



Benin

Benin's coastal waters are crossed by the West African Gas Pipeline which runs from Nigeria to Takoradi in Ghana.

The transboundary management of the shoreline dynamics between Togo and Benin is also an important issue, given the extreme sensitivity of coastal systems from Aného in Togo to Grand Popo in Benin and the implications of the shoreline mobility which must be assessed in a concerted manner.

The harmonization is ongoing with regard to the zoning and sectoring of the Benin Coast. The sector boundaries will remain the same but the major zones defined in the SDLAO will be harmonized with the nomenclature used in Benin and resulting from the master plan for the West African coastal area : (BJ1-a and BJ1-b), Central West Zone (BJ1c and BJ2a), East-Center Zone (BJ2-b, BJ2-c and BJ2-d) and the East Zone (BJ2-e).

BJ1 BENIN WEST AFRICA

				AGRICULTURE & TOURISM
BJ1-a	179 - TOGO BORDER - GRAND POPO			
BASELINE				
Diagnostics	Narrow terraces in a practically insular position bordered by continuous lagoons and channels. Coconut groves densely inhabited in islets separated by strips of less dense dwellings. Hard-surfaced road corridor back from the beach, but too close in places.			
Dynamics	<p>Beaches and very unstable and dynamic sandy formations. Formation of bars on the fore shore and duplication of the rim.</p> <p>Along to Grand Popo: This zone is in dynamic equilibrium and is subject to average seasonal fluctuations of approximately 25 metres. In the event of an exceptional storm this value may reach 60 metres. Real tendencies to erosion are felt at certain places.</p> <p>From Grand Popo to the border: this portion of the littoral zone has been highly eroded in the past, then a tendency to accretion between 1985 and 1990 and then a tendency to dynamic equilibrium since this period (Benin National Diagnostic Study).</p>			
Stakes	<p>Security of the population settled practically on the beach. Densification of human land use foreseeable with the corresponding stakes. In the long term, exposure of the buildings, infrastructure and populations of the Grand Popo site.</p> <p>Certain sections of road are too close to the beaches.</p>			
Actions	Monitor changes in the coastal system. Restrict new buildings and locate them back from the beach. Draw up a flood/submersion risk prevention plan. Preserve natural areas behind the channels parallel to the coast.			
Priority level	Very high	Monitoring-observation		Intensive and regular
DEVELOPMENTS SINCE 2010				
Evolution of stakes	Rehabilitation of the inter-state national road Cotonou - Hillacondji. Construction of a car-park on the beach. Building of a high standing Millennium hotel ranked 4 in Grand Popo. Gas pipeline. Important development of market-gardening.			
Coastal protection	Start-up phase of a coastal protection with rock fill. Environmental impact studies are under way to ensure that Aneho-Sanvi Codji (Togo) and Hillacondji-Grand Popo (Benin) zones can be protected simultaneously and in an integrated manner.			
Priority level	Very high	Monitoring – Observation		Intensive and regular
Protected area	YES	Hazards	Intensification of the erosion phenomenon affecting Hillacondji and Agoué (10 to 14m per year), in an area considered as a strip of land between the sea and the border of Togo and threatening road infrastructure, added to a dynamic equilibrium phenomenon between Agoué and Grand -Popo.	

Transboundary Biosphere Reserve in the Mono Delta (proposed)	TG1-e	BJ1-a-b
WDPA ID : inexistent		
A project supported by GIZ currently allows Togo and Benin to consider the inclusion of the Mono delta in UNESCO's global network of biosphere reserves before 2019. It has a simplified management plan drawn up in September 2016.		

