



Ramsar Information Sheet

Published on 30 September 2021

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Netherlands Pekelmeer



Designation date	23 May 1980
Site number	200
Coordinates	12°02'37"N 68°15'19"W
Area	1 612,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

The 1612 ha Ramsar Site Pekelmeer (including a 557 ha hypersaline lake and a 1055 ha surrounding bufferzone) is part of the larger Pekelmeer area which is one of the island's main saltwater lakes covering an area of 68.5 km² (6,850 hectares). The bufferzone includes some 513 ha of Caribbean sea with fringing coral reefs and sea turtle nesting beaches, which slopes down to more than 200 m deep. Some 109 ha however is shallow, between 0-6 m deep.

The site is located on the flat, low-elevated southern end of the island, about 10 kilometers south of Kralendijk. The area used to be a series of natural shallow lagoons, but these have been modified over hundreds of years for salt production. It is now connected to the open sea by an artificial channel, and water levels are adjusted for maximum salt production.

The salt flats of Pekelmeer range in colour from turquoise blue when they have just been flooded, to pink pools filled with brine shrimp, to the white of the dried salt crystals. The area does not have much vegetation; a few bushes of Buttonwood (*Conocarpus erecta*) grow along the shores of some lagoons. Most of Pekelmeer's salt-flats are government owned but are leased to the commercial salt works company Cargill Salt Bonaire N.V. Extensive shallow lagoons are habitat and nursery area to large schools of Gerridae, jacks (*Carangidae*), Palometa (*Trachinotus goodei*), lady fish (*Elops saurus*) and bonefish (*Albula vulpes*). The area has been denominated as an Important Bird Area by Birdlife International (see Wells and Debrot 2008). The area is especially significant for the Caribbean Flamingo (*Phoenicopterus ruber*). Pekelmeer supports one of the most important nesting colonies of Caribbean Flamingo in the Caribbean. A 55 hectare area (including an island) has actually been set aside since 1969 as a dedicated Flamingo Breeding Reserve. The site is not open to the public which may be one of the reasons that the site also attracts other colony breeders in relatively high numbers like Common Tern (*Sterna hirundo*), Sandwich Tern (*Sterna sandvicensis*), Least Tern (*Sterna antillarum*) and Royal Tern (*Thalasseus maximus*) (Debrot et al. 2009). Artificial islands have recently been constructed to support these species. Besides breeding birds the site also attracts thousands of migratory birds like pelicans, herons or shorebirds.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency	Wageningen Environmental Research
Postal address	PO Box 47 6700 AA Wageningen The Netherlands

National Ramsar Administrative Authority

Institution/agency	Ministry of Agriculture Nature and Food Quality
Postal address	Bezuidenhoutseweg 73 P.O. Box 20401 2500 EK The Hague The Netherlands

2.1.2 - Period of collection of data and information used to compile the RIS

From year	1960
To year	2019

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	Pekelmeer
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2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A. Changes to Site boundary	Yes <input type="radio"/> No <input checked="" type="radio"/>
(Update) B. Changes to Site area	No change to area
(Update) For secretariat only: This update is an extension	<input type="checkbox"/>

2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS?	Not evaluated
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2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<1 file(s) uploaded>

Former maps	0
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Boundaries description

Pekelmeer covers part of the salt flats in south-east of Bonaire. Dikes are located between the salt lake/flats and the beaches and Caribbean Sea. The boundaries of the Ramsar Site are determined by a 500m bufferzone (covering coral reefs and sand beaches among others) at the external part of the dikes.

2.2.2 - General location

a) In which large administrative region does the site lie?	Bonaire
b) What is the nearest town or population centre?	Kralendijk

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries?	Yes <input type="radio"/> No <input checked="" type="radio"/>
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b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes No

2.2.4 - Area of the Site

Official area, in hectares (ha):

