, a framework of the Mid-term Plan was designed with setting targets based on long-term directions on the Anzali Wetland conservation, which are to be well examined and decided. The term of “long-term” here is basically much longer period of the mid-term for the Mid-term Plan for 10 years, but not set one period common to all aspects of the Anzali Wetland conservation. For setting the long-term directions, three viewpoints are considered to be applied as follows.



1) Setting directions from viewpoint of criteria for internationally important wetland

When the Anzali Wetland was registered in the Ramsar Convention wetland, the Anzali Wetland satisfied six criteria of the Ramsar Convention on the internationally important wetland. Due to change of environmental conditions and some data clarified as result of the recent studies, it is considered that the Anzali Wetland currently satisfies eight criteria. Therefore, the long-term directions are set that the natural conditions of the Anzali Wetland should be improved, or at least maintained to satisfy the eight criteria for international importance of the wetland.

2) Setting directions from viewpoint of the wetland conditions in the Ramsar Convention mission in 1992

In the process of registration of the Anzali Wetland to the Montreux Record, a mission from the Ramsar Convention Secretariat has surveyed and evaluated the Anzali Wetland in 1992. Based on the results of the Ramsar mission in 1992, the long-term directions are set that the natural conditions of the Anzali Wetland should be improved, or at least maintained the surveyed items, which showed deterioration of the environmental conditions of the Anzali Wetland

3) Setting directions from viewpoint of the basic policies of the Ramsar Convention

In addition to the directions related to the natural environmental conditions above, the long-term directions are set based on the three basic policies of the Ramsar Convention; (1) conservation, (2) wise use, and (3) CEPA.

(4) Steps for preparation of the Mid-term Plan

Based on the long-term directions, the Mid-term Plan will be prepared with the following steps.

1) Setting long-term direction by each SC

Each SC will examine and establish long-term directions on relevant subject of the SC. It is not necessary to establish quantitative targets for the long-term direction, but qualitative one.

2) Examination of necessary actions based on long-term direction by each SC

Each SC will examine necessary actions to realize the long-term direction.

3) Setting targets for actions by each SC

For the actions above, each SC will examine and establish quantitative targets to be accomplished during the period of the Mid-term Plan for 2020 – 2030 with examination of the concrete contents of the actions.

4) Preparation of the Mid-term Plan document

Mid-term Plan document will be prepared by all the SCs.

### 3. Description

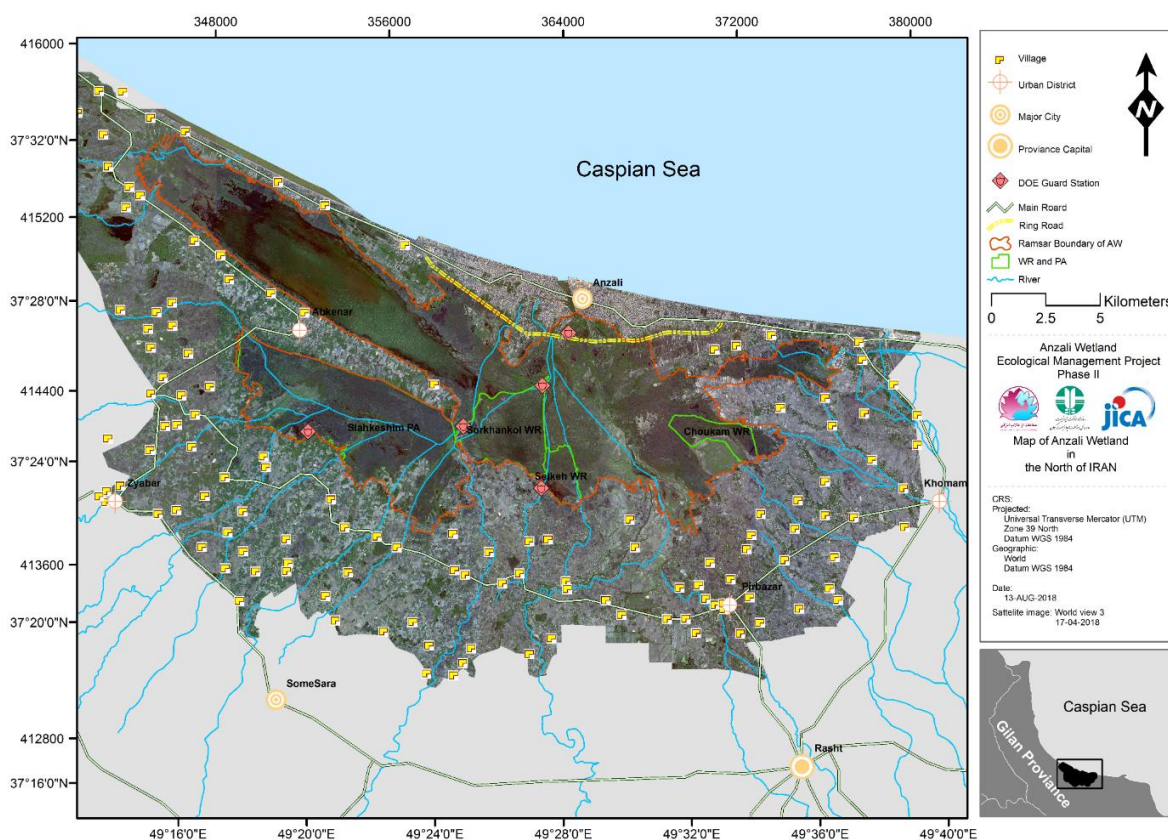
This chapter is basically described based on the latest RIS (Ramsar Information Sheet) submitted in June, 2018. Some of part was updated based on the latest information as of April, 2019.

#### 3.1 Location

The Anzali Wetland Complex is located near the port city of Bandar-e Anzali in Gilan Province, North part of Iran along the Southern coast of the Caspian Sea as shown in Figure 3.1-1. The wetland covers about 19,500 ha and the expanse of the area about 33 km from east to west and about 11 km from north to south at the maximum. It is spread among Anzali Shahrestan (second order administrative divisions of Iran), Somesara Shahrestan and Rasht Shahrestan.

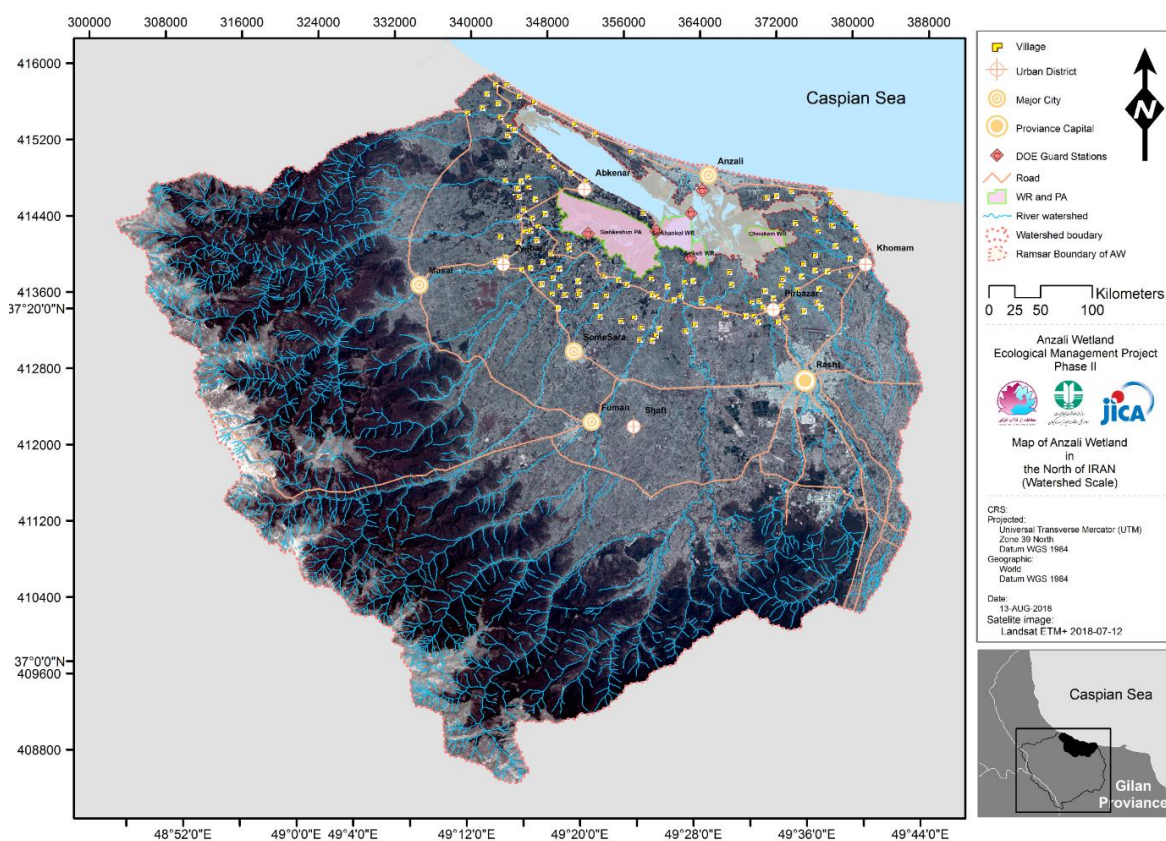
The Ramsar site boundary of the Anzali Wetland is about 19,500 ha.

The large freshwater lagoon is fed by several rivers from Talesh Mountains (west part of Albolz Mountains). The watershed of the Anzali Wetland is shown in Figure 3.1-2. The area of the watershed is 3,410 km<sup>2</sup>. The watershed includes the Rasht City, capital of the Gilan Province. The population of the watershed is about 1,318,000.



Source: JICA Expert Team

Figure 3.1-1 Location of the Anzali Wetland



Source: JICA Expert Team

**Figure 3.1-2 Location of the Watershed of the Anzali Wetland**

## 3.2 Ecological Character Description

### 3.2.1 Vegetation Succession to Reedbed based on Caspian Sea Level Fluctuation

The dominant vegetation throughout much of the Anzali Wetland consists of vast beds of *Phragmites australis*. A rapid expansion in the extent of the *Phragmites* reed began in the late 1960s, and by the early 1980s, almost the entire eastern and central portion of the main wetland were covered in reeds. Due to the continuing fall in the level of the Caspian Sea, and accelerated eutrophication as a result of increased inflow of domestic sewage, fertilizers and other organic material. The situation had become so serious by the end of the 1970s that the Department of the Environment was investigating possible methods of control. However, the rapid rise until from 1978 to 1995 in water level in the wetland changed the situation and stopped the expansion of *Phragmites*.

### 3.2.2 Wetland Types

The Anzali Wetland is composed by several types of the Wetland as shown in Table 3.2-1.

Almost half, 9,000 ha of the Anzali Wetland is TP:” Permanent freshwater marshes/pools” which is actually Reed bed.

Second large (2,000 ha) wetland type is O: “Permanent freshwater lakes” where is west part of the West Lagoon.

Third wetland (2,200 ha) is Ts: “Seasonal/ intermittent freshwater marshes/ pools on inorganic soils” which is scattered as actually seasonally(winter) submerged pasture in marginal area.

Fourth wetland (2,000 ha) is K: Coastal freshwater lagoon where is the north of Sorkhankol WR and east part of the West Lagoon. Saltwater intrusion from the Caspian Sea there has been occurred in mid-summer.

Smallest wetland (200 ha) is M: “Permanent rivers/ streams/ creeks” which is Nahang Roga, Sosa Roga and the other rivers and streams.

**Table 3.2-1 Wetland Types of the Anzali Wetland**

Wetland types (code and name)		Area (ha) of wetland type	Justification of Criterion 1
Marine or coastal wetlands	K: Coastal freshwater lagoons	2,000	Representative
Inland wetlands	Fresh water > Flowing water >> M: Permanent rivers/ streams/ creeks	300	Representative
	Fresh water > Lakes and pools >> O: Permanent freshwater lakes	3,000	Representative
	Fresh water > Lakes and pools >> Tp: Permanent freshwater marshes/ pools	9,000	Representative
	Fresh water > Lakes and pools >> Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils	2,200	Representative
Other non-wetland habitats within the site	Farm land and Residential	3,000	-

Source: Ramsar Information Sheet prepared by JICA Expert Team

### 3.2.3 Biological Component

#### (1) Overview

There are many kinds of the ecosystem components such as open static water, flowing water, Reed bed (emerged plant community), Lotus community (floating-leaf plant community), Water Chestnut community (floating-leaf plant community), Submerged plant communities, some kind of forests, grassland on seasonal wetland etc. They composed complicated mosaic structure of the habitats. Based on the various habitat, the Anzali Wetland supports very high biodiversity including fauna and flora. The mosaic of many types of habitats are special characteristics of the Anzali Wetland.

The fauna and flora composed by many typical species of this bioregion such as Palearctic and the ecoregion (Kura-South Caspian Drainages under FEOW).

(2) Fauna

1) Mammal

Mammal survey was implemented in 2015-16 as joint pilot activity under the Project. Mammal Checklist in and around the Anzali Wetland is shown in Table 3.2-2.

21 mammal species have been recorded in and around the Anzali Wetland.

**Table 3.2-2 Mammal Checklist in/around Anzali Wetland in 2015-16**

No.	Order	Family	English name	Species
1	Erinaceomorpha	Erinaceidae	Southern White-breasted Hedgehog	<i>Erinaceus concolor</i>
2	Soricomorpha	Talpidae	Blind Mole	<i>Talpa</i> sp.
3		Soricidae	Shrew	<i>Crocidura</i> sp.
4	Chiroptera	Rhinolophidae	Horseshoe Bat	<i>Rhinolophus hipposideros</i>
5		Vespertilionidae	Common Pipistrelle	<i>Pipistrellus pipistrellus</i>
6			Nathusius' Pipistrelle	<i>Pipistrellus nathusii</i>
7			A kind of Pipistrelle 1.	<i>Pipistrellus</i> sp.1
8			A kind of Pipistrelle 2.	<i>Pipistrellus</i> sp.2
9	Rodentia	Gliridae	Fat Dormouse	<i>Glis glis</i>
10		Cricetidae	Eurasian water vole	<i>Arvicola amphibious</i>
11		Muridae	Brown rat	<i>Rattus norvegicus</i>
12			Roof Rat	<i>Rattus rattus</i>
13			House Mouse	<i>Mus musculus</i>
14		Hystricidae	Indian Crested Porcupine	<i>Hystrix indica</i>
15	Carnivora	Canidae	Golden jackal	<i>Canis aureus</i>
16		Mustelidae	Least Weasel	<i>Mustela nivalis</i>
17			Common Badger	<i>Meles meles</i>
18			Common Otter	<i>Lutra lutra</i>
19		Felidae	Asiatic Wildcat	<i>Felis silvestris ornata</i>
20			Jungle Cat	<i>Felis chaus</i>
21	Artiodactyla	Suidae	Wild Boar	<i>Sus scropha</i>

Source: Updated by JICA Expert Team from Mammal Survey, Dr. Naderi et.al, 2015 (Subcontracted by JICA Expert Team)





Source: JICA Expert Team

**Figure 3.2-1 Typical Mammals in the Anzali Wetland**

## 2) Bird

Bird survey was implemented in 2015 as joint pilot activity under the Project. After the field survey, new information from monitoring activities and the other related survey was obtained.

The checklist was updated based on the literatures and the monitoring activities as shown in Table 3.2-3. Based on the table, 254 bird species were recorded in and around the Anzali Wetland until now.









Source: JICA Expert Team

Figure 3.2-2 Typical Birds in the Anzali Wetland

## 3) Reptile and Amphibian

Reptile and Amphibian survey was implemented in 2018 as joint pilot activity under the Project. The checklist of reptiles is shown in Table 3.2-4, amphibians is shown in Tale 3.2-5. Based on the table, 14 reptile species and 3 amphibian species were recorded in and around the Anzali Wetland until now.