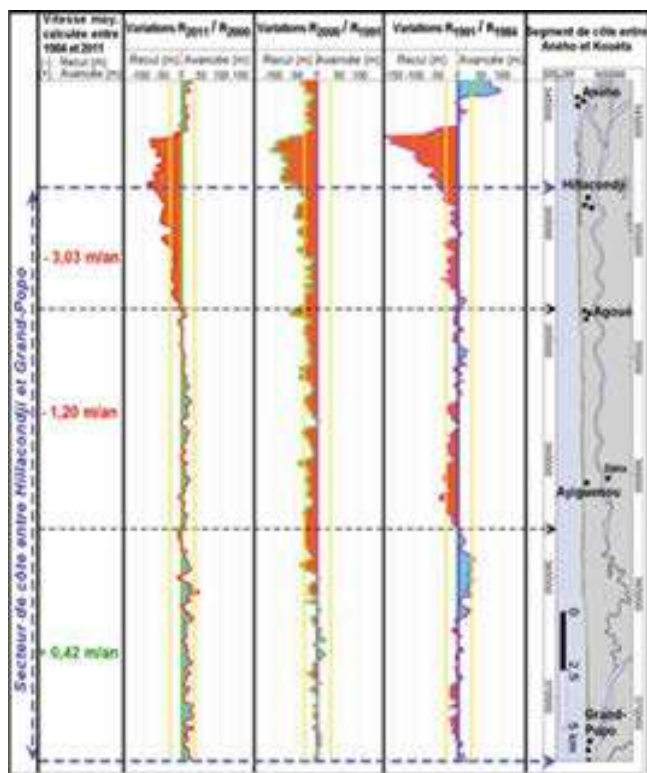
Gbaga Channel Transboundary Ramsar Site (proposed)	TG1-e	BJ1-a
WDPA ID : inexistent		
An initiative to register Gbaga Channel in the Wetlands of International Importance Network was initiated in 2014 with the development of the first version of Ramsar Information Sheets for the Togolese and Beninese parts of the site.		



Strong erosion on the lido of Grand Popo (source MOLOA country branch of Benin)



Conditions of the lido of Grand Popo (source MOLOA country branch of Benin)



On the Togo border, the shoreline retreat rate reaches more than 3m/year (source MOLOA country branch of Benin)

Hillacondji lagoon in the north of the lido of Grand Popo (source MOLOA country branch of Benin)

ENVIRONMENT & RURAL	
BJ1-b	173 - MONO AND KOUFFO ESTUARINE LAGOONS
BASELINE	
Diagnostics	Vast complex of channels, lagoons, wetlands, fresh and brackish water milieus. Hydric systems connected during seasonal spates of the Mono and the Kouffo. Littoral rim very narrow in places, broken at two points, final outlet of the Kouffo and its lagoons. Rural habitation in places in a high-risk situation. The dynamics of the «Bouche du Roi» river mouth were greatly affected by the Nangbéto dam built on the Mono in 1987.
Dynamics	Completely unstable sector with fluvio-marine dynamics: At the mouth of the river Mono called "BOUCHE DU ROY", where the river flows into the sea, complex morphological changes have taken place and the outlet is shifting along a stretch of around ten kilometres between Avlo and Djondji. The situation has greatly deteriorated since 1990 with the implementation of the NANGBETO dam and there has been a great deal of erosion during the period of spates; several dwellings and installations have been washed away. In August 1999, the village of Djondji was affected following the submersion of the village of Doçloboé in previous years. This deterioration has continued since 2000 (source: case study).

Stakes	High risks (flooding-submersion) for the few small villages. Important hub of the coastal fluviomarine system of undoubted biological value.		
Action	Monitor changes in the fluviomarine coastal system. Secure the population and habitations at risk (of submersion/flooding from continental waters and storm surges or conjugations of both) and totally restrict installations in the dynamic zones. Measures to preserve and conserve this unique system of wetlands.		
Priority level	Very high	Monitoring-observation	Intensive and regular
DEVELOPMENTS SINCE 2010			
Evolution of stakes	Rehabilitation of the National Road 1, Hillacondji - Cotonou;		
Coastal protection	Periodic opening of the Bouche du Roi by the government		
Priority level	Very high	Monitoring – Observation	Intensive and regular
Protected area	YES	Hazards	No changes (continuation of the morphodynamic development due to the mobility of the Bouche du Roi mouth)

Ramsar Site of the Low Valley of Couffo, Coastal Lagoon, Aho Channel, Lake Ahémé WII / Ramsar site : WII ID : 1BJ001 – 1017 / WDPA ID : 220056	BJ1-b / c
The Ramsar Site of Couffo Low Valley , Coastal Lagoon, Aho Channel, Ahémé Lake was designated as a Wetland of International Importance / Ramsar Site on January 20, 2001 (47,500 ha), the boundaries are not available in WDPA.	