Area, in hectares (ha) as calculated from GIS boundaries

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Southern Caribbean

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

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

Hydrological services provided

Brauman et al. 2007 recognises five hydrological services, three of which apply to a limited extent for Pekelmeer and its bufferzone:
 1. Water damage mitigation: this hydrological service concerns reduction of flood damage, dryland salinization, saltwater intrusion and sedimentation (Brauman et al. 2007). It does apply to the bufferzone of Pekelmeer. The annual coastal protection values of the coral reefs of Bonaire as a whole for short-term (i.e. within 10 years) and long-term processes (i.e. beyond 10 years) are estimated at \$33,000 and \$70,000, respectively. The reefs within the bufferzone of Pekelmeer are part of these figures (Min. EZ, 2013).
 2. Supporting: this hydrological service concerns water and nutrients to support vital estuaries and other habitats, preservation of options (Brauman et al. 2007). It does also apply to Pekelmeer in the sense that the lagoons are feeding and breeding habitat for multiple species, which can be observed and enjoyed by bird watchers.

Other ecosystem services provided

The surrounding area is mainly used for the production of salt, which is the major ecosystem service of the general area. Water levels are tightly controlled within the site which influences a series of condenser lagoons for maximum salt production through evapotranspiration. The buffer zone with its reefs and marine fish provides services for tourism, commercial and recreational fishing (Min EZ, 2013).
 Spiritual and aesthetic: this cultural service concerns provision of religious, educational and tourism values (Brauman et al. 2007). It does apply to Pekelmeer in the sense that tourists can enjoy the magnificent multi-coloured lagoons with flamingo's and other bird life from the borders of the site. The tourism sector is an industry with substantial size and financial contribution to the economy of Bonaire. The expenditure by tourists on Bonaire is found to be around \$125 million annually. An estimated welfare of around \$50 million is contributed by Bonaire's nature to tourism. Marine ecosystems are found to be more economically significant than terrestrial ecosystems on the island. Pekelmeer is part of these figures (Min EZ, 2013) but is nevertheless a minor destination for ecotourists on Bonaire.

Other reasons

Pekelmeer is one of Bonaire's main saltwater lakes which lies in an area of saltwater lagoons covering a total area of 6,850 hectares. The area is especially significant for birds, notably one of the largest nesting colonies of Caribbean Flamingos (*Phoenicopterus ruber*). A 55-hectare area (including an island) has actually been set aside since 1969 as a dedicated Flamingo Breeding Reserve. The site is not open to the public which may be one of the reasons that the site also attracts other colony breeders in relatively high numbers like Common Tern (*Sterna hirundo*), Sandwich Tern (*Sterna sandvicensis*), Least Tern (*Sterna antillarum*) and Royal Tern (*Thalasseus maximus*). Besides breeding birds like Black-winged Stilt (*Himantopus himantopus*) and Snowy Plover (*Charadrius alexandrinus*) (Wells and Wells 2006) the site also attracts thousands of migratory birds like pelicans, herons or shorebirds.

Criterion 2 : Rare species and threatened ecological communities

Criterion 3 : Biological diversity

Justification

- The fringing reefs of Bonaire (among which the reefs in the bufferzone of Pekelmeer) are one of the healthiest and most bio-diverse reefs in the region and are home to many threatened fish, hard and soft coral species.
- The sandy beaches in the bufferzone of Pekelmeer are vital nesting areas for the critically endangered Hawksbill (*Eretmochelys imbricata*) and the endangered Loggerhead (*Caretta caretta*) turtles (Stapleton et al. 2014).

Criterion 4 : Support during critical life cycle stage or in adverse conditions

Criterion 6 : >1% waterbird population

3.2 - Plant species whose presence relates to the international importance of the site

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA/ LILIOPSIDA	<i>Sabal causiarum</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	VU	<input type="checkbox"/>		