**Table 3.2-4 Checklist of Reptiles in the Anzali Wetland in 2018**

No	Order / Suborder	Scientific name	Common name	Farsi name
1	Cryptodira (Turtles & Tortoises)	<i>Emys orbicularis</i>	European Pond Turtle	اروپايي لاکپشت برکهاي
2		<i>Mauremys caspica</i>	Caspian Turtle	لاکپشت خزري
3		<i>Testudo graeca</i>	Spur-thighed Tortoise	لاکپشت مهميزدار
7	Lacertilia (Lizards)	<i>Lacerta strigata</i>	Caspian Green Lizard	خزري لاسرتاي سبز
8		<i>Darevskia chlorogaster</i>	Green-bellied Lizard	لاسرتاي شکم
9		<i>Cyrtopodion caspium</i>	Caspian Bent-toed Lizard	گکوي انگشت خميده خزري
10		<i>Pseudopus apodus</i>	European Glass Lizard	لوس مار
11		<i>Anguis colchica</i>	Slow Worm	کلمره
12	Serpentes (Snakes)	<i>Natrix natrix</i>	Ringed Snake	مار آبي
13		<i>Natrix tessellata</i>	Dice Snake	مار چلبير
14		<i>Zamenis longissimus</i>	Aesculapian Snake	مار درختي
15		<i>Elaphe dione</i>	Dione's Snake	گوند مار ديون
16		<i>Dolichophis schmidtii</i>	Fire Racer Snake	مار آتشي
17		<i>Platyceps najadum</i>	Dahl's Wipe Snake	قمچه مار

Source: Final Report of the Reptiles and Amphibians in Anzali Wetland, Omid Mozaffari. 2018  
(Subcontracted by JICA Expert Team)

**Table 3.2-5 Checklist of Amphibians in the Anzali Wetland in 2018**

No	Order / Suborder	Scientific name	Common name	Farsi name
1	Anura (Frogs & Toads)	<i>Pelophylax ridibundus</i>	Marsh Frog	قورباغه مردابي
2		<i>Hyla orientalis</i>	Eastern TreeFrog	شرقي قورباغه درختي
3		<i>Rana pseudodalmatina</i>	Iranian Longlegged Frog	قورباغه جنگلي

Source: Progress Report of the Reptiles and Amphibians in Anzali Wetland, Mohammad Dehdar Dargahi et al. 2018  
(Subcontracted by JICA Expert Team)





Source: Omid Mozaffari (2019)

Figure 3.2-3 Reptiles and Amphibians in the Anzali Wetland

4) Fish

Fish survey was implemented by NIWAI in 2016-2017 as joint pilot activity under the Project. The checklist of fish is shown in Table 3.2-6. As a result, 57 fish were recorded in the field survey in the Anzali Wetland and rivers in the watershed. 71 fish species were recorded in total in field survey and literature survey.

Table 3.2-6 Checklist of Fish in the Anzali Wetland and Watershed

No	Family	Scientific name	Farsi Name	2016-17	Wetland inside (W)	Anzali Rivers (R)	Wetland Estuary (E)	Native	Abundance in the habitat	Anadromous
1	Petromyzontidae	<i>Caspiomyzon wagneri</i>	کاسپین دهان گرد	✓	-	+	-	N	R	✓
2	Acipenseridae	<i>Acipenser persicus</i>	تاس ماهی ایران					N	R	✓
3		<i>Acipenser stellatus</i>	ازون یرون					N	R	✓
4	Anquillidae	<i>Anquilla anquilla</i>	ماز ماهی حقیقی					A	E	✓
5	Clupeidae	<i>Alosa braschnikowi</i>	شنگ ماهی براتشونیکووی	✓	-	-	+	N	E	
6		<i>Alosa caspia</i>	کاسپین شنگ ماهی	✓	■	-	+	N	E>W>R	
7		<i>Alosa kessleri</i>	شنگ ماهی مهاجر	✓	-	-	+	N	E>W	
8		<i>Clupeonella caspia</i>	کاسپین کیلکای	✓	-	+	-	N	E>W=R	
9	Cyprinidae	<i>Abramis brama</i>	ماهی سنبل	✓	+	+	-	N	E=W>R	✓
10		<i>Alburnoides samiii</i>	خیاطه ماهی	✓	+	+++	-	E	W<R	
11		<i>Alburnus chalcoides</i>	شاه کولی	✓	++	++	++	N	E>W=R	✓
12		<i>Alburnus filippi</i>	مزوارینماهی کورا	✓	+	++	-	N	W<R	
13		<i>Alburnus hohenerkeri</i>	مزوارینماهی قفقاز	✓	++	++	+	N	W>R>E	
14		<i>Barbus cyri</i>	سس ماهی کورا	✓	-	+	-	N	R	
15		<i>Blicca bjoerkna</i>	ماهی سینه نما	✓	+++	+	+	N	W>E=R	
16		<i>Capoeta razii</i>	سیاه ماهی رازی	✓	+	+++	+	E	E<W<R	
17		<i>Carassius auratus</i>	ماهی حوض رنگی	✓	+	+	-	O	W=R	
18		<i>Carassius gibelio</i>	ماهی حوض وحشی	✓	+++	++	+	A	W>R>E	
19		<i>Ctenopharyngodon idella</i>	کیور علفخوار	✓	+	+	-	A	E<W=R	
20		<i>Cyprinus carpio</i>	کیور معمولی	✓	+++	+	-	N,A	W>E>R	✓
21		<i>Hemiculter leucisculus</i>	تیز کولی	✓	+++	++	+	A	E>W>R	
22		<i>Hypophthalmichthys molitrix</i>	کیور نقره ای	✓	+	+	-	A	W>E=R	
23		<i>Hypophthalmichthys nobilis</i>	کیور سرگنده	✓	+	-	-	A	W>E=R	
24		<i>Leucaspis delineatus</i>	ماهی ریز نقره ای	✓	+	+	-	N	W>R	
25		<i>Leuciscus aspius</i>	ماش ماهی	✓	■	-	-	N	E=W<R	✓
26		<i>Luciobarbus capito</i>	سس ماهی سرگنده	✓	+	+	-	N	E=W=R	✓
27		<i>Luciobarbus caspius</i>	کاسپین سس ماهی	✓				N	E=W=R	
28		<i>Pelecus cultratus</i>	شمشیر ماهی آب شیرین	✓				N	E=W	✓
29		<i>Pseudorasbora parva</i>	ماهی امور نما	✓	+	+	-	A	E<W=R	
30		<i>Rhodeus amarus</i>	ماهی مخرج لوله ای	✓	+	+	-	N	W>R	
31		<i>Rutilus caspicus</i>	کولمه کلمه	✓	+	+	+	N	E>W>R	✓
32		<i>Rutilus frisii</i>	کاسپین ماهی سفید	✓	+	+	++	N	E>R>W	✓
33		<i>Scardinius erythrophthalmus</i>	سر خ باله	✓	++	+	-	N	W>E=R	
34		<i>Squalius turcicus</i>	ماهی سفید رودخانه ای	✓	+	++	-	N	E=W<R	
35	Cyprinidae	<i>Tinca tinca</i>	لای ماهی	✓	+	+	-	N	W=R	
36		<i>Vimba persa</i>	کاسپین سیاه کولی	✓	+	+	+	N	E>W=R	✓
37	Cobitidae	<i>Cobitis saniae</i>	رفتر ماهی سائیا	✓	++	+++	-	E	W=R	
38		<i>Sabanejewia caspia</i>	کاسپین رفتر ماهی	✓	++	+	-	N	W>E=R	
39	Nemacheilidae	<i>Oxynoemacheilus berqianus</i>	رفتر ماهی برگ	✓	-	+	-	E	R	
40	Siluridae	<i>Silurus glanis</i>	اسبله	✓	+	-	-	N	E=W=R	
41	Salmonidae	<i>Oncorhynchus mykiss</i>	قزل آلی رنگین کمان	✓	-	+	-	A	R	
42		<i>Salmo caspius</i>	کاسپین ماهی آزاد	✓	-	+	-	N	E=R	
43		<i>Salmo trutta</i>	قزل آلی خال قرمز	✓				N	R	
44	Esocidae	<i>Esox lucius</i>	اردک ماهی	✓	++	+	+	N	W>R>E	
45	Gobiidae	<i>Benthophilus ctenolepidus</i>	مترسک شنگاف	✓				N	E	
46		<i>Benthophilus leobergii</i>	مترسک ستاره ای	✓	-	-	+	N	E	
47		<i>Knipowitschia caucasica</i>	گوماهی ریز قفقاز	✓	+	-	+	N	E<W	
48		<i>Neogobius caspius</i>	کاسپین گوماهی	✓	-	-	++	N	E	
49		<i>Neogobius melanostomus</i>	گوماهی گرد	✓	+	-	++	N	E>W	
50		<i>Neogobius pallasii</i>	گوماهی شنی	✓	-	-	+++	N	E	
51		<i>Ponticola bathybius</i>	گوماهی صغری	✓				N	E	
52		<i>Ponticola goebelii</i>	گوماهی راتان	✓				N	E=W	
53		<i>Ponticola gortlap</i>	گوماهی سرگنده	✓	+	+	-	N	E=W>R	✓
54		<i>Ponticola iranica</i>	گوماهی ایران	✓	+	+++	-	E	E<W<R	
55		<i>Ponticola syrmian</i>	گوماهی سیرمان	✓				N	E=W	
56		<i>Proterorhinus nasalis</i>	گوماهی بینی لوله ای	✓	+	+	-	N	W>E=R	
57		<i>Rhinogobius lindbergi</i>	گوماهی رینوگوبیوس	✓	+	+	-	A	W=R	
58	Mugilidae	<i>Chelon auratus</i>	کفال طلایی	✓	-	-	+++	A	E	
59		<i>Chelon saliens</i>	کفال یوزد یاریک	✓	++	+	+++	N	E>W>R	
60	Atherinidae	<i>Atherina caspia</i>	گال آئین ماهی	✓	+	-	+++	N	E>W>R	
61	Poeciliidae	<i>Gambusia holbrooki</i>	ماهی گامبوزیا	✓	+++	++	-	A	E<W=R	
62	Synbranchidae	<i>Synbranchius caspius</i>	نهی ماهی، سوزن ماهی	✓	+	-	+	N	E=W	
63	Percidae	<i>Perca fluviatilis</i>	سوف حاجی طرخان	✓	+	-	-	N	W=R	
64		<i>Sander lucioperca</i>	سوف سفید	✓	■	-	■	N	E>W>R	✓
65		<i>Sander marinus</i>	سوف سیاه	✓	-	-	■	N	E	
66	Gasterosteidae	<i>Gasterosteus aculeatus</i>	ماهی سه خاره	✓	+	-	+	A	E>W=R	
67		<i>Pungitius platygaster</i>	ماهی نه خاره	✓	-	-	+	N	E=W	
68	Poeciliidae	<i>Poecilia reticulata</i>	ماهی گویی	✓				O	W=R	
69	Channidae	<i>Channa micropeltes</i>	ماهی سر مار ی	✓				O	W	
70	Pangasiidae	<i>Pangasius sanitwongsei</i>	پنگوسی بلند باله	✓				O	W	
71	Loricariidae	<i>Hypostomus plecostomus</i>	گر به ماهی زره دار	✓				O	W	
Total				57	37+3	38	24+2	E:5 N:49 A:13 O:5	—	15

2016-2017/ ✓ Recorded in Field Survey by NIWI as JPA

Negative Mark (-) / Sign of Absence, Positive Mark (+) Sign of presence and the number of positive signs indicate the amount of presence in field survey. Square Mark (■) indicates the caught fish which were purchased from fishermen in the survey.

Natve/ N:native species, E: Endemic species, A: alien species, O: ornament fish

Abundance in the habitat/ R:river, W:wetland, E:estuary

Anadromous/ ✓: anadromous fish

Source: Report on Fish abundance and reproduction biology in Anzali Wetland and its inlet rivers, Keyvan Abbasi NIWI,

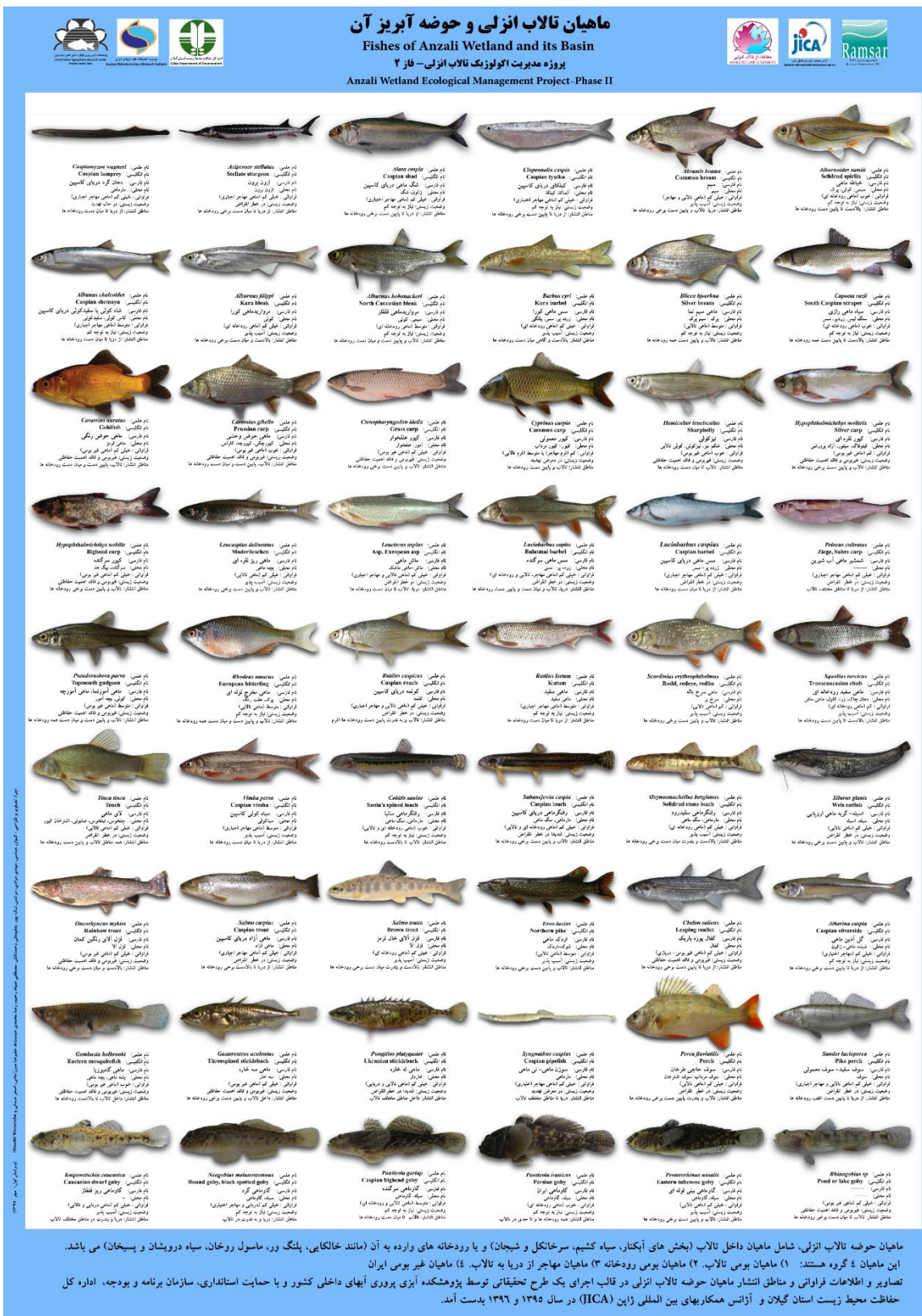


Figure 3.2-4 Fish in the Anzali Wetland and Its Watershed



(3) Flora

The comprehensive flora survey in the Anzali Wetland has not been implemented in the Project, even though the flora survey was on the action plan in the beginning of the project. The limited field survey of aquatic plant was implemented to grasp the Anzali Wetland Environmental Education Center in Selkeh Wildlife Refuge in autumn in 2018. The survey recorded 50 vascular plant species as shown in Table 3.2-7. That was limited field survey of plant only in Selkeh Wildlife Refuge in unappropriated season. 16 new plant species were recorded in addition to previous studies. It means the previous studies of plant were not enough to grasp the flora of the Selkeh Wildlife Refuge.

According to Dr. Bahram Zehzad, 360 vascular plant species have been recorded by previous studies in the Anzali Wetland. In fact, many studies about the plant was implemented before the Project. However, all of them was not enough to grasp the flora of the Anzali Wetland because there is no record of some common species in the Anzali Wetland. The flora of the Anzali Wetland must be more diverse and richer. Therefore, all season comprehensive vascular plant survey should be implemented as soon as possible.