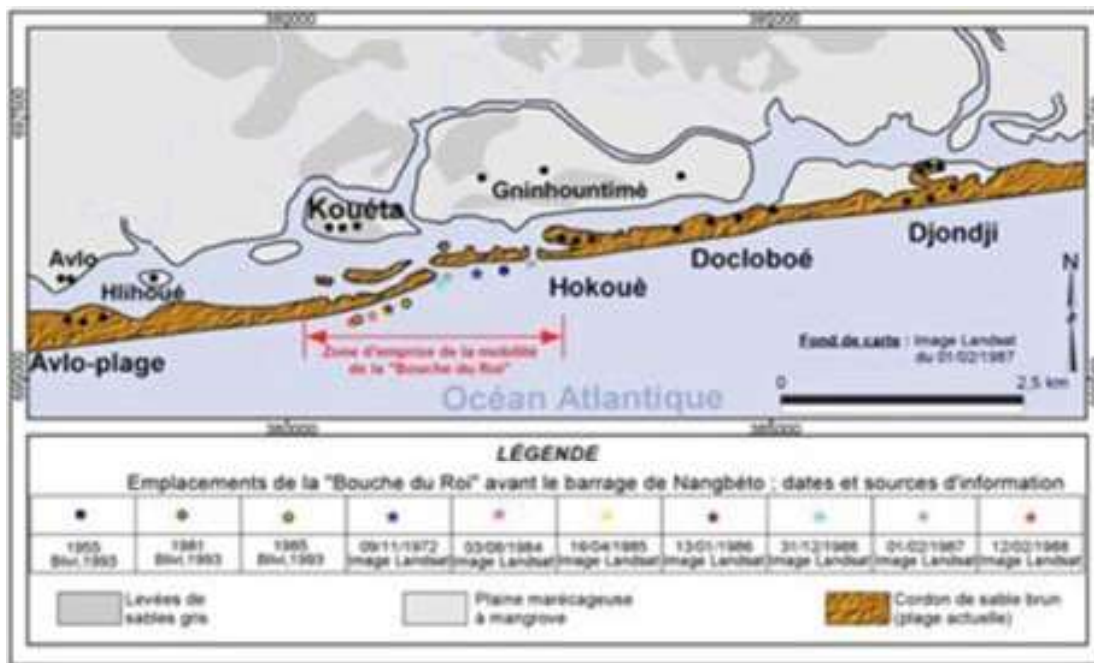
Map of proposed Marine Protected Areas in Benin, basing on the feasibility studies conducted in 2007 and 2011 in the framework on the Guinean Current Large Marine Ecosystem Project³

³ CEDED-NGO 2007. Creation of marine protected areas in Benin: Sites identification and description / CEDED-NGO 2011. Project for the creation and management of marine protected areas creation in Benin

<p>The Bouche du Roy's community conservation area</p> <p>WDPA ID: nonexistent</p>	<p>BJ1-b</p>
<p>The Bouche du Roy's biodiversity community-managed conservation area was created by the Comé's municipal order n°93/77/CC/SG-SADE of 15 September 2016. This community conservation area is integrated into in the zoning of the Mono biosphere reserve and is a component of the latter's central and buffer areas. The area has a simplified management plan drafted in September 2016.</p>	



The Bouche du Roy is one of the most dynamic sectors (migration of the river's mouth) of Benin's coastline, with local populations



Diachronic elements showing the migration of the Bouche du Roy (source : MOLOA's country branch in Benin)