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
Others																	
CNIDARIA/ ANTHOZOA	<i>Acropora cervicornis</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				CR	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CNIDARIA/ ANTHOZOA	<i>Acropora palmata</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				CR	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CNIDARIA/ ANTHOZOA	<i>Agaricia lamarcki</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CHORDATA/ REPTILIA	<i>Caretta caretta</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19	2003-2014		VU	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		nesting; Stapleton et al. 2014
CNIDARIA/ ANTHOZOA	<i>Dendrogyra cylindrus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CNIDARIA/ ANTHOZOA	<i>Dichocoenia stokesii</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CHORDATA/ REPTILIA	<i>Eretmochelys imbricata</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	41	2003-2014		CR	<input checked="" type="checkbox"/>	<input type="checkbox"/>		nesting; Stapleton et al. 2014
CNIDARIA/ ANTHOZOA	<i>Orbicella annularis</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				EN	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CNIDARIA/ ANTHOZOA	<i>Orbicella faveolata</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				EN	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
CNIDARIA/ ANTHOZOA	<i>Orbicella franksi</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Steneck et al. 2011
Fish, Mollusc and Crustacea																	
CHORDATA/ ACTINOPTERYGII	<i>Balistes vetula</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
CHORDATA/ ACTINOPTERYGII	<i>Epinephelus itajara</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
CHORDATA/ ACTINOPTERYGII	<i>Epinephelus striatus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				CR	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
CHORDATA/ACTINOPTERYGII	<i>Hyporthodus niveatus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
CHORDATA/ACTINOPTERYGII	<i>Lachnolaimus maximus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
CHORDATA/ACTINOPTERYGII	<i>Lutjanus analis</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
CHORDATA/ACTINOPTERYGII	<i>Lutjanus cyanopterus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
CHORDATA/ACTINOPTERYGII	<i>Mycteroperca interstitialis</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				VU	<input type="checkbox"/>	<input type="checkbox"/>		De Boer, 2010
MOLLUSCA/GASTROPODA	<i>Trapania bonellena</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	Endemic to Bonaire	Valdes, 2009
Birds																	
CHORDATA/AVES	<i>Phoenicopterus ruber</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3000	1980-2017	6	LC	<input type="checkbox"/>	<input type="checkbox"/>	SPAW Annex 3	Breeding. Birdlife International 2012
CHORDATA/AVES	<i>Sterna hirundo</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60	2007	4	LC	<input type="checkbox"/>	<input type="checkbox"/>	IBA-criteria A4	Breeding. Birdlife International 2012
CHORDATA/AVES	<i>Sternula antillarum</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	582	2002	1.1	LC	<input type="checkbox"/>	<input type="checkbox"/>	IBA-criteria A4	Breeding. Birdlife International 2012
CHORDATA/AVES	<i>Thalasseus maximus</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	172	1999-2002	0.1	LC	<input type="checkbox"/>	<input type="checkbox"/>	IBA-criteria A4	Breeding. Birdlife International 2012
CHORDATA/AVES	<i>Thalasseus sandvicensis</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	340	1999	0.9	LC	<input type="checkbox"/>	<input type="checkbox"/>	IBA-criteria A4	Breeding. Birdlife International 2012

1) Percentage of the total biogeographic population at the site

breeding area for waterbirds

SPAW: Specially Protected Areas and Wildlife (<http://www.cep.unep.org/content/about-cep/spaw>)

3.4 - Ecological communities whose presence relates to the international importance of the site

<no data available>

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

The Ramsar Site Pekelmeer (1612 ha) is part of the island's main saltwater lakes which covers an area of 68.5 km² (6,850 hectares). It is located on the flat, low-elevation southern end of the island. The area used to be a series of natural shallow lagoons, but these have been modified over hundreds of years for salt production. It is now connected to the open sea by an artificial channel, and water levels are adjusted for maximum salt production. The salt flats range in colour from turquoise blue when they have just been flooded, to pink pools filled with brine shrimp, to the white of the dried salt crystals. The area does not have much vegetation; a few bushes of Buttonwood (*Conocarpus erecta*) grow along the shores of some lagoons. Extensive shallow lagoons are habitat and nursery area to large schools of Gerridae, jacks (*Carangidae*), Palometa (*Trachinotus goodiei*), lady fish (*Elops saurus*) and bonefish (*Albula vulpes*).

A 55 hectare area (including an island) has been set aside since 1969 as a dedicated Flamingo Breeding Reserve. While flamingos forage at various sites around the island they have only established breeding colonies adjacent to the Pekelmeer (and more recently in Gotomeer in the North-west of Bonaire). The site is also important for other breeders among which various tern species (Debrot et al. 2009). Artificial islands have recently been constructed to support these species. The site attracts hundreds to thousands of various migratory birds during the migration periods. More extensive inventories of the avifauna for this Ramsar Site are provided by Voous (1983) and Prins et al. (2009). A 500 m (buffer) zone (1055 ha) surrounds the actual Pekelmeer. This zone includes 582 ha of Caribbean sea with fringing coral reefs and turtle nesting beaches.