**Table 3.2-7 Checklist of Vascular Plant in Selkeh WR in the Anzali Wetland**

No	Family	Species (Scientific Name)	Previous studies	2018 study	No	Family	Species (Scientific Name)	Previous studies	2018 study
1	Adoxaceae	<i>Sambucus ebulus</i>	+	+	61	Leguminosae	<i>Trifolium fragiferum</i>	+	
2	Alismataceae	<i>Alisma plantago-aquatica</i>	+		62		<i>Trifolium repens</i>	+	
3		<i>Amaranthus retroflexus</i>	+		63	Lythraceae	<i>Lythrum salicaria</i>	+	
4	Amaranthaceae	<i>Chenopodium album</i>	+	+	64		<i>Trapa natans</i>	+	+
5		<i>Dysphania ambrosioides</i>		+	65	Malvaceae	<i>Abutilon theophrasti</i>		+
6		<i>Dysphania botrys</i>	+		66	Marsileaceae	<i>Marsilea quadrifolia</i>	+	
7	Apiaceae	<i>Berula erecta</i>	+		67	Menyanthaceae	<i>Nymphoides cristata</i>		+
8		<i>Eryngium caucasicum</i>	+	+	68		<i>Nymphoides indica</i>	+	
9		<i>Torilis japonica</i>	+		69	Nelumbonaceae	<i>Nelumbo nucifera</i>	+	+
10		<i>Spirodela polyrrhiza</i>	+	+	70	Onagraceae	<i>Epilobium hirsutum</i>	+	
11		<i>Wolffia arthiza</i>	+		71		<i>Ludwigia palustris</i>	+	
12	Araliaceae	<i>Hydrocotyle ranunculoides</i>	+		72		<i>Lycopus europaeus</i>	+	
13	Betulaceae	<i>Alnus glutinosa</i>	+	+	73	Oxalidaceae	<i>Oxalis corniculata</i>	+	
14	Brassicaceae	<i>Biscutella didyma</i>	+		74	Phytolaccaceae	<i>Phytolacca americana</i>	+	+
15		<i>Briza minor</i>	+		75	Plantaginaceae	<i>Plantago major</i>	+	
16		<i>Capsella bursa-pastoris</i>	+		76		<i>Veronica persica</i>	+	+
17		<i>Cardamine hirsuta</i>	+		77		<i>Veronica polita</i>	+	
18	Boraginaceae	<i>Myosotis anomala</i>	+		78	Poaceae	<i>Avena fatua</i>	+	
19		<i>Myosotis scorpioides</i>	+		79		<i>Cynodon dactylon</i>		+
20	Brassicaceae	<i>Nasturtium officinale</i>	+		80		<i>Digitaria ischaemum</i>	+	+
21		<i>Rorippa islandica</i>	+		81		<i>Echinochloa crus-galli</i>	+	+
22		<i>Sisymbrium ino</i>	+		82		<i>Lolium persicum</i>	+	
23		<i>Typha latifolia</i>	+	+	83		<i>Microstegium vimineum</i>	+	
24	Butomaceae	<i>Butomus umbellatus</i>	+		84		<i>Paspalum dilatatum</i>	+	+
25	Ceratophyllaceae	<i>Ceratophyllum demersum</i>	+	+	85		<i>Paspalum paspaloides</i>	+	+
26	Caryophyllaceae	<i>Stellaria holostea</i>	+		86		<i>Phalaris minor</i>	+	
27		<i>Stellaria media</i>	+		87		<i>Phleum phleoides</i>	+	
28	Compositae	<i>Artemisia annua</i>	+	+	88		<i>Phragmites australis</i>	+	+
29		<i>Artemisia vulgaris</i>	+	+	89		<i>Poa trivialis</i>	+	
30		<i>Bidens tripartita</i>	+	+	90		<i>Setaria viridis</i>		+
31		<i>Centaurea iberica</i>	+		91		<i>Vulpia myuros</i>	+	
32		<i>Conyza canadensis</i>	+	+	92	Polygonaceae	<i>Fallopia convolvulus</i>	+	
33		<i>Eclipta prostrata</i>		+	93		<i>Persicaria hydropiper</i>	+	
34		<i>Senecio leucanthemifolius</i>		+	94		<i>Persicaria lapathifolia</i>		+
35		<i>Silybum marianum</i>	+		95		<i>Polygonum aviculare</i>	+	
36		<i>Sonchus oleraceus</i>	+		96		<i>Rumex conglomeratus</i>	+	+
37		<i>Xanthium strumarium</i>	+	+	97	Potamogetonaceae	<i>Potamogeton crispus</i>	+	+
38		<i>Symphytichum squamatum</i>	+	+	98		<i>Potamogeton perfoliatus</i>		+
39	Convolvulaceae	<i>Calystegia sepium</i>	+		99		<i>Stuckenia pectinata</i>	+	+
40	Cyperaceae	<i>Carex remota</i>	+		100		<i>Potamogeton nodosus</i>		+
41		<i>Carex riparia</i>	+		101	Ranunculaceae	<i>Batrachium trichophyllum</i>	+	
42		<i>Cladium mariscus</i>	+		102		<i>Ranunculus marginatus</i>	+	
43		<i>Cyperus longus</i>	+	+	103		<i>Ranunculus repens</i>	+	
44		<i>Cyperus rotundus</i>	+		104		<i>Ranunculus sceleratus</i>	+	+
45		<i>Schoenoplectus lacustris</i>		+	105	Rosaceae	<i>Potentilla reptans</i>		+
46		<i>Schoenoplectus tabernaemontani</i>	+		106		<i>Rubus caesius</i>	+	
47	Dennstaedtiaceae	<i>Pteridium aquilinum</i>	+		107		<i>Rubus persicus</i>	+	
48	Equisetaceae	<i>Equisetum arvense</i>	+		108		<i>Rubus sanctus</i>	+	+
49	Haloragaceae	<i>Myriophyllum spicatum</i>		+	109		<i>Galium aparine</i>	+	
50		<i>Myriophyllum verticillatum</i>	+		110	Salicaceae	<i>Populus caspica</i>	+	+
51	Hydrocharitaceae	<i>Hydrilla verticillata</i>	+		111		<i>Salix alba</i>	+	+
52		<i>Najas marina</i>		+	112	Salviniaceae	<i>Azolla filiculoides</i>	+	
53	Iridaceae	<i>Iris pseudacorus</i>	+		113		<i>Salvinia natans</i>	+	
54	Juncaceae	<i>Juncus bufonius</i>	+		114	Solanaceae	<i>Datura stramonium</i>	+	
55		<i>Juncus effusus</i>	+	+	115		<i>Solanum dulcamara</i>	+	
56	Lamiaceae	<i>Mentha aquatica</i>	+		116		<i>Solanum nigrum</i>	+	+
57	Leguminosae	<i>Gleditsia caspia</i>		+	117	Taxodiaceae	<i>Taxodium distichum</i>		+
58		<i>Lemna minor</i>	+		118	Thelypteridaceae	<i>Thelypteris palustris</i>	+	
59		<i>Lemna trisulca</i>	+		119	Typhaceae	<i>Sparganium erectum ssp. neglectum</i>	+	+
60		<i>Melilotus officinalis</i>	+		120	Urticaceae	<i>Urtica dioica</i>	+	+
					<b>Total 120 taxa</b>				
					104 50				

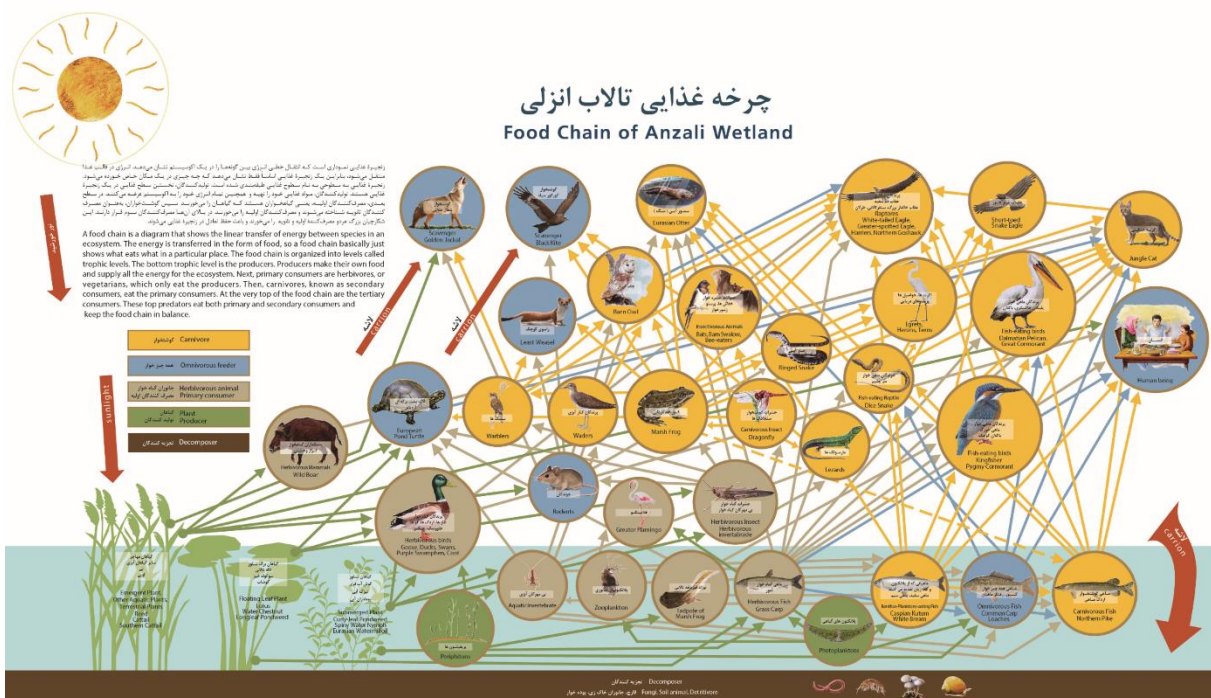
Source: Aquatic Plants Survey in Selkeh Wildlife Refuge, Bahram Zehza and Alireza Mirzajani(2019)  
(Subcontracted by JICA Expert Team)

(4) The Other Biological Component

Insect, benthos, zooplankton and phytoplankton survey have not been implemented in the Project, even though these surveys were on the action plan as part of comprehensive ecosystem survey as joint pilot activity in the beginning of the Project.

(5) Ecosystem

Chart of food chain of the Anzali Wetland. Is shown in Figure 3.2-5. It is very complicated even though the chart shows only typical species in the Anzali Wetland. There are many predator animals as top level of ecosystem pyramid. It means the wetland forms a very rich ecosystem based on the production of many plants. In addition, the biomass of the Marsh Frog is very large and many other animals including fish eat Marsh Frog in the Anzali Wetland. It is notable that Marsh Frog plays very important role as food resource in the Anzali Wetland ecosystem. Local people get food from the Anzali Wetland as well. Local people eat many Coot, Ducks, Fish and Herb from the Anzali Wetland.



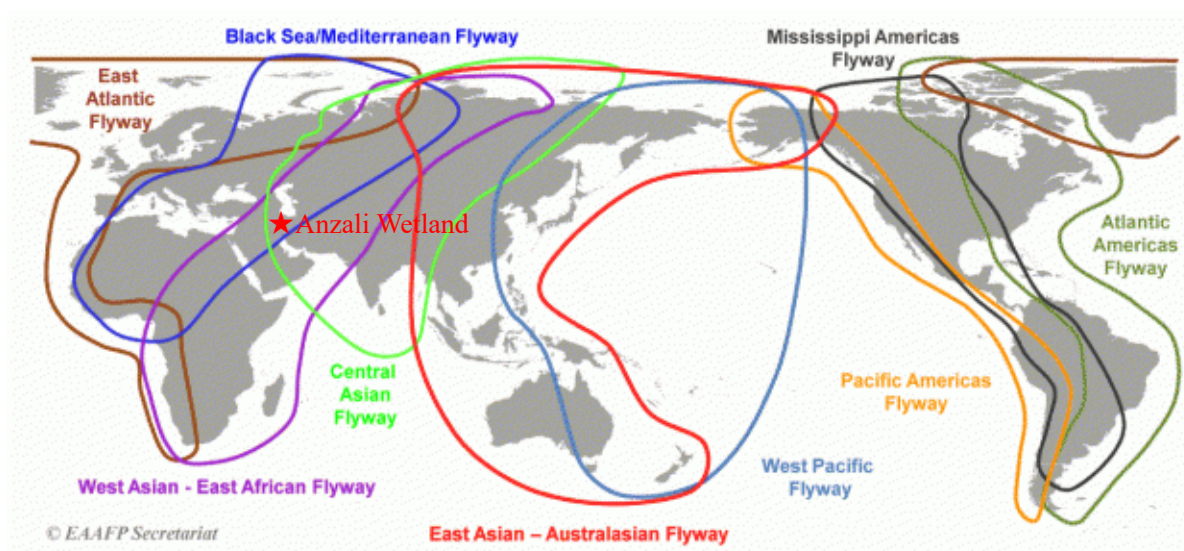
Source: JICA Expert Team

Figure 3.2-5 Food Chain of the Anzali Wetland

(6) Flyway and Wetland Network

There is a significant ecological feature that is unique to the Anzali Wetland. The Wetland is located in the middle of three flyways, the Black Sea/ Mediterranean Flyway, the West Asian East African flyways and Central Asian Flyways, crossing each other as shown in Figure 3.2-6.





Source: East Asian-Australian Flyway Partnership (Anzali Wetland is added by JICA Expert Team)

**Figure 3.2-6 Nine Flyways of Migratory Birds and Anzali Wetland**

A satellite bird tracking survey of four Dalmatian Pelicans (*Pelecanus crispus*) as typical wintering waterbird in the Anzali Wetland was implemented from March to May 2016.

The Pelicans stopped over in Ghizr-agaj Wetland in Azerbaijan and migrated to Volga Delta in Russia. It means Wetland network along the Caspian Sea is very important to conserve the migratory birds.

In addition, Purple Heron (*Ardea purpurea*) as a typical species of summering migrant breeding bird in the Anzali Wetland was selected as second target species. Purple Heron breeds in reed bed of the Anzali Wetland. It generally breeds in Iran including coast area of the Caspian Sea, and winters in southern countries. A satellite bird tracking survey of three Purple Herons was implemented from May to Dec 2017. The Herons stopped over at several wetland in Iran and migrated to Hawizeh Marsh in Iraq and Izad Khast Dam in Fars Province. It means wetland network in Iran is very important to conserve the migratory birds as well.



Source: JICA Expert Team

**Figure 3.2-7 Migratory Route of Dalmatian Pelican and Purple Heron**

### 3.2.4 Physical Component

#### (1) Climate

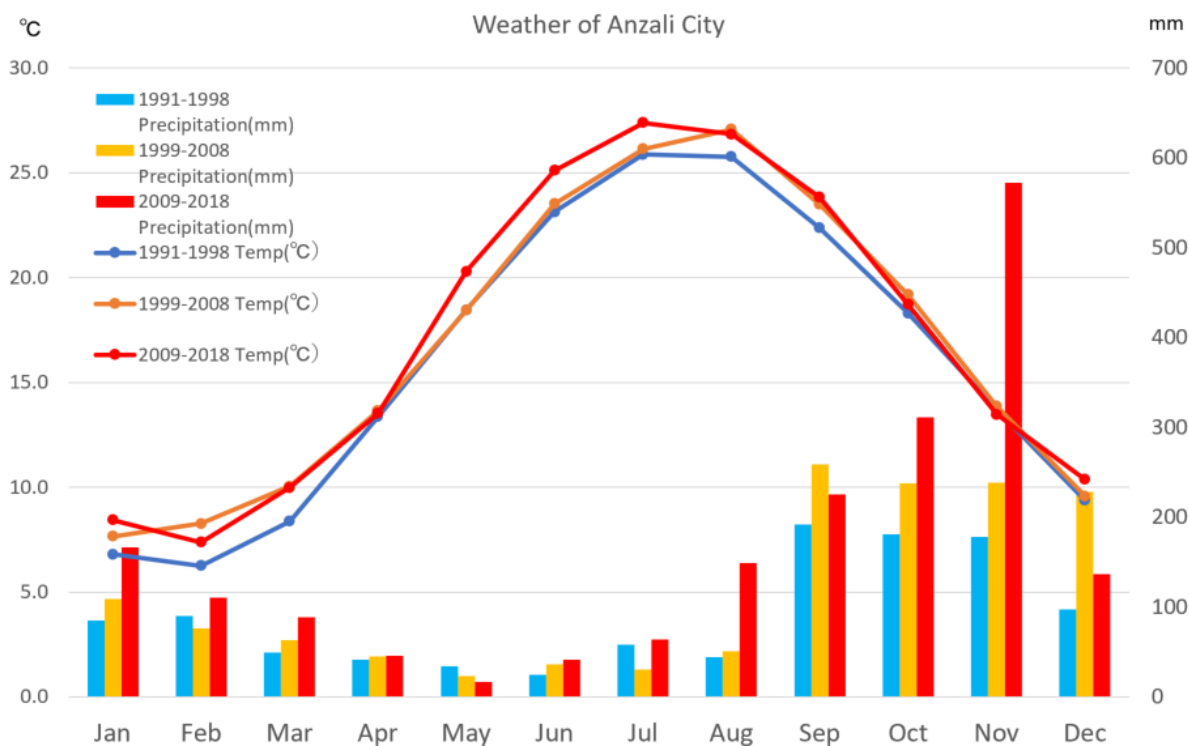
There is Caspian mild climate in this site. Anzali has the most humid climate of any city in Iran, having a climate heavy autumn and early winter rainfall. Rain Temperature Diagram of the Anzali City from 1992 to 2018 is shown in Figure 3.2-8. It classified as a Mediterranean climate (Köppen Csa). Its influence on this thin coastal strip of land along the Caspian Sea, coupled with the close proximity of the Alborz Mountains (including Talesh Mountains) Range to the south, results in a climate that is unique from the arid climate that is typical in the rest of Iran. Wind in this region comes from two main directions. The predominant wind is from the north-west as a result of continental air movements, namely the Atlantic and Mediterranean fronts, while the Alborz Mountain Range causes a local southerly wind which starts in the mountains and moves northwards down the mountains and towards the plains and coast. The climate in the Anzali Wetland watershed is characterized by two distinct types. The lowland area to the north under El.500 m is characterized by warm temperatures, high moisture and abundant rainfall during the summer with a mild climate during the winter. The climate between El. 500 m to

3,000 m is noticeably different from the lowland, characterized by cooler temperatures, drier conditions and less rainfall.