BJ2 BENIN CENTRAL WEST AREA

		ANTICIPATION	
BJ2-a	174 - WEST OUIDAH - COTONOU (Previous BJ1-c)		
BASELINE			
Diagnostics	<p>Relatively homogeneous sector. Sandy terrace bordered on the landward side by a network of lagoons and channels practically connected, but with few intermediate channels between this network and the coastline.</p> <p>Land use, predominantly coconut palms, interspersed with staple crops on small/average properties with «large huts». Residential dwellings on the edge of the beach approaching Cotonou. Appropriate land ownership regime. Registered concessions?</p> <p>Coastal track the line of which approaches the beach (sometimes approximately 100 m). Precarious settlements in segments or in concessions inserted between the track and the beach. Wetlands of Ouidah to be preserved in association with the listed historical site.</p>		
Dynamics	Coastline which is homogeneous, longitudinal, straight profile, slight tendency to undulation near Cotonou expressing the presence of waves of «sediment trains» along the coastline. Alternate areas undergoing slight erosion and progradation. Presence of bars on the shoreface.		
Stakes	<p>In the medium term, accompaniment and supervision of the development of a West Cotonou residential and tourism area which will require:</p> <ul style="list-style-type: none"> <input type="checkbox"/> · The defining and drawing of boundaries of a littoral strip that is not secured and not suitable for equipment (road and dwellings). <input type="checkbox"/> · The most exposed segments of road should be moved landward. <input type="checkbox"/> · Withdrawal landward of dwellings on the edge of the beach. <input type="checkbox"/> · The probable densification of the periurban area of West Cotonou in a residential area should be accompanied. 		
Actions⁹	<p>Agreed development area, and implementation of a sector scheme comprising improvement works structured by the building of a road or new, secured track more than 500 m from the beach with satellites towards the beach, which would be a powerful engine for densification. In this scenario, the former track would be abandoned.</p> <p>This mechanism could propose a natural seafront (essentially plantations of coconut palms?) preparing the land for a possible future change in the shoreline. Supervision of the preservation of the wetlands of Ouidah should enable better promotion of these areas which are an integral part of the historical site.</p> <p>Such an operation would require expropriations and a replotting of land with a view to withdrawing existing installations on the beach to the landward side of the road. This operation would have a high impact on land ownership (winners and losers regarding real estate and land property values).</p> <p>Supervise and officialise the preservation of the wetlands and sea marshes of Ouidah;</p>		
Priority level	High	Monitoring-observation	Watch-keeping for the purpose of anticipation
DEVELOPMENTS SINCE 2010			
Evolution of stakes	Ouidah - Cotonou highway. Entry-point of the West-African pipeline. Start of the fishers-road project. Rehabilitation of the Cotonou-Hillacondji RNIE1 road		
Coastal protection	Development of protective works (5 spurs) in Aného, 1500m West of the old facilities built in 1985.		

⁹ The followings are only general comment and they do not specifically take into account the above-mentioned fishery route project on which the national study did not provide additional information.

Priority level	High	Monitoring - Observation	Regular
Protected Area	YES	Hazards	Moderate erosion, local shoreline retreat estimated between 0.25 and 0.55 m/year, others viable sectors.

Vodountô's community conservation area	BJ1-c
WDPA ID: nonexistent	
The Vodountô's biodiversity community conservation area was created in 2014. The area has a simplified management plan drafted in March 2014.	

Togbin-Adounko's community conservation area	BJ1-c
WDPA ID: nonexistent	
The Togin-Adounko's biodiversity community conservation area was created in 2014. It has a simplified management plan prepared in April 2014.	

The "Fishermen's road" tourist project (Municipalities of Cotonou, Abomey-Calavi and Ouidah)

The whole of this area is directly concerned by the Fishing Road tourist development project which will be conducted in the form of a public-private partnership. This is a land planning and regional development operation under the aegis of the government of Benin. The first section of the coastal road will be moved northward 150 to 200 m, taking it to mid-way between the edge of the coast and the coastal lagoon. The area extends from Fridjrossè to Ouidah along a stretch of around thirty kilometres. More precisely, the area covers a total surface area of 5,000 ha, including 1,500 ha for building and 3,500 ha devoted to leisure facilities¹⁰. For a total cost of approximately 132 billion, the Fishing Road Project is one of the most ambitious undertaken by the government of Benin.

The project was conceived of several years ago, and this perspective has encouraged land speculation on the whole coastline, especially on the Fishing Road where a hectare of land today costs more than 20 million CFA francs (source: national diagnostic study). Conflicts are emerging over usage, in particular with the fishermen's coastal establishments which fear expropriation and having their access to the beaches reduced. The area has been listed since 2005 (Decree no.2005-684 of 3 November 2005 classifying the fishing road as an area with an exclusively touristic vocation).¹¹ - source SDLAO 2011.

Additional information 2015

The projects provides for the creation of tourist area, with the construction of hotels (6 000 rooms), housing developments (7 000 units, from to villas to apartments), leisure, commercial, transportation and services facilities...This resort should favour the creation of about 23 000 direct employments (230 000 indirect employments) et receive up to 95 000 visitors per day.

In 2015, only the developments work of a 12.5 km road section between Cotonou and the Village of Adounko were initiated in February 2014, with an amount of 13.6 billion F CFA (about 20.7 million euros).

¹⁰ Source: Republic of Benin The Ministry of Tourism and Handicraft. 2005. The Fisherman's road Development project. Summary sheet. 16 p.

¹¹ For more information: <http://laroutedespeches.bj>

BJ3 BENIN CENTRAL EAST

		URBAN	
BJ3-a	176 - HARBOUR AIRPORT (Previous BJ2-b)		
BASELINE			
Diagnostics	Very diversified and dense urbanisation, besides the airport footprint. Residential habitation at various levels of quality (swimming pools), large hotel infrastructure, unbuilt land, but projected increasingly close to the shore or encroachment of precarious, random buildings. Vegetable growing area. Urban effluent outlets on the beach at the level of the harbour. Large quantity of solid waste.		
Dynamics	Slightly undulated longitudinal profile, foreshore and beach highly developed (accretion favoured by the harbour developments). Area exposed in the event of storm waves. This area, situated immediately to the west of the harbour, is undergoing constant accretion under the influence of the harbour structures. The recession of the sea in this area is estimated at between 20 to 25 metres per year (Benin National Diagnostic Study).		
Stakes	In the medium term, implementation of a coherent project to develop the seafront and control the extension of building.		
Actions	Restrict new buildings in the areas close to the shore. Closely monitor the changes in the shoreline along the entire area. Anticipate installation of facilities and development through a sector scheme.		
Priority level	High	Monitoring-observation	Regular
DEVELOPMENTS SINCE 2010			
Evolution of stakes	Construction of the Ganhi's commercial area; Gas pipeline; harbour development works (prolongation of the Western pier, dredging of the harbour's basin; Optical fibre		
Priority level	High	Monitoring - Observation	Regular
Protected Area	YES	Hazards	Increase of the accretion, west of the port

Lake Nokoué's (proposed) protected area.	BJ2-b
WDPA ID: nonexistent	
A first study on the marine protected areas to be protected was conducted in 2007 and led to the beginning, in 2009-2010 of a process to carry outreach activities towards local communities, a participatory mapping and to define management measures. 4 areas that need to be protected were identified, among those areas is the Lac Nokoué's protected area which hosts the western part of the lake. This proposed protected area is not listed in WDPA.	

		URBAN AND PORT	
BJ3-b	177 - HARBOUR SECTOR AND COTONOU CHANNEL (previous BJ2-c)		
BASELINE			
Diagnostics	Complex, highly urbanised sector, habitation and harbour facilities, random dwellings at risk of flooding on the left bank of the lagoon outlet. Right bank in rock fill ending with a pier in the sea.		
Dynamics	<p>Beach on the right bank in a complex situation: The western part is undergoing accretion at a high rate, the eastern part possibly has a tendency to erosion or is stabilised (anchorage to two piers at the ends of the beach).</p> <p>Coastline situated between the lagoon outlet and a second protective structure built at the same time as the harbour: this area is in dynamic equilibrium under the influence of the protective groyne commonly known as «east groyne or Siafato groyne». Coastline situated between the port and the outlet of Cotonou Channel. This area is protected by a groyne of rock fill (commonly known as West groyne). The area is currently in dynamic equilibrium. The lagoon outlet is an area of variable morphology which has been subject to considerable changes since Cotonou Harbour was built (Benin National Diagnostic Study).</p>		
Stakes	In the medium term, preservation of the buildings and infrastructure close to the shore.		
Actions	Restrict new buildings in the areas close to the shore. Requalification accompanied by a withdrawal of habitations situated on the edge of the left bank of Cotonou Channel. Possible additional structures against erosion. Closely monitor the changes in the shoreline along the entire area.		
Priority level	High	Monitoring-observation	Regular
DEVELOPMENTS SINCE 2010			
Evolution of stakes	<p>Harbour development works (prolongation of the western pier in 2014, dredging of the harbour's basin), launching of the «Epine Dorsale» project that includes a deep-sea, oil, mineral and commercial port in Sèmè-Podji (Benin), a functioning railway from Cotonou to Parakou that should be extended from Parakou to Dosso and Niamey (Niger), as many dry ports as needed, especially in Parakou and Dosso, as well as an international airport in Kraké, on the border between Benin and Nigeria.</p> <p>Project to extend and exploit the banks of the lagoon and the optical fibre transit area; Gas pipeline; Rehabilitation of the Cotonou - Sèmè-Kraké road;</p> <p>Renovation and extension of the protective spurs west of the Cotonou channel</p>		
Characterization of port installations	<p>The port of Cotonou was built in 1962. The concession of the Cotonou's port has been granted to Bolloré Africa Logistics since 2009 for a 25-year period, in the framework of the public-private partnership with the port's Authority.</p> <p>The reception of a 540-m marked the beginning of the terminal's development works.</p> <p>90% of exchanges with foreign countries/more than 60% of the countries GDP/8 million tonnes. It is through this port that Areva exports the Uranium extracted in the north of Niger.</p>		
Coastal Protection	Start of the emergency protection works in the CAME area.		
Priority level	High	Monitoring - Observation	Regular
Protected Area	YES	Hazards	Not reported



Distribution of protection works around the port (source: SDLAO, National Study, Benin)

		URBAN	
BJ3-c	178 - AMBASSADORS SECTOR (Previous BJ2-d)		
BASELINE			
Diagnostics	Largely urbanised, the eastern part is structured in quadrats. High density right to the edge of the beach. No development of the sea front. Since the 1980s, in the West part of the sector, affected by erosion, beach sandstone (beachrock) has appeared, unearthed by erosion.		
Dynamics	Sector subject to high rate of erosion upstream of the channel and the port of Cotonou, despite several old structures (groynes + stabiplage). This area is currently undergoing strong erosion at rates of approximately 20 metres per year in the east in the immediate proximity to the Sifato groyne. These rates decrease eastward and remain greater than one metre per year towards Kraké on the border with Nigeria. This part of the littoral was also where the largest sand quarries were situated. More than 800.000 m3 of sand were extracted annually (source: Benin national diagnostic study).		
Stakes	In the short term, considerable shoreline recession threatening dense urban districts.		
Actions	Absolute restriction on new buildings in the areas close to the shore Defensive project underway involving a groyne mechanism. Close monitoring of the impact of the developments.		
Priority level	Very high	Monitoring-observation	Intense and regular
Case study	The beaches of Benin in the Gulf of Guinea in West Africa: changes and socio-economic consequences. See annex 1.		
DEVELOPMENTS SINCE 2010			
Evolution of stakes	Rehabilitation of former infrastructure built by SAGA Petroleum for the exploitation of the residual oil reserve of the Sèmè field by the SAPETRO company ; Gas Pipeline. Ongoing exploration of the country's whole offshore		
Coastal protection	Construction of 07 protective spurs between 2012 and 2013 and a coating on a 7.5 km distance from the Sifato spur westwards		
Priority level	Very high	Monitoring - Observation	Intense and regular
Protected Area	YES	Hazards	Important morpho-dynamic change following the establishment of the spurs.



Important erosion (reflexive beach) in front of the port (Source, MOLOA's country office in Benin)



Development of the spurs system west of the port of Cotonou (source: MOLOA's country office in Benin)



Development of the spurs system west of the port of Cotonou (source: MOLOA's country office in Benin)



Development of the spurs system west of the port of Cotonou (source: MOLOA's country office in Benin)



Rock-filled coastline north of the port of Cotonou (Source: Google Earth)

BJ4 BENIN EAST AREA

		PERI-URBAN	
BJ4-a	179 - EAST COTONOU (Previous BJ2-e)		
BASELINE			
Diagnostics	Coastline sparsely populated, despite the proximity of urban centres. Coastal road between 1.2 and 1.6 km from the shore. Large plantations (coconut palms). Land reserves destined for future use on terrains close to Nigeria. Area suitable for equipment (high, well-drained terraces).		
Dynamics	Recession of the shoreline to be anticipated depending on the developments planned for the Ambassadors area.		
Stakes	Urbanisation respecting the seafront with no buildings and developed, anticipation of developments and land use/urbanisation of the sector		
Actions	Anticipate equipment and development. Closely monitor the changes in the shoreline.		
Priority level	High	Monitoring-observation	Watch-keeping for the purpose of anticipation
DEVELOPMENTS SINCE 2010			
Evolution of stakes	Construction of the Cotonou-Nigeria road; Gas pipeline Construction of a customs inspection station juxtaposed to Sèmè-Kraké Project for the construction of the deep-sea port of Sèmè-Podji.		
Priority level	High	Monitoring - Observation	Intense and regular
Protected Area	YES	Hazards	It is necessary to closely monitor the impacts of the implementation of the spur system East of the Port of Cotonou that is already resulting in a substantial recess of the shoreline west of the spurs systems.

Ouémé Low Valley Ramsar Site, Porto-Novo Lagoon, Nokoué Lake	BJ2-b / c / d / e
WII / Ramsar site: WII ID: 1CI003 – 1018 / WDPA ID : 220055	
The Ouémé Low Valley, Porto-Novo Lagoon, Nokoué Lake Ramsar site was classified as a wetland of international importance/ Ramsar site on 24 January 2000 (91 600 ha) (no map in the WDPA)	

Bymins' community conservation area	BJ1-c
WDPA ID: nonexistent	
The Bymins' biodiversity community conservation area was created in 2014.	