4.2 - What wetland type(s) are in the site?

Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
A: Permanent shallow marine waters		3	109	Representative
C: Coral reefs		2		
G: Intertidal mud, sand or salt flats		4	39	Representative
J: Coastal brackish / saline lagoons		1	471	Representative

Human-made wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type
5: Salt exploitation sites		1	471
9: Canals and drainage channels or ditches		3	

Other non-wetland habitat

Other non-wetland habitats within the site	Area (ha) if known
Construction/development/settlement area	1
Dry land (lower terrace)	46
Artificial islands to support breeding birds	

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTAMAGNOLIOPSIDA	<i>Conocarpus erectus</i>	

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTALILIOPSIDA	<i>Halophila stipulacea</i>	Actual (minor impacts)	No change
TRACHEOPHYTAMAGNOLIOPSIDA	<i>Scaevola sericea</i>	Actual (minor impacts)	No change

Optional text box to provide further information

Paddle grass provides beach stabilization

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	% occurrence	Position in range /endemism/other
CHORDATA/AVES	<i>Ardea alba egretta</i>				
CHORDATA/AVES	<i>Ardea herodias occidentalis</i>				
CHORDATA/AVES	<i>Calidris canutus roselaari</i>				
CHORDATA/AVES	<i>Charadrius alexandrinus</i>				
CHORDATA/AVES	<i>Charadrius melodus</i>				
CHORDATA/ACTINOPTERYGII	<i>Cyprinodon dearborni</i>				
CHORDATA/AVES	<i>Egretta caerulea</i>				
CHORDATA/AVES	<i>Egretta rufescens</i>				
CHORDATA/AVES	<i>Egretta thula</i>				
CHORDATA/AVES	<i>Egretta tricolor</i>				
CHORDATA/AVES	<i>Himantopus himantopus</i>				

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATA/MAMMALIA	<i>Felis catus</i>	Actual (minor impacts)	No change
CHORDATA/ACTINOPTERYGII	<i>Pterois volitans</i>	Actual (minor impacts)	No change

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
B: Dry climate	BWh: Subtropical desert (Low-latitude desert)

The fringing reefs in the bufferzone are zoned benthic communities and form an important coastal defence against waves. They are already quite vulnerable to extreme weather (Meyer et al., 2003; Bries et al., 2004) and will only become more so with greater water depth in shallow areas (Debrot and Bugter 2010).

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

- Entire river basin
- Upper part of river basin
- Middle part of river basin
- Lower part of river basin
- More than one river basin
- Not in river basin
- Coastal

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

Southern Caribbean Sea

4.4.3 - Soil

Mineral

(Update) Changes at RIS update No change Increase Decrease Unknown

No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes No

Please provide further information on the soil (optional)

The large industrial salt pans in south Bonaire are former shallow lagoons or salinas. The soil profiles have a sandy, loamy or clayey texture, and a high and saline groundwater table. The soils are characterised as 'miscellaneous landtypes' (De Freitas et al., 2005).

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Water inputs from precipitation	<input checked="" type="checkbox"/>	No change
Marine water	<input checked="" type="checkbox"/>	No change

Water destination

Presence?	Changes at RIS update
Marine	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology:

The site has controlled water levels for salt production in the adjacent salt lagoons (evaporation ponds)

(ECD) Connectivity of surface waters and of groundwater

Artificial channels connect the site with the sea.

4.4.5 - Sediment regime

Sediment regime unknown

(ECD) Water turbidity and colour

The colours of the water vary depending the presence of halophilic blue-green algae and level of evaporation

4.4.6 - Water pH

Unknown

4.4.7 - Water salinity

Hyperhaline/Hypersaline (>40 g/l)

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

Please provide further information on salinity (optional):

The salinity of the waters can increase extremely, due to the evaporation process.