According to NOAA's National Climatic Data Center (NCDC), the average annual rainfall in the Anzali City between 1992 and 2018 is 1480 mm, with rain falling throughout the year but mainly from autumn to winter. The lowest temperatures occur in February (mean around 7.3°C) and the highest in July (mean maximum nearly 26.5°C).

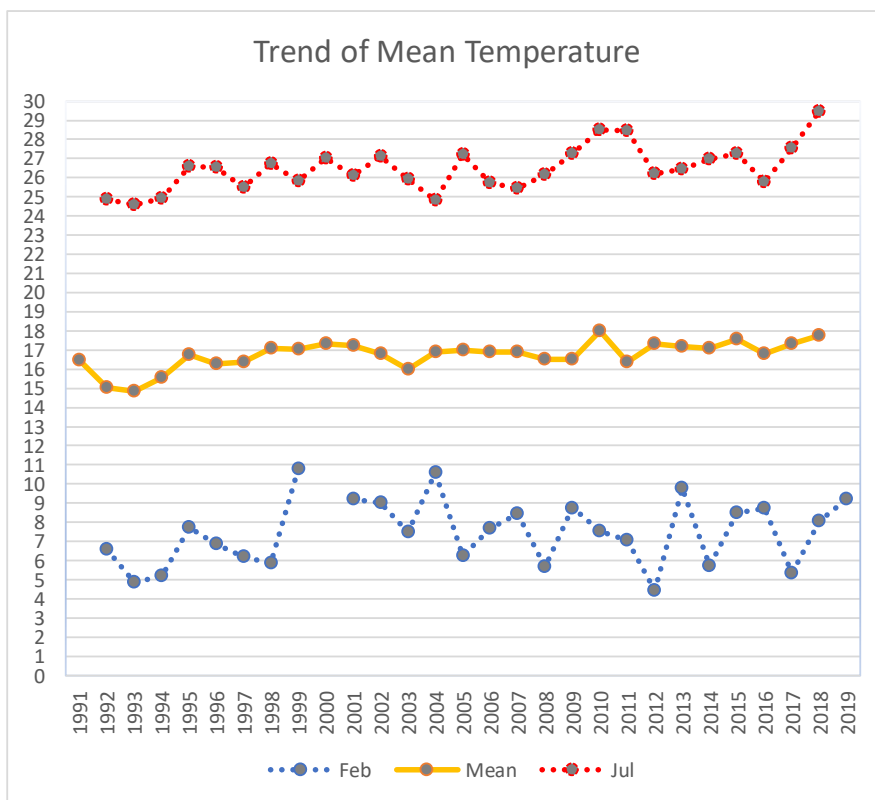
The temperature is increasing at a slow speed as global warming. Annual average of temperature has been increased about 1°C during recent 30 years as shown in Figure 3.2-9. Especially the summer temperature has been increased. In July, about 1.5°C has increased.

The annual precipitation is under slightly increasing trend as shown in Figure 3.2-10.



Source: Prepared by JICA Expert Team based on NCDC Climate Data Online (<https://gis.ncdc.noaa.gov/>)

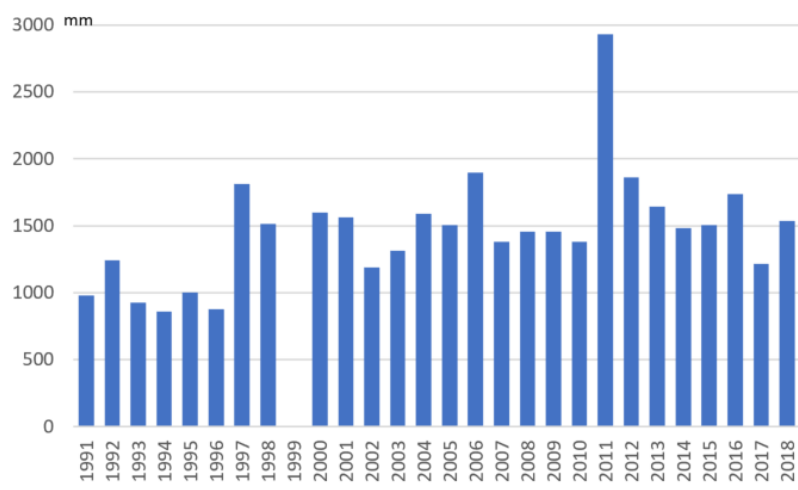
**Figure 3.2-8 Rain Temperature Diagram of the Anzali City**



Note: Feb temperature in 1999 is data missing

Source: Prepared by JICA Expert Team based on NCDC Climate Data Online (<https://gis.ncdc.noaa.gov/>)

**Figure 3.2-9 Temperature Trend of the Anzali City**



Note: 1999 data is missing

Source: Prepared by JICA Expert Team based on NCDC Climate Data Online (<https://gis.ncdc.noaa.gov/>)

**Figure 3.2-10 Annual Precipitation Trend of the Anzali City**

(2) Rivers in the Watershed and Discharge Characteristics

The Anzali Wetland watershed has a catchment area of 3,610 km<sup>2</sup>. There are 10 major river systems entering the wetlands. The sub-catchment areas range between 100 km<sup>2</sup> and 700 km<sup>2</sup>. These rivers have perennial flow with origins in the Alborz Mountains to the south. Starting

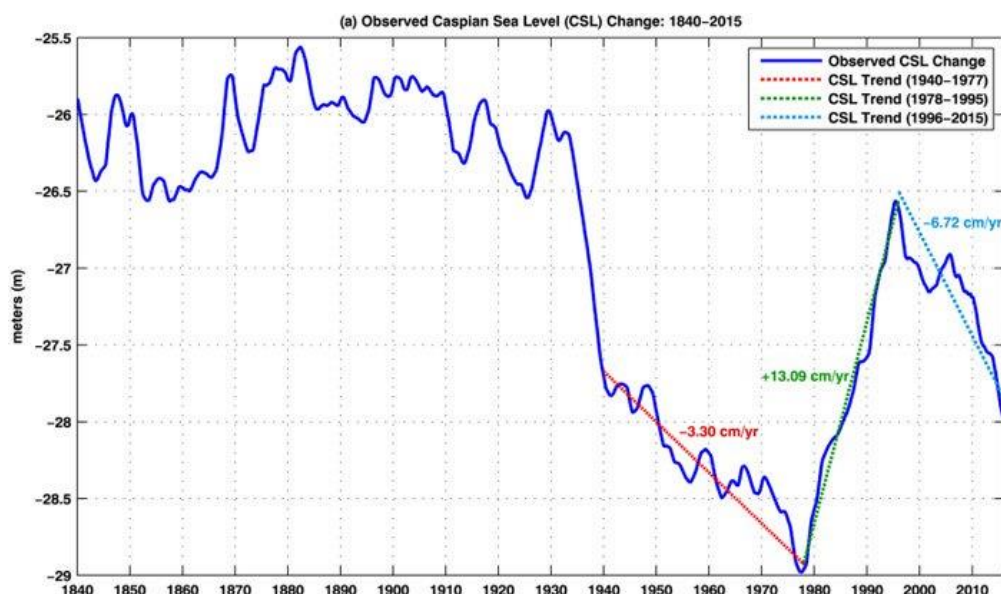
from the eastern-most side of the wetland, the Khomamroud River flows westward and enters the wetland from the east. The Pirbazar and Pasikhan Rivers flow northward and merge just before entering the wetland. The Pishroudbar (also called Shakhraz), Masulehroud Khan, Palangvar, Khalkai, Morghak and Bahambar Rivers flow northeast and enter the wetland area. The Chafroud River alone enters the Anzali lagoon from the west. All rivers eventually drain into the Caspian Sea via the Anzali Wetland.

Examination of monthly discharge data reveals that there are two periods of high flow for the rivers in the Anzali Wetland watershed. The first occurs in October/November due primarily to runoff during the rainy season. The second occurs in February/March due to snowmelt from the mountain areas. The annual mean discharge into the wetlands is estimated to be 76.14 m<sup>3</sup>/s, or 2,400 MCM.

(3) Water Regime related with Caspian Sea Level

Water level of the Anzali Wetland except Siahkeshim Protected Area is almost linked with Caspian Sea Level (CSL). According to J. L. Chen et al (2017), rapid CSL increase (about +12.74 cm/yr) in 1979–1995 and significant drop (–6.72 cm/yr) during 1996–2015 were observed. It means the water level and water depth of the site was recently decreased. After rainfall the water level of the site is increased during several days as a reservoir and flow down smoothly.

The monitoring of water level and water depth of the wetland has recently started. Therefore, the accurate long-term trend of the water level and water depth is unknown.



Source: Jianli Chen/Geophysical Research Letters/AGU

Figure 3.2-11 Caspian Sea Level Change

(4) Water Quality

Water Quality of Anzali Wetland is described in Chapter 6.3.

(5) Geology and Soil

The geology of the Anzali Wetland watershed is classified into two geological zones, the Quaternary zone and the Pre-Tertiary zone. The plain area in the northern part of the watershed is widely covered by the Quaternary zone consisting of Pliocene to recent sediments, whereas the mountainous area in the southern part is underlain by a Pre-Tertiary zone consisting of Lower Paleozoic to Neogene Formations and some intrusive rocks.

The oldest bedrock in the watershed is the Pre-Paleozoic formation. It is exposed mainly along the upstream of the Shiamazgiroud River, the Gashtroudkhan River, the east bank of the Masulehroudhan River and the Morghak River. Above the Pre-Paleozoic formation is a Paleozoic Formation. The Lower Paleozoic formation is of limited occurrence in the watershed. The Upper Paleozoic formation is widely developed along the upstream of the Khalkaii River, the Shahmoalem River and the Teniyan River. Triassic-Jurassic, lower and upper Cretaceous formations are scattered on the eastern and western parts of the mountainous area, upstream of Masulehroudhan River and the south part of the Rasht.

Along the foot of mountainous area, recent deluvial and fluvial deposits have developed in the form of a narrow bank from east to northwest.

In the plain area of the watershed, the underlying zone is older in the southern part than in the northern part and is subdivided into 1) the lower alluvial, flood-plain and deltaic deposits distributed only along some rivers, especially in the eastern part of the watershed; 2) pleistocene marine deposits distributed widely in the plain; 3) beach deposits overlying pleistocene marine deposits in the form of a narrow zone; and 4) upper alluvium and flood plain deposits distributed along the rivers, recent deposits distributed along the Caspian Sea, and most recent deposits of the Sefidroud River's fan, distributed south-east of Rasht.

The soil types in the area are classified into two types, namely mountainous soils and plain soils. The mountainous soils are composed of lithic leptosols, dystric cambisols, humic cambisols, mollic leptosols, calcareous regosols, gleyic cambisols and calcareous cambisols while eutric cambisols, eutric gleysols and gleyic luvisols are distributed widely in the plain area. These soils, especially eutric cambisols and gleyic luvisols, are usually acidic soils with a deep and heavy structure.

Around the Anzali Wetland, mollic gleysols and calcareous regosols are dominant. Both soils have developed from gleyic coastal sand, but the former has a significant hydromorphic feature with fertile topsoil.

### 3.2.5 Ecosystem Services

(1) Ecosystem Services/Benefits

Ecosystem services and benefits of the Anzali Wetland is shown in Table 3.2-8.

The table was prepared based on the RIS format using qualitative information. It means the Anzali Wetland contributes many ecosystem services and benefits.

**Table 3.2-8 Ecosystem Services of the Anzali Wetland**

Ecosystem service		Examples	Importance /Extent /Significance
Provisioning Services	Food for humans	Sustenance for humans (fish, duck, herb)	High
	Fresh water	Water for irrigated agriculture	High
	Wetland non-food products	Livestock fodder	High
		Reeds and fibre	Medium
Regulating Services	Maintenance of hydrological regimes	Storage and delivery of water as part of water supply systems for agriculture and industry	High
	Maintenance of hydrological regimes	Groundwater recharge and discharge	High
	Erosion protection	Soil, sediment and nutrient retention	Medium
	Pollution control and detoxification	Water purification/waste treatment or dilution	Medium
	Climate regulation	Local climate regulation/buffering of change	Medium
	Hazard reduction	Flood control, flood storage	High
Cultural Services	Recreation and tourism	Recreational hunting and fishing	High
		Water sports and activities	Medium
		Picnics, outings, touring	Medium
		Nature observation and nature-based tourism	High
	Spiritual and inspirational	Aesthetic and sense of place values	High
		Contemporary cultural significance, including for arts and creative inspiration, and including existence values	High
	Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	Medium
		Major scientific study site	High
		Type location for a taxon	Medium
		Long-term monitoring site	Medium
Supporting Services	Biodiversity	Supports a variety of all life forms including plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part	High
		Sediment retention	High
	Soil formation	Accumulation of organic matter	High
		Nutrient cycling	Carbon storage/sequestration
		Storage, recycling, processing and acquisition of nutrients	Medium

Source: JICA Expert Team

(2) Social and Cultural Values

One of the local cultures that plays an important role in the conservation and wise use of the Anzali Wetland is the system of customary management practiced among the communities



surrounding the wetland, known as “Abbandan-dari”. "Abbandan" is water area in the Anzali Wetland for hunting and fishing. The customary Abbandan-dari system is practiced by a group of local people. Since 1971, Abbandan-dari practices have been undertaken under the supervision of the DOE. Areas are rented to groups of local people in winter, and conservation conditions are built in to the rental agreements. Kinds of waterbirds, number, days for hunting were limited based on the agreement. 90 *Abbandans* which range in size from 8 to 160 hectares were rented in 2018 winter. Many licensed owners constructed simple cottage in *Abbandan*.

### **3.3 Conservation and Management**

#### **3.3.1 Ecological Character Threats and Responses**

Ecological Character Threats and Responses of the Anzali Wetland is shown in Table 3.3-1.

The table was prepared based on the RIS format using qualitative information. It means there are many actual and potential threats of the Anzali Wetland. The information to prepare the table is not enough. It is better to use the table to check roughly an outline of the actual threat and responses. A detailed information should be collected and reviewed when the specific detailed plan will be prepared.



**Table 3.3-1 Ecological Character Threats and Responses of the Anzali Wetland**

Factors adversely affecting site		Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Human settlements (non agricultural)	Housing and urban areas	Medium	Medium		?	✓	↑
	Commercial and industrial areas	Low	Medium		?	✓	↑
	Tourism and recreation areas	Medium	High	✓	↑	✓	↑
	Unspecified development	Low	Medium	✓	?	✓	?
Water regulation	Drainage	High	High	✓	↑	✓	↑
	Water abstraction	High	High	✓	↑	✓	↑
	Dredging	Medium	Medium	✓	↑	✓	?
	Canalisation and river regulation	Medium	High	✓	↑	✓	↑
Agriculture and aquaculture	Annual and perennial non-timber crops	Medium	Medium	✓	→	✓	↑
	Wood and pulp plantations	Medium	Medium	✓	↑	✓	↑
	Livestock farming and ranching	Medium	Medium	✓	→	✓	↑
	Marine and freshwater aquaculture	Medium	Medium	✓	→	✓	→
Energy production and mining		Low	Low		→		→
Transportation and service corridors	Roads and railroads	Medium	High	✓	↑	✓	↑
	Aircraft flight paths	Low	Low	✓	→	✓	→
Biological resource use	Hunting and collecting terrestrial animals	High	High	✓	→	✓	→
	Fishing and harvesting aquatic resources	High	High	✓	→	✓	→
	Gathering terrestrial plants	Low	Low	✓	→	✓	→
	Logging and wood harvesting	Low	Low	✓	→	✓	→
Human intrusions and disturbance	Recreational and tourism activities	Medium	Medium	✓	↑	✓	↑
	(Para)military activities	Low	Low		→		→
Natural system modifications	Fire and fire suppression	Medium	Medium	✓	→	✓	→
	Dams and water management/use	Medium	Medium	✓	↑	✓	↑
Invasive and other problematic species and genes	Invasive non-native/ alien species	Medium	High	✓	↑	✓	?
	Problematic native species	Low	Low		?		?
Pollution	Household sewage, urban waste water	High	High	✓	↑	✓	↑
	Industrial and military effluents	Low	Medium	✓	→	✓	?
	Agricultural and forestry effluents	Medium	High	✓	?	✓	?
	Garbage and solid waste	High	High	✓	→	✓	→
	Air-borne pollutants	Low	Low		→		?
Geological events		Low	Low		→		→
Climate change and severe weather	Habitat shifting and alteration	Low	Low		↑		↑
	Caspian Sea Level Decline	High	High	✓	↑	✓	↑

Source: JICA Expert Team

### 3.3.2 Land Tenure and Management Authority

Almost of the inside of the boundary of the Ramsar site is owned by the government. Mainly, NRWGO manages as the land owner. And the other governmental organization related to the land use in the wetland.

However, inappropriate permission of land use sometimes issued to local people in Ramsar Site and even in the protected areas. It causes some difficulties to manage the land use in the Anzali Wetland.

### 3.3.3 Protected Area Management by DOE

Three wildlife refuges (WRs) and one protected area (PA) were established in the Anzali Wetland as shown in Table 3.3-2 and Figure 3.3-1. These areas are strictly protected based on the Hunting and Fishing Law. Total area of these WRs and PA is 6,510 ha, it is 33.4% of the Anzali Wetland (19,485 ha).

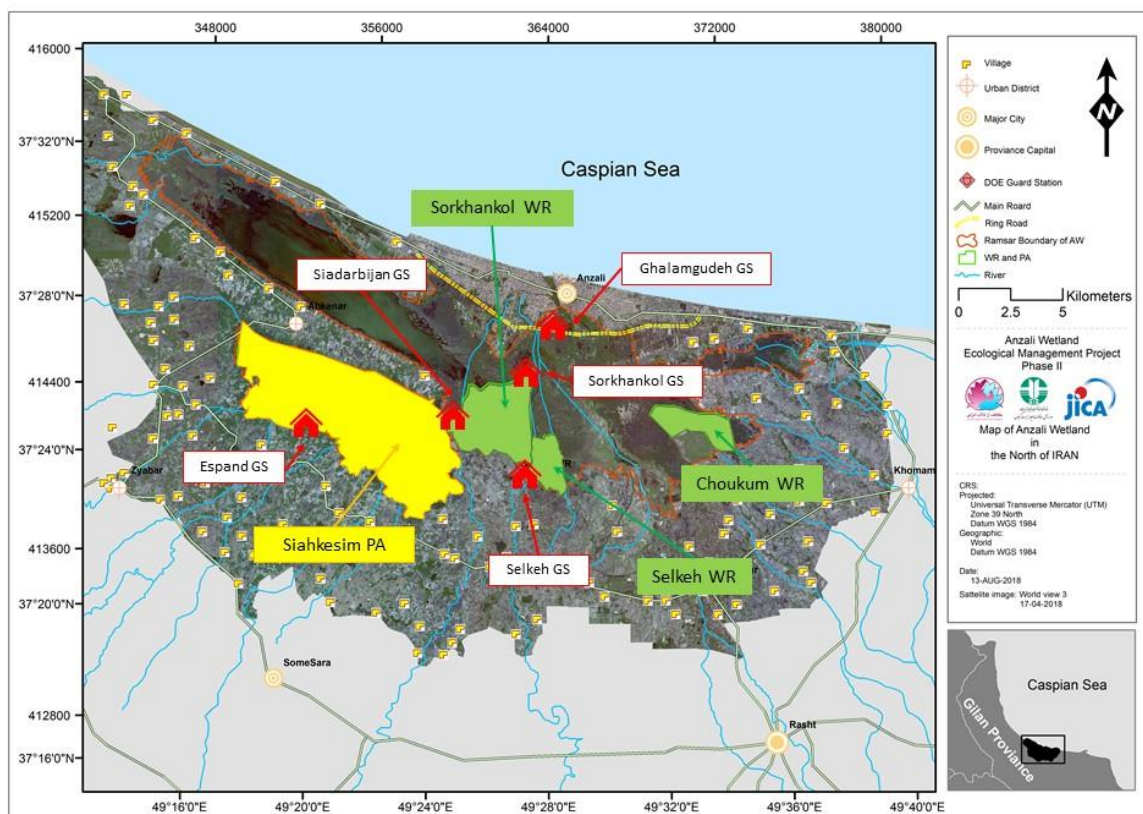
Anzali Wetland has five guard stations (GSs) of DOE as shown in Table 3.3-3 and Figure 3.3-2. The DOE guards cover all of WRs, PA and the other Anzali Wetland. The number of guards are not e

There are 48 warning signboards on the boundaries of these WRs and PA (42 signboards were installed by JICA Expert Team under Anzali Wetland Ecological Management Project PhaseII)

**Table 3.3-2 Protected Areas in the Anzali Wetland**

No	Protected Area	Area(ha)	Establishment
1	Selkeh Wildlife Refuge	360	1970
2	Siahkeshim Protected Area	4,498	1967
3	Sorkhankol Wildlife Refuge	1,209	2002
4	Choukum Wildlife Refuge	443	2007
	<b>Total</b>	<b>6,510</b>	

Source: JICA Expert Team



Source: JICA Expert Team

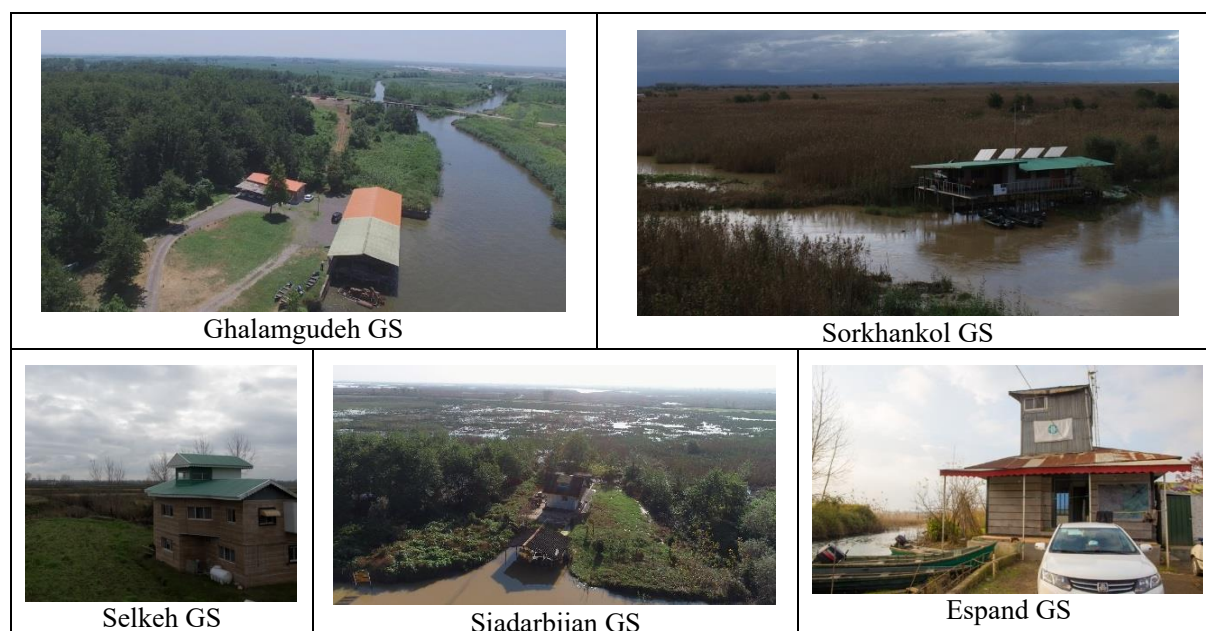
**Figure 3.3-1 Protected Areas and Guard Stations in the Anzali Wetland**

The Anzali Wetland has 5 GSs to manage the Anzali Wetland including WRs and PA as shown in Figure 3.3-2 and Table 3.3-3. In total, 30 DOE guards are in charge of patrol and management of Anzali Wetland including WRs and PA in 48 hours shift. These GSs have played a certain role in the protected area management. However, the number of guards have been not enough to cover huge whole Anzali Wetland.

**Table 3.3-3 DOE Guard Stations in the Anzali Wetland**

No	Protected Area	DOE Branch	Number of guards	Territory
1	Ghalamgudeh GS	Anzali	7	Sorkhankol WR, West Lagoon
2	Sorkhankol GS	Anzali	5	Sorkhankol WR
3	Selkeh GS	Somesara	6	Selkeh WR, Sorkhankol WR (south part)
4	Siadarbijan GS	Somesara	6	Siahkesim PA, Sorkhankol WR (south part)
5	Espand GS	Somesara	6	Siahkesim PA
	Total		30	

Source: JICA Expert Team



Source: JICA Expert Team

**Figure 3.3-2 Guard Stations in the Anzali Wetland**

### 3.4 Montreux Record

The Montreux Record is a register of wetland sites on the List of Wetlands of International Importance (Ramsar Sites) where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference. It is maintained as part of the Ramsar List.

### 3.4.1 Ramsar Advisory Mission (RAM) in 1992

In discussions between the Ramsar Secretariat and the DOE of Iran at and after the Montreux Conference (COP4) in 1990, the need for a mission to visit Iran at an early date was emphasized. The Iranian authorities stressed the importance of the mission assessing the situation in the wetlands of the Seistan basin but welcomed the prospect that the mission should also visit other Iranian wetlands including the Anzali Wetland designated for the List. Four wetlands in the South Caspian have been designated by Iran for the Ramsar List; they are, from west to east, Anzali Wetland, Bandar Kiashahr, Amirkelayeh, and Miankaleh. The Iranian report to the 1984 Groningen Conference did not mention any change of ecological character at these sites but it was felt appropriate that the Ramsar mission should visit the Caspian region in order to see the current state of the four Ramsar sites and in particular to investigate any effects on these wetlands of the well-documented rise in level of the Caspian Sea.

A RAM visited the wetlands including the Anzali Wetland in Iran in March 1992. The mission evaluated the situation of the Anzali Wetland and recommended as follows;

(1) Situation of Management and Waterfowl the Anzali Wetland as of 1992

1) Situation and Management problem

The RAM pointed the current situation and management problem of the Anzali Wetland as following;

- Rapid spread of Reed bed
- Eutrophication as a result of increased inflow of domestic sewage, fertilizers and other organic material.
- Salt water intrusion during summer months because of high level Caspian Sea level and less water inflow.

2) Changes in Waterfowls

The RAM mentioned that the total number of waterfowls observed (18,500 Anatidae, 8,650 Coot and 3,950 other waterfowl) was far below counts in the 1970s, when the total count of Ducks and Coots usually exceeded 200,000. The RAM pointed followings as well;

- Decline of Coot and Pochard in Central Area caused by over hunting.
- Decline of Dabbling Duck and Geese in Selkeh Wildlife Refuge caused by high water level.
- Decline of Purple Swamphen in Central Area caused by high water level and Azolla.
- Large population of Pygmy Cormorant.

(2) Recommendations by RAM in 1992

1) Continuing of Research and Monitoring

The RAM recommends research and monitoring be continued and extended in the Anzali Wetland. Some of the issues worthy of special attention include:

- The impact of sea-level rise on the ecology of the wetlands;
- Water pollution from domestic sewage, fertilizers and pesticides, and the problem of eutrophication;
- Infestation by Azolla;
- The effects of excessive hunting pressure and its associated disturbance on waterfowl populations.

2) Introduction of Measures to Curb Hunting Pressure

The RAM recommends that the DOE should investigate a variety of possibilities for conserving waterfowl populations in the wetland and maintaining hunting opportunities for the general public. These might include:

- Imposing stricter controls on the number of hunters, number of days when hunting is permitted, bag limits and hunting techniques;
- Giving greater encouragement to duck hunting communities which use traditional hunting techniques to manage and patrol their hunting areas (eg . as occurs at Gasghiasheh in the eastern wetland);
- Encouraging sport hunters (using shot-guns) to form their own hunting clubs or societies to manage their activities more wisely;
- Improving the protection of Siahkeshim Protected Area;
- Creating a buffer zone around Selke Wildlife Refuge to reduce poaching around the edge of this extremely important reserve;
- Establishing additional non-hunting areas in other parts of the Anzali Wetland (eg. at Sorkhankol).

### 3.4.2 Listed in Montreux Record in 1993

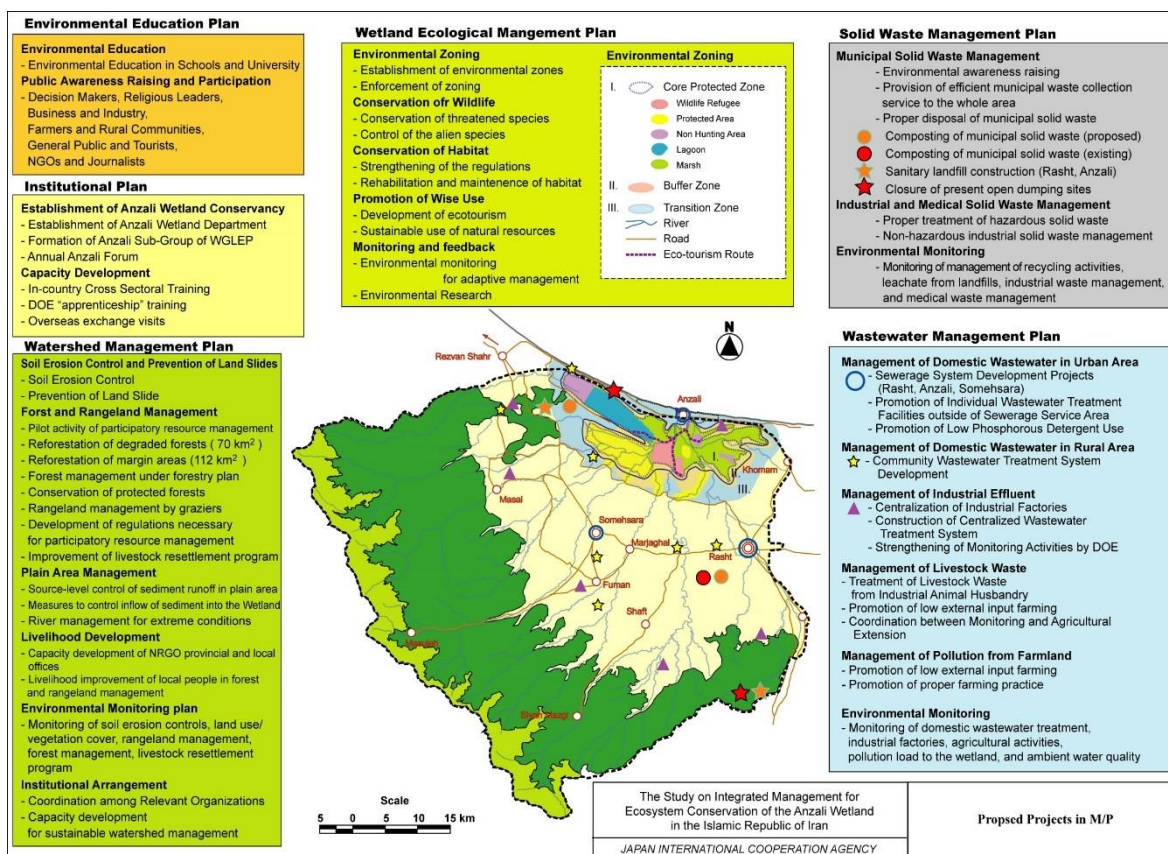
Based on the RAM report in 1992, the Anzali Wetland was listed in the Montreux Record on Dec 31, 1993. There were many issues mentioned on the RAM report, however research activity and control of excessive hunting are recommended finally.

The situation of the Anzali Wetland has been greatly changed until now. The evaluation of current situation is described in Chapter 4.



### 3.5 History of International Cooperation with JICA

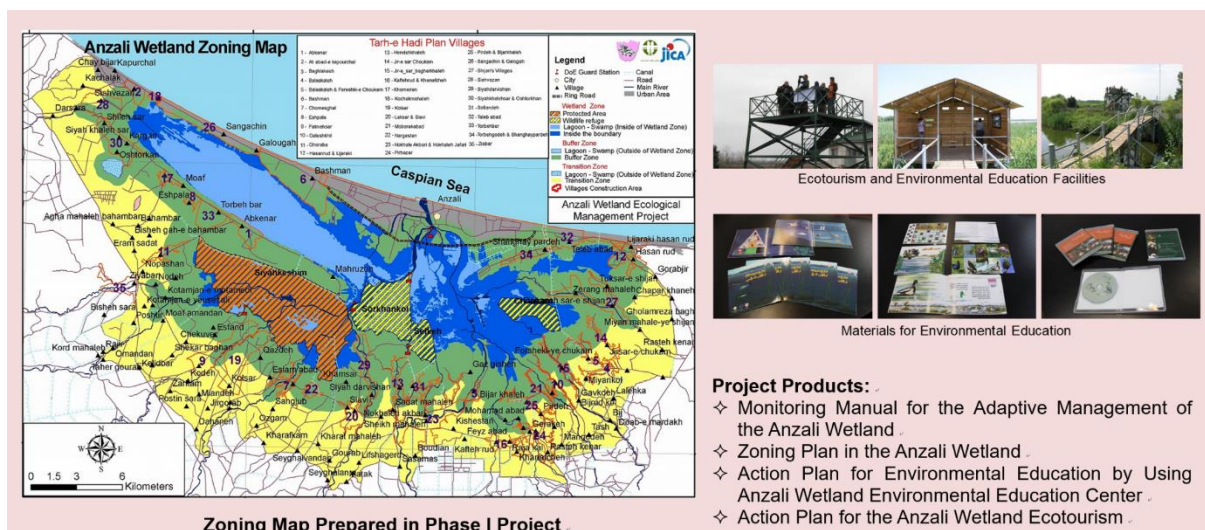
Recognizing the necessity of enhancement of the Anzali Wetland conservation, the Government of Iran requested the Government of Japan to conduct a comprehensive study for the conservation of the Wetland. From 2003 to 2005, the Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran was conducted by JICA, including: 1) the preparation of a comprehensive Master Plan for the conservation of the Wetland; 2) the execution of pilot activities; and 3) capacity development of concerned agencies and the staff for the management of wetlands as shown in Figure 3.5-1.