4.4.8 - Dissolved or suspended nutrients in water

Oligotrophic

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ii) significantly different

Surrounding area has greater urbanisation or development

Surrounding area has higher human population density

Surrounding area has more intensive agricultural use

Surrounding area has significantly different land cover or habitat types

Please describe other ways in which the surrounding area is different:

Het Pekelmeer is part of the larger area of salt pans of approximately 6,850 hectares. In that sense there is no significant difference. The area however also encompasses the turtle nesting beaches and coral reefs to the south-west, which among others attract substantial numbers of divers and kite boarders. The dikes surrounding the site in the south-west are open for public traffic.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Wetland non-food products	Other	High

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	Medium
Scientific and educational	Long-term monitoring site	Medium

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
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	Medium

Within the site:

Outside the site:

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes No Unknown

Where economic studies or assessments of economic valuation have been undertaken at the site, it would be helpful to provide information on where the results of such studies may be located (e.g. website links, citation of published literature):

The economic value of the salt production is known with the Cargill saltworks company.

No studies on ecosystem services have particularly been carried out on Pekelmeer, though they have on Bonaire as a whole. See reference Min. EZ (2013) or:
<https://www.dcbd.nl/document/whats-bonaires-nature-worth-2011-2012>
<http://www.wolfscompany.com/sem-porta-mollis-parturient/>
http://www.ivm.vu.nl/en/projects/projects/economics/bonaire/ind_ex.aspx

4.5.2 - Social and cultural values

- i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland

Description if applicable

Pekelmeer is a former man-made wetland which, also provides important habitat for numerous wetland (bird) species.

- ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland
- iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples
- iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Local authority, municipality, (sub)district, etc.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Commercial (company)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Provide further information on the land tenure / ownership regime (optional):

The saltwater lakes are government-owned but are leased to the commercial saltworks company. A 55 ha area has been set-aside since 1969 as a flamingo reserve where the birds nest. In the Bonaire Nature Management Plan the Pekelmeer is allocated as a strict nature reserve.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:

1) Public Entity of Bonaire,
Dep. of Spatial Planning and Development

2) Cargill Salt Bonaire

Provide the name and/or title of the person or people with responsibility for the wetland:

Frank van der Slobbe

Postal address:

1) Kaya Amsterdam 23 Bonaire
2) Bulevar EEG 117

E-mail address:

frank.slobbe@bonairegov.com

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Marine and freshwater aquaculture	unknown impact	unknown impact	<input checked="" type="checkbox"/>	No change	<input type="checkbox"/>	No change

Energy production and mining

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Mining and quarrying			<input checked="" type="checkbox"/>		<input type="checkbox"/>	

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Roads and railroads	Low impact	Low impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Human intrusions and disturbance

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
(Para)military activities			<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Recreational and tourism activities	Low impact	Low impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Invasive non-native/ alien species	Medium impact	High impact	<input checked="" type="checkbox"/>	decrease	<input checked="" type="checkbox"/>	unknown

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified	unknown impact	High impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Please describe any other threats (optional):

Lionfish are not present in the saltwater lakes, but they are at the coral reefs. Lionfish were first spotted off the coast of Bonaire back in 2009. Since then, STINAPA Bonaire has been working alongside a cast of dedicated volunteers to continuously track, monitor and control this expanding invasive species. Overall, current monitoring and removing procedures have managed to keep the local lionfish population growth to a minimum within recreational dive limits. Areas inaccessible to divers, such as in the reserved areas, still require monitoring by marine park staff. Thanks to the hard work of Bonaire National Marine Park and their dedicated patrol of volunteers, local lionfish populations have been kept under control. (Johnson et al., 2019).