Source: JICA Expert Team

Figure 3.5-1 Summary of Proposed Master Plan in 2005

As the following step or the preparation of Master Plan, the Government of Iran requested the Government of Japan to undertake a technical cooperation to realize some of key measures from the Master Plan such as the establishment of institutional mechanism for conservation and the framework of detailed zoning including regulations from 2008-2010, 2011-2012 as shown in Figure 3.5-2.

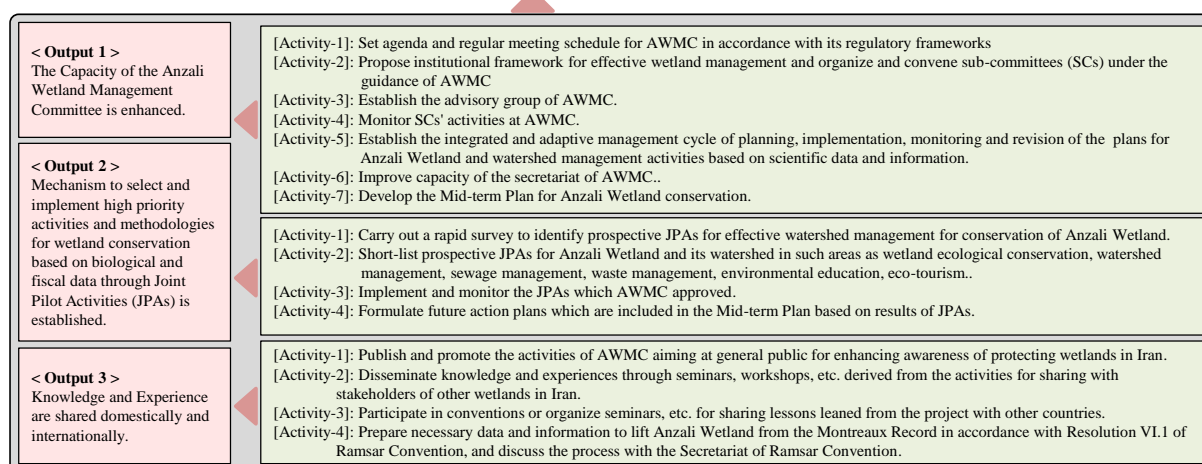


Source: JICA Expert Team

Figure 3.5-2 Products of Phase I Project from 2007-8, 2011-12

In accordance with the achievement of Phase I Project, the Anzali Wetland Ecological Management Project - Phase II was requested from GOI to the Government of Japan. The project was implemented based on the Record of Discussions (R/D), which was agreed and signed on 15th December 2013 among Gilan Province, DOE, and JICA as shown in Figure 3.5-3. The purpose of the Phase II Project was “An integrated and adaptive wetland management system of the Anzali Wetland with effective involvement of all stakeholders and appropriate scientific data and information is established.” In order to realize the project purpose, three outputs are set; 1) The Capacity of the Anzali Wetland Management Committee is enhanced, 2) Mechanism to select and implement high priority activities and methodologies for wetland conservation based on biological and fiscal data through Joint Pilot Activities (JPAs) is established, and 3) Knowledge and experience are shared domestically and internationally. In accordance with the R/D for Phase II Project, a Mid-term Plan for Anzali Wetland Conservation between 2020 and 2030 (Mid-term Plan) would be prepared on necessary actions to be implemented for conservation of the Anzali Wetland for 10 years after completion of the project based on results, knowledge, lessons-learned of the project including experiences of the JPAs.

<p><b>[ Super Goal ]</b> Anzali wetland receives clean water to sustain an attractive landscape and supports rich biodiversity where local communities make wise use of its resources as a natural heritage and enhance cooperation among the organizations involve.</p>	<p>&lt;Objectively Verifiable Indicators&gt; Anzali wet land is removed from the Montreaux record of the Ramsar Convention.</p>
<p><b>[Overall Goal]</b> (1) The conservation activities of Anzali wetland is enhanced by a variety of approaches and methodologies introduced. (2) The integrated Anzali wetland management system under the Anzali Wetland Management Committee (AWMC) is recognized as a conservation model for wetlands in Iran and the Caspian Region.</p>	<p>&lt;Objectively Verifiable Indicators&gt; (1-1) The system which was formulated in the Project such as AWMC and SCs continuously held under the Mid-term Plan. (1-2) Under AWMC and SCs, the conservation and restoration activities are continuously developed and evaluated to reduce the drivers degrading the wetland ecosystem, based on scientific information, such as biological and physical data, from monitoring surveys. (2-1) Policy dialogue meeting regarding to the management of Anzali Wetland Conservation among Central Government, the other Caspian Region, and stakeholders of Anzali wetland is held within one year after the Project. (2-2) At least one wetland in Iran and/or the Caspian Region introduces the integrated Wetland conservation mechanism developed in Anzali Wetland.</p>
<p><b>[Project Purpose]</b> An integrated and adaptive Wetland management system of Anzali wetland with effective involvement of all stakeholders and appropriate scientific data and information is established.</p>	<p>&lt;Objectively Verifiable Indicators&gt; (1) AWMC is held based on the Anzali Wetland Decree/Declaration and discuss conservation issues raised by Sub-Committees (SCs), decide necessary actions and allocate budget for the actions. (2) Wetland conservation activities are decided based on appropriate scientific data and information. (3) Annual reports of AWMC are elaborated.</p>



Note: Revision of the Project Design Matrix was proposed by the JICA Mid-Term Review Team in June 2016 as PDM Version 2.0 and confirmed by the Iranian side with revision of the Revision of the Record Discussion.

Source: JICA Expert Team

**Figure 3.5-3 Outline of the Project Design Matrix (Version 2.0)**

## 4. Evaluation -Why is the Anzali Wetland Important?

### 4.1 Evaluation Based on the Ramsar Sites Criteria

Any wetlands satisfied at least only one of the Criteria (Table 4.1-1) can designate as Ramsar Site. Anzali Wetland satisfy eight of nine criteria as described in Sections 4.1.1 - 4.1.9. It means the Anzali Wetland has still significant value of ecological character.

**Table 4.1-1 Nine Criteria for Identifying Wetlands of International Importance**

<b>Group A of the Criteria. Sites containing representative, rare or unique wetland types</b>	
Criterion 1	A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
<b>Group B of the Criteria. Sites of international importance for conserving biological diversity</b>	
<i>Criteria based on species and ecological communities</i>	
Criterion 2	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
Criterion 3	A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
Criterion 4	A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
<i>Specific criteria based on waterbirds</i>	
Criterion 5	A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.
Criterion 6	A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
<i>Specific criteria based on fish</i>	
Criterion 7	A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
Criterion 8	A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
<i>Specific criteria based on other taxa</i>	
Criterion 9	A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent nonavian animal species.

Source: Ramsar Convention

#### 4.1.1 Criterion 1: Representative, rare or unique natural or near-natural wetland types

##### (1) Hydrological Services Provided

The Anzali Wetland is a typical example of lagoon along the south coast of the Caspian Sea. The Anzali Wetland Complex is located near the port city of Bandar Anzali in Gilan Province, North part of Iran along the Southern coast of the Caspian Sea.



The site is complex of inland wetland and coastal wetland. Almost half of the site (about 9,000ha) is permanent freshwater marshes (Tp) and 2,200 ha is seasonal (from autumn to spring) freshwater marshes (Ts) mainly pasture or covered by Reed-bed.

About 3,000 ha of the site is permanent freshwater lake(O).

Coastal freshwater lagoon (K) is about 2,000 ha which sometimes has salt water intrusion from Caspian Sea in summer.

Permanent rivers/streams/creeks(M) are 300 ha in total in the site.

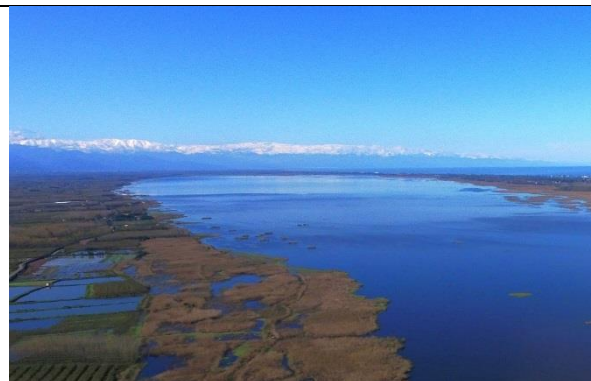
The main hydrological values and functions of the wetland are water purification, biodiversity, water storage, flood control and preventing water intrusion as well as Anzali Wetland plays a vital role as a micro-climate during the dry season. Especially water supply for agriculture and aquaculture is important services of Anzali Wetland. Also, many pump stations are working to pump up the water from the wetland.



Permanent freshwater marsh (Tp)  
Siahkeshim PA

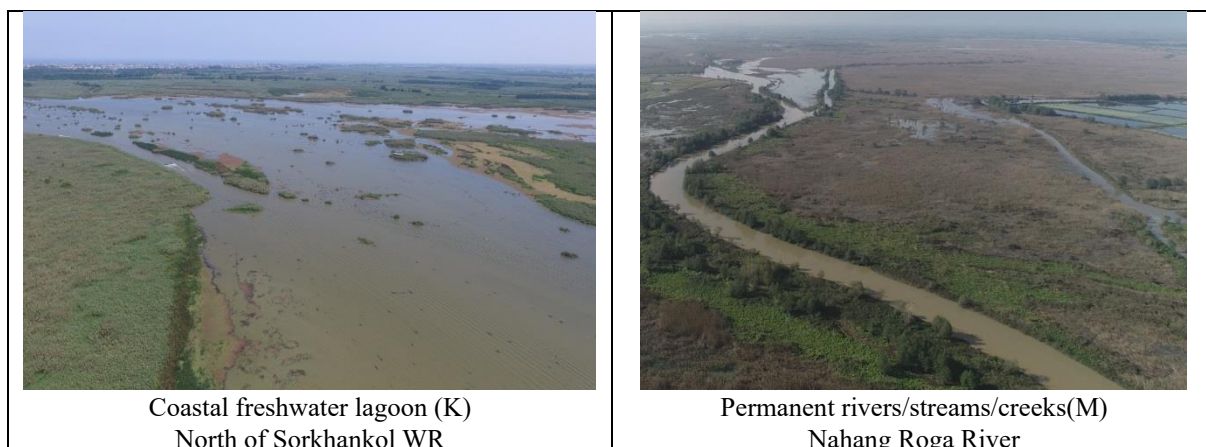


Permanent freshwater lake(O).  
West Lagoon



Seasonal freshwater marshes (Ts)  
Choukam WR in winter





Source: JICA Expert Team

**Figure 4.1-1 Wetland Types in the Anzali Wetland**

(2) Other Ecosystem Services Provided

The Anzali Wetland is a very important spawning and nursery area for economically important species in the Caspian Sea fishery as an ecosystem service. In addition, limited hunting of Coot, Ducks and Geese etc. are approved by DOE in winter season outside the national protected areas. Some tourism activities including ecotourism activity are conducting. Some local people take some kinds of herb as food from the wetland. Reed in the wetland is utilized as material of shed and crafts. Boat tourism in to enjoy the nature of the Anzali Wetland is important income for local people.



Source: JICA Expert Team

**Figure 4.1-2 Other Ecosystem Services of the Anzali Wetland**

**4.1.2 Criterion 2: Rare Species and Threatened Ecological Communities**

The site provides various habitats of endangered and rare species as shown in Table 4.1-2. The list shows the important species in international level. National protected species live in the Anzali Wetland as well.

The information of fauna and flora is limited, especially in plant, planktons, benthos and insect. Therefore, the other species may occur in such taxa in the Anzali Wetland.

**Table 4.1-2 Checklist of Rare Species on Criterion 2**

No	Class	Scientific name*	Common name	IUCN	CITES	CMS	Remarks
				RL	Apx.I	Apx.I	
1	Mammal	<i>Lutra lutra</i>	European Otter	NT	✓		Umbrella species of the Anzali Wetland ecosystem.
2	Bird	<i>Aquila clanga</i>	Greater Spotted Eagle	VU		✓	Winter migrant
3		<i>Aquila heliaca</i>	Eastern Imperial Eagle	VU	✓	✓	Winter migrant
4		<i>Aquila nipalensis</i>	Steppe Eagle	EN		✓	Winter migrant
5		<i>Aythya ferina</i>	Common Pochard	VU			Winter migrant
6		<i>Aythya nyroca</i>	Ferruginous Duck	NT		✓	Recently small number of Ferruginous Duck is breeding in the site.
7		<i>Cygnus cygnus</i>	Whooper Swan	LC			Winter migrant
8		<i>Falco cherrug</i>	Saker Falcon	EN		✓	Passing migrant
9		<i>Falco naumanni</i>	Lesser Kestrel	LC		✓	Summer migrant
10		<i>Falco peregrinoides</i>	Barbary Falcon	NE	✓		Winter migrant
11		<i>Falco peregrinus</i>	Peregrine Falcon	LC	✓		Winter migrant. Small number of Coot probably breeds in Anzali Wetland.
12		<i>Haliaeetus albicilla</i>	White-tailed Eagle	LC	✓	✓	more than two pairs of the species breed in the wetland. also the wetland is a important area for wintering of it.
13		<i>Oxyura leucocephala</i>	White-headed Duck	EN		✓	Winter migrant
14		<i>Pelecanus crispus</i>	Dalmatian Pelican	NT	✓	✓	Winter migrant. More than 1% of global population is wintering in Anzali Wetland
15		<i>Pelecanus onocrotalus</i>	Great White Pelican	LC		✓	Winter migrant
16		<i>Podiceps auritus</i>	Horned Grebe	VU			Winter migrant
17		<i>Vanellus gregarius</i>	Sociable Lapwing	CR		✓	Passing migrant
18	Reptile	<i>Emys orbicularis</i>	European Pond Turtle	NT			Very common in Anzali Wetland.
19	Fish	<i>Acipenser stellatus</i>	Star sturgeon	CR			There are records of this Sturgeon in the Anzali Wetland. However, the field survey did not find the fish in 2016-2017.
20		<i>Cyprinus carpio</i>	Common Carp	VU			
21		<i>Luciobarbus capito</i>	Bulat-mai Barbel	VU			

Ramsar Criterion/ Species which contributes the Ramsar Criteria (The nine criteria for identifying Wetlands of International Importance)

IUCN RL/ IUCN Red List/ CR:critically endangered, VU:vulnerable, NT: near threaten, LC: least concern NE: not evaluated

CITES Apx.I/ Species listed in Appendix.I on Convention on International Trade in Endangered Species of Wild Fauna and Flora

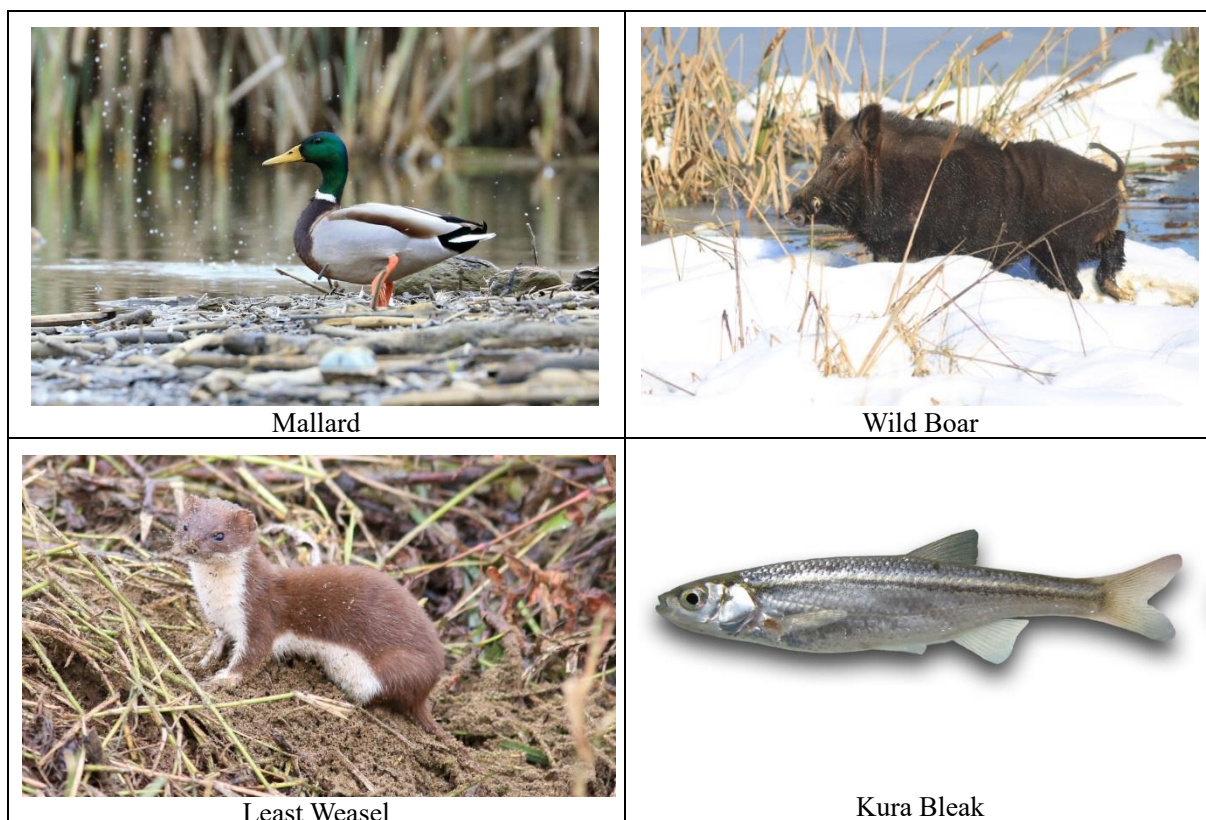
CMS Apx.I/ Species listed in Appendix.I on Convention on the Conservation of Migratory Species of Wild Animals

attention/ This table does not mention about plant, insects, benthos, planktons. Survey of these taxon have not been completed recently.

### 4.1.3 Criterion 3: Biological Diversity

Anzali Wetland Complex supports an extremely diverse wetland flora and fauna of the Caspian Sea lowland. And it supports of typical fauna diverse of Palearctic such as Mallard(*Anas platyrhynchos*), Least Weasel(*Mustela nivalis*), Wild Boar(*Sus scrofa*) etc.

In addition, it supports populations of plant and animal species of the ecoregion (Kura-South Caspian Drainages under FEOW). Kura Bleak (*Alburnus filippii*) which is endemic species in the Kura-South Caspian Drainages occurs in the site.



Source: JICA Expert Team (Mallard, Wild Bear and Least Weasel) and Dr. Keyvan Abbasi (Kura Bleak)

**Figure 4.1-3 Typical Species of Palearctic and Caspian Drainages Bioregion under FEOW in the Anzali Wetland**

#### **4.1.4 Criterion 4: Support during Critical Life Cycle Stage or in Adverse Conditions**

The Anzali Wetland is a critical site for migratory waterbirds and shorebirds providing vitally important habitats during migration. The wetland is located in the south west of Caspian Sea which is very important stopover site in Afro-Eurasian Flyway and Central Asia Flyway. In the migratory season the wetland is filled and covered by huge number of migratory birds such as Cranes, Storks, Geese, Ducks, Sandpipers and Plovers. Especially, Mallard and Ferruginous duck are breeding and moulting after breeding in the site.





Source: JICA Expert Team

**Figure 4.1-4 Numerous Wintering Teals in Migration Season in the Anzali Wetland**

#### **4.1.5 Criterion 5: >20,000 Waterbirds**

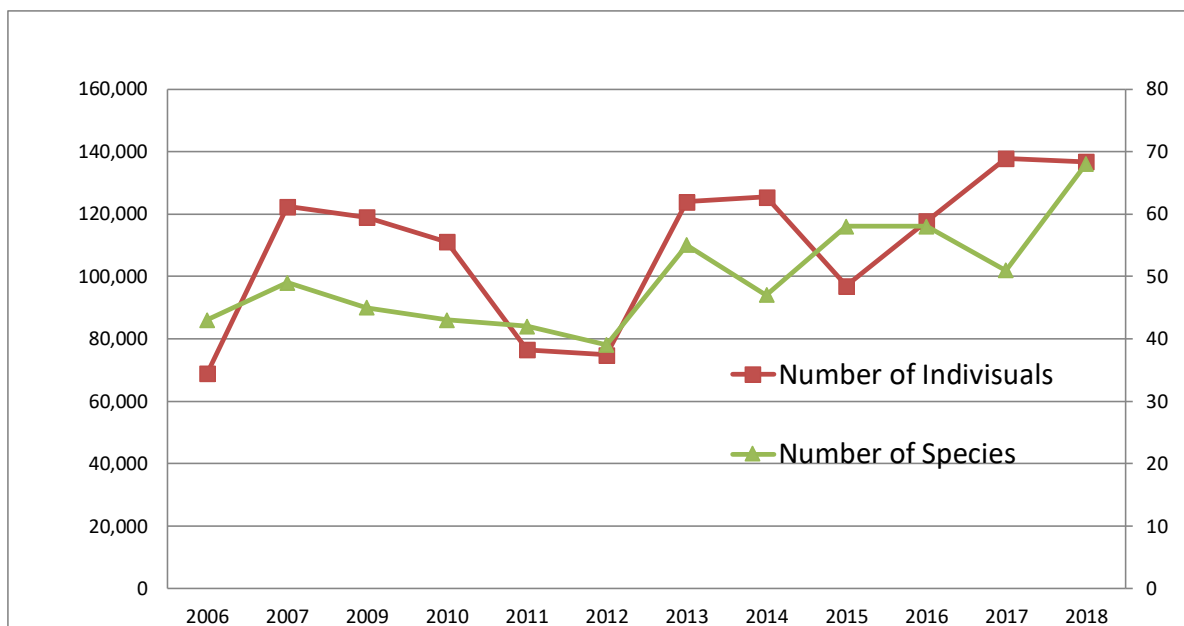
Regularly more than 120,000 waterbird individuals were counted in mid-winter in the site.

The trend of number of individuals and species in midwinter is increasing as shown in Figure 4.1-5. It is very difficult to count all individuals because Anzali Wetland Complex is very huge, and it is partially covered by dense vegetation. Actually, many waterbirds, greater than counted, wintered in the site.



Source: JICA Expert Team

**Figure 4.1-5 Numerous Wintering Waterbirds in the Anzali Wetland**



Source: JICA Expert Team prepared by using the data of DOE midwinter bird counting

**Figure 4.1-6 Trend of Water birds in Midwinter in the Anzali Wetland**

#### 4.1.6 Criterion 6: >1% Waterbird Population

(1) Whiskered Tern (*Chlidonias hybrida*)

Whiskered Tern is breeding in the site. 2,725 nests, which equates to more than 5,400 mature individuals, were counted in summer of 2015 by JICA study, Population 1% level *hybrida*, Caspian (breeding) is 1,000 (Wetlands International 2018), 5.4 % of the population bred to meet criterion 6. Furthermore, the global population is estimated to number 300,000-1,500,000 individuals (Wetlands International 2015). It was about 1% of global population.

In addition, according to the recent results (2013-2017) of monitoring by Department of Environment based on Mid-Winter Bird Count, 7 wintering waterbird species meets the criterion 6 as the followings.





Source: JICA Expert Team

**Figure 4.1-7 Nest of Whiskered Tern in West Lagoon in the Anzali Wetland**

(2) Green-winged Teal (*Anas crecca*)

Green-winged Teal was 35,502 individuals on average in the site. Population 1% level of *crecca*, Western Siberia/SW Asia & NE Africa is 7,000 (Wetland International 2018), 5.0% of the population wintered.



Source: JICA Expert Team

**Figure 4.1-8 Green-winged Teal in the Sorkhankol WR in the Anzali Wetland**

(3) Mallard (*Anas platyrhynchos*)

Mallard was 10,957 individuals on average in the Anzali Wetland in mid-winter from 2014-2018. Population 1% level of *platyrhynchos*, Western Siberia/Southwest Asia is 8,000 (Wetland International 2018), 1.4% of the population wintered.

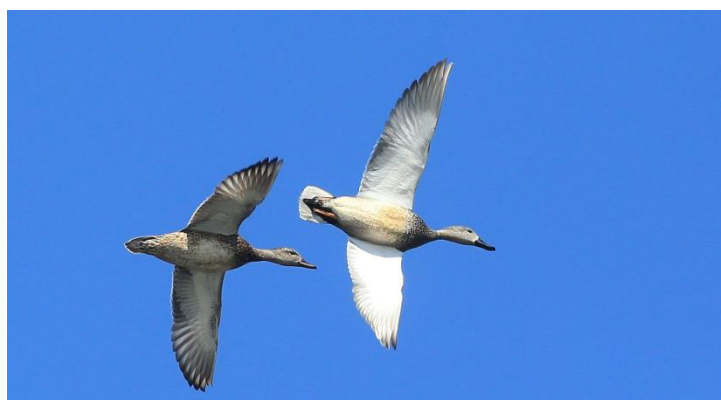


Source: JICA Expert Team

**Figure 4.1-9 Mallard in the Selkeh WR in the Anzali Wetland**

(4) Gadwall (*Mareca strepera*)

Gadwall was 26,114 on average in the Anzali Wetland in mid-winter from 2014-2018. Population 1% level of *strepera*, Western Siberia/South-west Asia is 1,200 (Wetland International 2018), 20.8% of the population wintered.



Source: JICA Expert Team

**Figure 4.1-10 Gadwall in the Sorkhankol WR in the Anzali Wetland**

(5) Whooper Swan (*Cygnus cygnus*)

Whooper Swan was 555 on average in the Anzali Wetland in mid-winter from 2014-2018.. Population 1% level of West & Central Siberia/Caspiana is 200 (Wetland International 2018), 2.8% of the population wintered. Furthermore, the global population is estimated to number > c.180,000 individuals (Wetlands International 2015). Wintering individual number of Whooper Swan was very fluctuated in the site. Once in 4-6 years, wintering number exceeded one thousand. Recently, 2,266 individuals were wintered in the site in 2013. It was more than 1% of global population.





Source: JICA Expert Team

**Figure 4.1-11 Whooper Swan in the Selkeh WR in the Anzali Wetland**

(6) Pygmy Cormorant (*Microcarbo pygmeus*)

Pygmy Cormorant was 5,463 on average in the Anzali Wetland in mid-winter from 2014-2018. Population 1% level of South-west Asia is 1,000 (Wetland International 2018), 5.5% of the population wintered. Furthermore, the species has a large global population estimated to be 48,000-137,000 individuals (Wetlands International 2015). There are probably 4-11% individuals in the site.



Source: JICA Expert Team

**Figure 4.1-12 Pygmy Cormorant in the Anzali Wetland**

(7) Dalmatian Pelican (*Pelecanus crispus*)

Dalmatian Pelican was 924 on average in the Anzali Wetland in mid-winter from 2014-2018. Population 1% level of South-west Asia & South Asia (win) is 150 (Wetland International 2018), 6.2% of the population wintered. Furthermore, 22,050-26,800 is world population size (Wetlands International 2018). About 3% - 4% of world population winters in the site.



Source: JICA Expert Team

**Figure 4.1-13 Dalmatian Pelican in the Sorkhankol WR in the Anzali Wetland**

(8) Great Cormorant (*Phalacrocorax carbo*)

Great Cormorant was 6,185 on average in the Anzali Wetland in mid-winter from 2014-2018. Population 1% level of South-west Asia & South Asia (win) is 1,400 (Wetland International 2018), 4.4% of the population wintered.



Source: JICA Expert Team

**Figure 4.1-14 Great Cormorant in the Sorkhankol WR in the Anzali Wetland**

#### 4.1.7 Criterion 7: Significant and Representative Fish

Caspian Kutum (*Rutilus kutum*) is the endemic fish of Caspian Sea. Main distribution of Caspian Kutum is south of Caspian Sea. It is a semi-anadromous species which occurs in large brackish estuaries and their large, freshened plume waters, coastal lakes connected to rivers and lowland stretches of large rivers. Anzali Wetland and its distributaries are the central part of its distribution. In Anzali Wetland and its inflowing rivers, it has two populations. One is spring migration population which lays eggs which adhere to rocks and gravel of inflowing rivers of the wetland. The other one is autumn migration population which lays eggs on submerged plants in the Anzali Wetland. Autumn population is very rare, and it is mainly occurred in the Anzali



Wetland. The Anzali Wetland and its inflowing river is very important habitat for it as spawning and nursery.



Source: Dr. Keyvan Abbasi

**Figure 4.1-15 Caspian Kutum**

#### **4.1.8 Criterion 8: Fish Spawning Grounds, etc.**

71 species of fish were recorded in the Anzali Wetland and its inflowing rivers until 2017. Anzali Wetland is a large complex of fresh water lagoons with extensive reed-beds, the other aquatic plant communities, and many inflowing rivers. These various habitats provide spawning, nursery and feeding grounds to many kinds of semi-anadromous and non-migratory fish species.

Especially Caspian Kutum (*Rutilus kutum*) is one of the most important economic fish in South of Caspian Sea in Iran and the Anzali Wetland is the one of the most important habitats as migration, spawning, nursery and feeding ground for this fish.

#### **4.1.9 Criterion 9: >1% Non-avian Animal Population**

Criterion 9 needs to satisfy the following: “A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species”. This is only one criterion which the Anzali Wetland cannot satisfy.

However, it is necessary to note about the one race of the fish species, Caspian Kutum as following. The Kutum is one of the economically valuable species of Caspian Sea. The Anzali Wetland is one of centers of distribution area of the fish. Two different races of this fish exist in the Caspian Sea, the spring race and the autumn race. The spring race is main population which spawn in small rivers or streams with heavy current on gravel bottom in spring. The autumn race rarely spawns on submerged plant in wetland. The spring race is widely distributed along the Caspian Sea including Anzali Wetland. However, autumn race is much rarer than spring race and autumn race is distributed only in Anzali Wetland. Ghasemi et al (2009) reported the result of genetic analysis showed spring and autumn races of Kutum in two regions of southern part of Caspian Sea are two independent populations. It showed possibility of genetic differentiation between spring race and autumn race of Kutum on process in Anzali Wetland.



It means that autumn race of Caspian Kutum is possible to satisfy the criterion 9. Ramsar Convention requires to clarify the amount of population size; therefore, it is impossible to satisfy the criteria as of now.

## **4.2 Ecological Evaluation**

### **4.2.1 Size**

Iran has 25 Ramsar Sites as of April 2019. Area of the Anzali Wetland is 19,500 ha. It is the 9th largest Ramsar Site in Iran. The Anzali Wetland is the largest wetland in Gilan Province.

Almost half, 9,200 ha of the Anzali Wetland is covered by Reed bed. This is the very huge reed bed in this region. Reed bed is one of the most important types of habitats of the wetland. Sometimes reed bed is considered as indicator of drying. For example, Marsh Harrier, Purple Heron, Purple Swamphen, Great Reed Warbler and Reed Bunting are breeding in Reed bed. Jungle Cat utilized Reed bed as habitat as well.

Very shallow freshwater (seasonally brackish) lagoon including Sorkhankol WR is about 2,000ha. It is almost under 50 cm depth, very important habitat. It is often covered by many kinds of aquatic plant and forms very various habitats.

The size of various types of habitats found within the Ramsar Site are significant in the context of Gilan province and the littoral wetland of Caspian Sea and have the significance in maintaining the overall ecological values of the Ramsar Site.

### **4.2.2 Biodiversity**

#### **(1) Ecosystem Diversity**

There are many kinds of the ecosystem components such as open static water, flowing water, Reed bed (emerged plant community), Lotus community (floating-leaf plant community), Water Chestnut community (floating-leaf plant community) , Submerged plant communities, some kind of forests, grassland on seasonal wetland etc. They composed complicated mosaic structure of the habitats.

Ecosystem diversity is high.

#### **(2) Species Diversity**

Comprehensive ecosystem survey has not been completed, therefore there is less baseline information of some of taxa. However, 21 species of mammals, 254 species of birds, 14 species of reptiles, 3 species of amphibian, 72 species of fish have been recorded in the Anzali Wetland until now. It is significant result of the fauna survey in only one wetland. Species diversity can be evaluated as quite high.

(3) Genetic Diversity

Genetic diversity of the taxa of the Anzali Wetland has not been studied yet.

As mentioned in 4.1.9, Ghasemi et al (2009) reported the result of genetic analysis of Caspian Kutum showed spring and autumn races of Kutum in two regions of southern part of Caspian Sea are two independent populations. It showed possibility of genetic differentiation between spring race and autumn race of Kutum on process in Anzali Wetland. Anzali Wetland supports the genetic diversity.

The biological diversity of the Anzali Wetland is considered as quite high in total.

#### 4.2.3 Naturalness

Anzali Wetland has been used by local people for long time. People made canal, water way and dredged to change some part of the wetland. Therefore, it is not easy to identify where is the complete naturalness area. It can be though that the lagoon and Reedbed are almost naturalness area. The marginal area of the seasonal wetland was changed to grassland as pasture. It is very artificial land in the wetland. However, it contributes a kind of habitat for migratory birds. The mosaic of many types of habitats are special characteristics of the Anzali Wetland.

#### 4.2.4 Rarity

Many predators as rare species such as European Otter (*Lutra lutra*), Greater Spotted Eagle (*Aquila clanga*), Eastern Imperial Eagle (*Aquila heliaca*), Steppe Eagle (*Aquila nipalensis*), Saker Falcon (*Falco cherrug*), Lesser Kestrel (*Falco naumanni*), Barbary Falcon (*Falco pelegrinoides*), Peregrine Falcon (*Falco peregrinus*) and White-tailed Eagle (*Haliaeetus albicilla*) occur and depend on the food production of the Anzali Wetland ecosystem.

About 1,000 Dalmatian Pelicans (*Pelecanus crispus*) as internationally important species migrated to the Anzali Wetland every winter. 1000 individual means more than 1% of global population. Rare fish such as Star Sturgeon (*Acipenser stellatus*) was recorded in the Anzali Wetland. There is no doubt about the rarity of the Anzali Wetland.

#### 4.2.5 Fragility

If the Caspian Sea Level decline trend will be continued, the large shallow and diverse habitat will be dried up. Important habitat might be lost. It may be very fragile. In addition, economical activities in the Anzali Wetland is recently increasing. The hunting and fishing pressure and land use pressure might become larger and larger.

Main parts of the Anzali Wetland are protecting as wildlife refuge and protected area by DOE Gilan. And the combination of various types of habitat make the wetland ecosystem have resilience against both natural change of environment and human developing pressure. It is

necessary to remember that the Anzali Wetland ecosystem become easily very fragile if such protecting and conserving efforts will be stopped.

#### 4.2.6 Typicalness

Size of many types of habitats such as Reed bed and Lagoon is very large, however each component of habitats is typical in this region along the Caspian Sea. The fauna and flora composed by many typical species of this bioregion such as Palearctic and the ecoregion (Kura-South Caspian Drainages under FEOW). For example, Marsh Frog is very common and typical species in this area. The biomass of the Marsh Frog is very large and many other animals including fish eat it in the Anzali Wetland.

### 4.3 Evaluation Based on the Issues Related to Montreux Record

#### 4.3.1 Current Situation about the Threats Pointed by RAM in 1992

The current threats and measures taken after RMA in 1992 were evaluated as follows. All pointed threats are improved or stable. However, the trend of Caspian Sea Level fluctuation is totally changed from raise to decline. Current level is not bad. However, if the decline trend of Caspian Sea Level will be continued, some part of the wetland will be dried up.

**Table 4.3-1 Current Situation about the Threats Pointed by RAM in 1992**

Threat	Impt.	Evaluation or Measures taken (or proposed)	Trend
The impact of sea-level rise on the ecology of the wetlands	LOW	<ul style="list-style-type: none"> <li>➤ Sea-level trend is totally changed. The sea-level was increased by 1995. And then the sea level has been decreased until now. Habitat changes have been occurred by shallow water and trend of drying of marginal area of the wetland because of sea level decline.</li> <li>➤ The impact was changed from sea level rise to sea level decline.</li> </ul>	BETTER
The impact of sea-level decline on the ecology of the wetlands. (This was not described in 1992 RAM report. However, the Caspian Sea Level was totally changed from rise to decline.)	High	<ul style="list-style-type: none"> <li>➤ Current situation is not bad. Shallow water area supports many habitats for aquatic plants, waterbirds, fish etc. However, if the decline trend of Caspian Sea Level will be continued, some part of the wetland will be dried up.</li> </ul>	WORSE
Rapid spread of Reed bed	LOW	<ul style="list-style-type: none"> <li>➤ Reedbed plays important role as wildlife habitat such as Marsh Harrier, Purple Swamphen, Purple Heron etc. Mosaic structure of open water, aquatic vegetations are important.</li> </ul>	STABLE
Eutrophication as a result of increased inflow of domestic sewage, fertilizers and other organic material.	MED	<ul style="list-style-type: none"> <li>➤ Anzali Wetland is classified eutrophied wetland. Current level of eutrophication is not bad for ecosystem. Monitoring of water quality is not enough to grasp the situation. However, the water quality is not worse based on limited data after operating of sewage treatment plants.</li> </ul>	STABLE
Salt water intrusion during summer months because of high level Caspian Sea level	LOW	<ul style="list-style-type: none"> <li>➤ Due to the Caspian Sea Lever decline, the salt water intrusion is limited. Mid-summer with less</li> </ul>	STABLE

Threat	Impt.	Evaluation or Measures taken (or proposed)	Trend
and less water inflow.		rainfall, short time salt water intrusion was happened.	
Coot and Pochard in Central Area caused by over hunting	MED	➤ Selkeh and Sorkhankol WR are well protected and these species were protected.	BETTER
Dabbling Duck and Geese in Selkeh Wildlife Refuge	LOW	➤ Many dabbling duck and Graylag Goose were recorded in Selkeh WR after dredging by DOE restoration project.	BETTER
Purple Swamphen in Central Area	LOW	➤ Purple Swamphen is breeding in the Anzali Wetland and can be seen throughout the year. It is very difficult to count the accurate number of individuals because there are often hidden in reedbed. However, the population is increased and more than thousands PS is probably inhabit.	BETTER
			BETTER
Infestation by Azolla	LOW	➤ Almost of water surface of the Anzali Wetland was covered by Azolla until 2017. ➤ Azolla was still remained in west part of the Anzali Wetland, 99.9% was dramatically disappeared in summer 2017 by natural phenomenon. The Azolla has started to increase from the end of 2018.	BETTER

Source: JICA Expert Team

#### 4.3.2 Ameliorative and Restoration Measures after Listed in Montreux Record

Many ameliorative and restoration measures by DOE and Iranian relevant organizations have been implemented in cooperation with JICA as shown in Table 4.3-2.

**Table 4.3-2 Ameliorative and Restoration Measures after Listed in Montreux Record in 1993**

No	Year	Measure	Remarks
1	2002	Establishment of Sorkhankol Wildlife Refuge (2002)	The WR with DOE guard station is very effective to control hunting in central of the Anzali Wetland.
2	2005	Establishment of Choukam Wildlife Refuge	However, management is not enough due to lack of DOE guard station.
3	2004	Establishment of Anzali Wetland Environmental Education Center	The first wetland education center in Iran. CEPA activities were accelerated.
4	2004	Preparation of Anzali Wetland Integrated Management Plan	Comprehensive Master plan was prepared to. conserve the wetland based on watershed approach concept.
5	2008-2009,	Anzali Wetland Ecological Management Project Phase I	Integrated management was enhanced.
6	2007-2012	Installation of Sewage Plant in Rasht City and Anzali City	Three sewage treatment plants have been constructed and started to treat partially.
7	2011	Establishment of Anzali Wetland Management Committee	Integrated management was started among all relevant organizations.
8	2012	Determination Anzali Wetland Zoning Plan (2012)	Land Use management was enhanced.

No	Year	Measure	Remarks
9	2013	Delineation of Wetland Boundary based on Water Equitable Distribution Law	The boundary of wetland which limited the land use was delineated based on strong law.
10	2014-2019	Anzali Wetland Ecological Management Project Phase II (2014)	Integrated management was enhanced.
11	2015-2016	Selkeh Wildlife Refuge Restoration Project	To restore open water surface, dredging and pump station construction were implemented.
12	2018	Update of the Boundary of Ramsar Site and RIS	Submitted to Ramsar Convention
13	2017	Establishment of JBK Community-based Ecotourism Center	CEPA activities were accelerated.
14	2019	Establishment of Anzali Wetland Nature School	CEPA activities were accelerated.
15	2019	Establishment of Anzali Wetland Visitor Center	CEPA activities were accelerated.
16	2019	Formulation of Mid-term Plan for Conservation of the Anzali Wetland for 2020-2030	This plan.

Source: JICA Expert Team

### 4.3.3 Evaluation

After listing the Montreux Record, the situation of the ecosystem such as Caspian Sea Level Fluctuation trend was changed. In addition, many ameliorative and restoration measures by DOE and Iranian relevant organizations have been implemented in cooperation with JICA. These measures and restorations were not perfect in fact however several measures were very effective. Considering the situation of the ecological character based on the Ramsar Site Criteria, the ecological character of the Anzali Wetland can be thought as significant situation. Comparing the situation of the other Ramsar Sites in other countries, it can be evaluated that Anzali Wetland is not bad as listed in the Montreux Record.

However, it is also the fact that there are many things to be solved in this Mid-term Plan. It is necessary to continue to conserve and restore the Anzali Wetland based on this Mid-term Plan even after removal the Anzali Wetland from the Montreux Record.



## 5. Objectives

### 5.1 General Objectives

The Anzali Wetland was designated as a Ramsar Site based on the Ramsar Sites Criteria (the nine criteria for identifying wetlands of international importance). Evaluation of the Anzali Wetland meets the eight criteria as of 2018. It means the Anzali Wetland has still significant value of ecological character. It is necessary to conserve the ecological character of Anzali Wetland based on the criteria.

On the other hand, the Anzali Wetland was listed in the Montreux Record in 1993. (The Montreux Record is a register of Ramsar Wetland where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference.) The Anzali Wetland should be removed from the list.

In addition, the Ramsar Convention promote three main activities, Conservation and Restoration, Wise Use and CEPA (Communication, Education, Participation and Awareness). The midterm plan should follow the main activities of Ramsar Convention.

Therefore, this midterm plan set three general objectives as following.

- To keep its state of satisfaction of the eight(1 to 8) Ramsar Sites Criteria
- To solve the issues why the Anzali Wetland was listed in Montreux Record
- To promote the activities of the Ramsar Convention including CEPA

### 5.2 Long Term Goals

#### 5.2.1 Objectives to Meet Ramsar Criteria

As a result of activities on the midterm plan, the ecological character of the Anzali Wetland must be maintained for long time to meet eight Ramsar Criteria for identifying Wetlands of International Importance as shown in Table 5.2-1.

**Table 5.2-1 Long Term Goals to Meet Ramsar Criteria**

No	Current Situation of Anzali Wetland on Ramsar Criteria	Long Term Goal
1	The wetland is one of representative wetland along the south coast of the Caspian Sea.	Necessary scientific adaptive management or/and restoration activities are implemented to keep all kind of representative wetland habitats of the Anzali Wetland. Sedimentation to the Anzali Wetland is reduced to keep the water habitat.
2	Many endangered species are occurred such as Imperial Eagle, Common Pochard, White-headed Duck, Dalmatian Pelican etc.	Necessary scientific adaptive management or/and restoration activities are implemented to keep habitats of the endangered species in the Anzali Wetland including catchment area of it. Illegal hunting is strictly controlled by DOE guards.

No	Current Situation of Anzali Wetland on Ramsar Criteria	Long Term Goal
3	It supports populations of plant and animal species of the ecoregion (Kura-South Caspian Drainages under FEOW (Freshwater Ecoregions of the World). For example, 21 mammals, 243 birds, 14 reptiles, 3 amphibians and 72 fish were recorded from 2015 to 2018 under the project.	Necessary scientific adaptive management or/and restoration activities are implemented to keep all kind of habitats of the Anzali Wetland including catchment area of it. Sedimentation to the Anzali Wetland is reduced to keep the water habitat. Water pollution load is not increased and water quality in the Wetland and its inflowing river is kept ad good condition. Inflowing waste is reduced to keep the habitat quality.
4	The site is a critical for migratory waterbirds and shorebirds providing vitally important habitats during breeding, migration and moulting.	Illegal hunting is strictly controlled by DOE guards.
5	Regularly more than 120,000 waterbird individuals were counted in mid-winter.	Necessary scientific adaptive management or/and restoration activities are implemented to keep all kind of habitats of the Anzali Wetland including catchment area of it. Hunting is sustainably controlled by DOE guards.
6	Recently more than 1% of global population of Dalmatian Pelican and Pygmy Cormorant wintered and Whiskered Tern bred as well.	Necessary scientific adaptive management or/and restoration activities are implemented to conserve the habitats of these important species.
7	Anzali Wetland and it distributaries are the central part of Caspian Kutum population which is endemic fish of Caspian Sea.	Ecological network for these species between the Caspian Sea, Anzali Wetland and its inflowing river is conserved. Water pollution load is not increased and water quality in the Wetland and its inflowing river is kept ad good condition.
8	Various habitats of the site provide spawning, nursery and feeding grounds to many kinds of semi-anadromous and non-migratory fish species.	Ecological network for these species between the Caspian Sea, Anzali Wetland and its inflowing river is conserved. Water pollution load is not increased and water quality in the Wetland and its inflowing river is kept ad good condition.

Source: JICA Expert Team

## 5.2.2 Objective to Solve the Issues Why Anzali Wetland Listed in Montreux Record

Ramsar Convention send a Ramsar Advisory Mission (RAM) to Iran as its monitoring procedure in 1992. Several wetlands in Iran including the Anzali Wetland were evaluated in the mission. The Anzali Wetland was listed in the Montreux Record based on the report of the RAM in 1993. According to the report, two recommendations were mentioned. Long term goals to solve these matters should be included as shown in Table 5.2-2.

**Table 5.2-2 Long Term Goals to Remove Anzali Wetland from Montreux Record**

No	Recommendation in RAM 1992	Long Term Goal
1	DOE should implement and extend research program about the impact of Caspian Sea Level rise on the ecology of the wetlands, water pollution, invasion of alien species and the effect of excessive hunting pressure.	Appropriate comprehensive ecosystem surveys every six years and annual monitoring of natural indicators will be implemented.
2	DOE should investigate a variety of possibilities for conserving waterfowl populations in the wetland and maintaining hunting opportunities for the general public.	Appropriate conservation and wise-use by protected area management including hunting control by DOE guard are implemented to maintain the ecological characteristics of the Anzali Wetland.

Source: JICA Expert Team

### 5.2.3 Objective to Promote the Ramsar Convention

Above-mentioned long-term goals to promote the activities on the Ramsar Convention as shown in Table 5.2-3.

**Table 5.2-3 Long Term Goals to Promote Activities on the Ramsar Convention**

No	Ramsar Conventions	Long Term Goal
1	Conservation and Restoration	Integrated wetland management among all stakeholders is implemented under AWMC chaired by Gilan Provincial Governor. All other goals mentioned in 5.1.1 and 5.1.2.
2	Promotion of Wise Use	Zoning plan and land use guideline are determined, and they function in cooperation with all relevant organizations to prevent overuse of the wetland resource. Ecotourism programs and facilities are developed and implemented to promote Wise Use of Anzali Wetland
3	Promotion of CEPA (Communication, Education, Participation and Awareness)	Ecotourism programs and facilities are developed and implemented to promote CEPA activities. Environmental Education programs and facilities are developed and implemented to promote CEPA activities.

Source: JICA Expert Team

### 5.3 Long Term Goals of AWMC and Sub Committees

Above-mentioned long-term goals are sorted and compiled for each AWMC and Sub committees as shown in Table 5.3-1.

**Table 5.3-1 Long Term Goals of AWMC and Sub-Committees**

No	Sub Committees	Long Term Goals
1	Integrated management by AWMC	Integrated wetland management among all stakeholders is appropriately implemented under AWMC chaired by Gilan Provincial Governor.
2	Wetland Ecosystem Conservation SC (WEC SC) Conservation and Restoration WG	Appropriate comprehensive ecosystem surveys every six years and annual monitoring of natural indicators will be implemented. Based on the result of the surveys and monitoring, necessary scientific adaptive management or/and restoration activities will be implemented to conserve biodiversity, habitat of important species, ecological network and ecosystem of the Anzali Wetland including catchment area of it.
3	WEC SC Water and Sediment Quality Monitoring WG	Appropriate monitoring of water and sediment quality are regularly implemented as a scientific baseline for the adaptive management of the Anzali Wetland.
4	WEC SC Environmental Zoning and Land Use Guideline	Zoning plan and land use guideline are determined, and they function in cooperation with all relevant organizations to prevent overuse of the wetland resource.
5	Watershed Management SC	Sedimentation to the Anzali Wetland is reduced to conserve the water habitat.
6	Sewage Management SC	Water pollution load is not increased and water quality in the Wetland and its inflowing river is kept ad good condition.
7	Waste Management SC	Inflowing waste to the wetland is reduced to conserve the habitat.
8	Ecotourism SC	Ecotourism programs and facilities are developed and implemented to promote CEPA activities.
9	Environmental Education SC	Environmental Education programs and facilities are developed and implemented to promote CEPA activities.

Source: JICA Expert Team

#### **5.4 Breakdown Mid-Term Goals**

Breakdown Mid Term Goals for 2020-2030 are mentioned in each chapter as follows.