5.2.2 - Legal conservation status

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
none			whole

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Pekelmeer Saltworks, Bonaire	http://datazone.birdlife.org/site/factsheet/pekemeer-saltworks-bonaire-iba-bonaire-sint-eustatius-and-saba-%28to-netherlands%29	whole

5.2.3 - IUCN protected areas categories (2008)

- Ia Strict Nature Reserve
- Ib Wilderness Area: protected area managed mainly for wilderness protection
- II National Park: protected area managed mainly for ecosystem protection and recreation
- III Natural Monument: protected area managed mainly for conservation of specific natural features
- IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
- V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
- VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Habitat

Measures	Status
Habitat manipulation/enhancement	Implemented

Species

Measures	Status
Threatened/rare species management programmes	Implemented

Human Activities

Measures	Status
Research	Implemented

Other:

No lionfish control on site

- A marine zone of 500 meters from the high water mark part of the Ramsar site is incorporated in the Spatial Plan of Bonaire. It is needed to control developments, which can have a negative impact on the Ramsar site.
- Part of the contract with the island government is that the salt company actively maintains the Flamingo Sanctuary for the birds, through maintenance of the water level so that the birds have the mud for nesting as well as food in the water.

5.2.5 - Management planning

Is there a site-specific management plan for the site? In preparation

Has a management effectiveness assessment been undertaken for the site? Yes No

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes No

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site:

Management plan to be published December 2021
<https://dcnature.org/wp-content/uploads/2021/04/STINAPA-Develop-Southern-Bonaire-Wetlands-management-plan-request-for-tenders.pdf>

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? No need identified

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Birds	Implemented

The salt company management does monthly bird counts of flamingos and terns and shares the data with STINAPA (the island's national park management) and the Island Government - D&RO (the regional planning and development department).

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

The Dutch Caribbean Biodiversity Database (www.dcbd.nl) provides the most complete overview of data, maps and documents on the Dutch Caribbean Islands, among which Klein Bonaire.

References used to compile this RIS are:

BirdLife International, 2012. Important Bird Areas factsheet: Pekelmeer Salt works Bonaire. Downloaded from <http://www.birdlife.org/datazone/sitefactsheet.php?id=19158>

BirdLife International, 2008. Important Bird Areas in the Caribbean: Key sites for Conservation. Cambridge, UK: BirdLife International. (BirdLife Conservation Series No. 15).

Brauman, Kate A, Gretchen C. Daily, T. Ka'eo Duarte and Harold A. Mooney, 2007. The Nature and Value of Ecosystem Services: An Overview Highlighting Hydrologic Services. Annual Review of Environment and Resources.32:6.1–6.32.

Debrot, A. O., C. Boogerd and D. van den Broeck. 2009. Chapter 24. The Netherlands Antilles III: Curaçao and Bonaire. Pp. 207-215. In: P. E. Bradley and R. L. Norton (eds.) Breeding seabirds of the Caribbean. Univ. Press, Florida.

De Freitas, J.A., Nijhof, B.S.J., Rojer, A.C. and A.O. Debrot, 2005. Landscape ecological vegetation map of the island of Bonaire (Southern Caribbean). Camabi Foundation. 64p.

Min. EZ, 2013. What's Bonaire's Nature Worth? The Economics of Ecosystems and Biodiversity on Bonaire. VU Amsterdam & WICKS. 12p.

Prins, T. G., J. H. Reuter, A. O. Debrot, J. Wattel, and V. Nijman. 2009. Checklist of the birds of Aruba, Curaçao, and Bonaire, South Caribbean. Ardea 97 :137–268.

Stapleton, S., Nava, M., Willis, S. and B. Brabec, 2014. Research and Monitoring of Bonaire 's Sea Turtles: 2014 Technical Report. Sea Turtles Conservation Bonaire. 26p.

Wells, J. and Debrot, A.O. 2008. Bonaire. Pp. 95-102. In: D. C. Wege and V. Anadon-Irizarry. Important Bird Areas in the Caribbean: key sites for conservation. Cambridge, UK: BirdLife International (BirdLife Conservation Series 15).

Wells, J.C. and A. V. Wells 2006. The significance of Bonaire, Netherlands Antilles, as a breeding site for terns and plovers. J. Carib. Ornithol. 19:21-26.

Voous, K. H. 1983. Birds of the Netherlands Antilles. De Walburg Pers, Utrecht, Netherlands.

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)

<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)

<no file available>

iii. a description of the site in a national or regional wetland inventory

<no file available>

iv. relevant Article 3.2 reports

<no file available>

v. site management plan

<no file available>

vi. other published literature

<no file available>

<no data available>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Het Ketelmeer (Directie R&O, OLB Bonaire, 25-07-2018)

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation