Restoration of Atanasovsko Lake, Bulgaria

Year of issue

2025

Summary

The Salt of Life project (LIFE11 NAT/BG/000362) restored the lagoon’s water-management infrastructure at Atanasovsko Lake by repairing dykes and barriers, dredging 23 km of the perimeter channel and rehabilitating 20.5 km of embankments to secure long-term habitat conditions for roosting and breeding birds. Building on this, Lagoon of LIFE (LIFE17 NAT/BG/000558, 2018–2024) scaled up restoration: three major earth dikes (~5.8 km) were rebuilt, 17.6 km of mini-dikes restored and 14.3 km of internal saline channels cleaned; the North sea sluice was repaired in 2021. These actions increased water exchange more than fourfold, stabilised water levels and salinity, improved oxygen, and reduced chlorophyll-a - directly improving ~220 ha with positive effects across >700 ha. A pilot, low-impact method using a mini-excavator to build/maintain mini-dikes reduced cost, time and disturbance and has been widely applied. Macrophyte recovery advanced with Ruppia maritima transplanted (TERFS/Chimove), establishing three self-reproducing colonies. In 2024, Greater Flamingo bred here for the first time in Bulgaria. An After-LIFE plan and an active Public Advisory Council support ongoing maintenance with Black Sea Salinas, strengthening resilience to extreme rainfall and safeguarding salt-extraction infrastructure and lagoon habitats.

Photo Gallery






Location

42.5772, 27.4749

Project

NWRM

National ID

Bulgaria_11

Sector

Hydromorphology

Installation Date

2018-08

Implementation status

Completed

Contact

Jovanka Ignjatovic

Overview

Location of the project

Atanasovsko Lake is immediately north of Burgas on the Black Sea coast, and is cut by the Burgas–Varna road (E87), which splits the lagoon into North and South. Bird access points run along/near the E87.

Country

Bulgaria

NUTS2 Code

Югоизточен (Yugoiztochen)

Sponge measures implemented in the case study

Lake restoration

Objectives

Establish a functional, efficient and sustainable water-management infrastructure for the lagoon to improve habitat conditions and enable adaptation to climate-change effects.
Reduce impacts of threats (floods, degraded sea connection, polluted surface inflows) on lagoon habitats and target bird species (6 spp.: Collared Pratincole, Kentish Plover, Avocet, Black-winged Stilt, Little Tern, Sandwich Tern) via sustainable habitat management and breeding-site improvements.
Monitor and evaluate effects of restoration measures and feed results into management.
Improve visitor experience and disseminate results; raise public understanding/support for coastal lagoons' ecological, economic and social values.
Aim to restore and protect 1,458.82 ha of coastal lagoon habitat 1150* (project coverage).
Recover 20 ha of currently drained 1150* and restore physico-chemical characteristics over >720 ha via active water-level/salinity management, channel clearing and a new sluice gate.

Involved partners

Authority type	Authority name	Authority role	Authority responsibility
NGO	Bulgarian Biodiversity Foundation	Initiation of the measure	Responsible
NGO	Bulgarian Society for the Protection of Birds	Implementation	Supporting
Private property owners	Chernomorski solnici JSC	Implementation	Supporting

Site Information

Climate Zone

Warm temperate moist

Precipitation

550.00 mm

Temperature (°C)

13.00 °C

Runoff coefficient

0.30

Elevation range

0 m

Slope range

1-2%

Vegetation class

Predominantly halophytic salt-marsh vegetation around the salt pans—annual glasswort (Salicornia europaea) and other Mediterranean salt meadows (Juncetalia maritimi)—with patchy reedbeds (Phragmites) and bulrush (Typha) in fresher pockets; dry fringes host steppe-like grasses/forbs (e.g., Artemisia, Poa, Lolium). Aquatic Ruppia maritima occurs in restored basins.

WFD Ecological status

Poor

WFD Chemical status

Good

Water quality status

Surface-water pollution and changes in water regime. Nutrient-loaded inflow from rivers Azmak, Kurbardere and Dermerdere via bypass-channel works.

Design and Implementation

Project scale

Micro

Project scale specifications

The actions are confined to a single coastal-lagoon site (Atanasovsko Lake, immediately north of Burgas and split by the E87), focusing on localised hydromorphological works on dikes, mini-dikes, channels and sluices within the saltpan system.

Project area

10600

Area subject to Land use change or Management/Practice change (ha)

10600.00 ha

Size

7200.00

Size unit

ha

Constraints

Old and compromised salt-production infrastructure (separation barriers, water supply facilities) and flood protection (dyke, channel)

Favourable preconditions

Salinas are still in operation, using the traditional salt extraction approach

Financing

Total cost

4385161.00 €

Total cost information

€1,935,368 : LIFE11 NAT/BG/000362 “Salt of Life” (2012–2018) Total project budget, including technical design, restoration, monitoring, management and public awareness
€2,449,793 : LIFE17 NAT/BG/000558 “Lagoon of LIFE” (2018–2024)

Costs capital

2013027.00 €

Costs operational

100000.00 €

Costs operational information

Annual capital investments from Black Sea Salinas for infrastructure improvements and operation

Administrative annual costs

98000.00 €

Administrative annual cost information

Monitoring, administration, overheads and public awareness costs on average annual basis until 2018

Financing authorities

Authority name	Type of funding	Comments	Financing share
European Union	EU-funds: LIFE+	LIFE11 NAT/BG/000362 “Salt of Life” (2012–2018) €1,450,558 LIFE17 NAT/BG/000558 “Lagoon of LIFE” (2018–2024) €1,836,683	75 %
Black Sea Salinas Ltd.	Private funds	Only of LIFE17	25 %
BBF	Private funds	Only of LIFE17	25 %
BSPB	Private funds	Only of LIFE17	25 %
Zaedno	Private funds	Only of LIFE17	25 %

Compensations

Non

Policy and Governance

Policy description

Decline of the conservation status of priority Coastal lagoon habitat and the associated protected species due to changes of the hydrological and hydrochemical conditions caused by destruction of water management facilities

Land ownership

National government ~83.9%, Municipality ~10.8%, Private ~4.39%, NGOs ~0.86%

Policy targets

Improved Biodiversity

Pollutants Removal

Oher Societal Benefits

Part of a wider plan

Oui

Wider plan

Name
Management plan of Atanasovsko lake Maintained reserve

Public consultation

Oui

Consultation activities

Activity type	Key issues	Comments
Public consultation of Atanasovsko lake Management Plan	—	—
Festival	Organise Salt of Life Festival to communicate project objectives and results to the broader public	—

Activity type	Key issues	Comments
—	—	90+ public events, >1 million media reach; film “Salty People” won international awards, raising Burgas’ profile as the “Pink Salt Lake.”

Has contractual arrangements

Oui

Contractual arrangements

Arrangement type	Name
Organisational arrangement	Partnership agreement for the implementation of LIFE11 NAT/BG/000362 Project

Impacts and Monitoring

Monitoring System

Monitoring requirements

Continue the partner-led scheme tracking water regime and hydro-chemistry (e.g., O_2, chlorophyll-a, salinity), habitat condition (1150*, 1310, 1410), Ruppia patches and breeding birds, under the After-LIFE plan and annual expert reporting.

Monitoring parameters

Water-exchange efficiency, dissolved oxygen and chlorophyll-a (as eutrophication indicators), water levels/salinity (with the 2021 sea-sluice fix improving control) and a noted rise in groundwater table in restored areas; species/habitat indicators include breeding bird numbers and the extent/status of lagoon and salt-meadow habitats, plus presence/area of Ruppia maritima colonies; methods include counts, camera/drones/photo-traps, and an integrated monitoring matrix (elsewhere applied with monthly salinity, O_2, pH, temperature).

Maintenance

Maintenance requirements

Routine O&M is led by Black Sea Salinas—mechanised upkeep of dikes, mini-dikes, channels and sluices - within a governance setup involving BBF/BSPB and RIEW Burgas.

Impact Assessment Methodology

Performance impact assessment method

Catchment outlet

Performance impact estimation information

Monitoring of the populations of target bird species; Monitoring of the area of the target habitats; Monitoring of key hydrological and chemical parameters.

Socio-economic Impacts

Direct benefits

200000

Direct benefits information

Salt production safeguarded, operations more efficient. Restoring dikes/channels and repairing the main sea sluice improved circulation in benefit of salt extraction; using a mini-excavator for mini-dikes compensates labour shortages and speeds future O&M.
Reduced costs & disturbance. The mechanised mini-dike method cut manual work, materials and restoration time, while limiting disturbance during breeding (project manager statement, 2025).
Market diversification: the project created/promoted 10 new products and 3 value-added services, incl. Pelican soap, Flamingo candle, Laika.bg vegan chocolates (5 types), Gaillot sea-salt chocolate (7% profit donated), “Nature in a box – Atanasovsko Lake,” and “green salt” (Salicornia).
Visitor services: Black Sea Salinas offers lye and mud pool experiences on the south lake (non-medical), strengthening local tourism linked to the salt pans.

Ancillary benefits information

Flood-risk mitigation protects the salt-extraction infrastructure and site assets (confirmed by project team and municipal notes on the benefits of restored circulation).
Recent negative impacts :
Storm damage (Nov 2023): the lakeside simBiotic visitor space was heavily damaged/closed, prompting plans for a new information centre.
Lower salt tonnage in recent years, but greater product/service diversification around lake resources.

Biophysical impacts: Hydrology

Retained water

3.20

Retained water unit

mio m3/year

Information on retained water

Total volume of the lake.
3 major earth dikes rebuilt (5,800 m), 17,640 m of mini-dikes restored, 14,330 m of internal saline channels cleaned; hydrotechnical facilities (sluices, spillways, locks) repaired. In 2021 the main sea lock (North) was repaired, improving control of water regime and stabilising water levels and salinity. Direct improvement on ~220 ha, with effects across >700 ha.
Water exchange between basins increased >4×, enabling control of circulation/levels; reduced sediment resuspension and lower turbidity noted post-sluice repair.
Reports of a rise in the groundwater table in restored areas, supporting favourable water regime in peripheral parts.
Creation of ~13 ha of small wetlands (bittern habitat) by dredging ~50,000–60,000 m³ of sediment and building three earthen embankments; minimum water depth 30 cm maintained; connected to Banska River to stabilise levels.
Under Salt of Life, 23 km of the perimeter/bypass channel were cleaned to prevent freshwater inflow that alters lagoon conditions and to route river inputs to the sea. 20.5 km of dykes/barriers repaired.

Increased water storage

10.00

Increased water storage unit

% Percent

Information on increased water storage

Expected

Runoff reduction

32000.00

Runoff reduction unit

m3/year

Biophysical impacts: Biodiversity

Improved biodiversity

Oui

Information on improved biodiversity

Improved status and increased area of priority habitat 1150* Coastal lagoons and breeding space for endangered bird species
Habitats (area changes under Salt of Life): Habitat 1310 +10.9 ha; 1340* +240 ha; 1410 +~10 ha; 1530* +~197 ha (SCI totals).
Lagoon macrophytes: Ruppia maritima restored using TERFS/Chimove; 3 self-reproducing colonies, now >0.3 ha; in 2024 a new natural colony formed after constructing three earthen dikes.
Target birds (Salt of Life): Common Tern numbers ×10 vs. project start; Gull-billed Tern returned as breeder after 18 years; artificial islands (>500 m² repaired + a new 144 m² island) supported nesting/rest.
Flagship event: First successful breeding of Greater Flamingo in Bulgaria (2024)-3 chicks observed in June 2024.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

Reduction of inflow of polluted water from the bypass channel to the Lake; Increased depth of salt water inflow (restored underground connection with Black Sea)
Eutrophication indicators: Higher dissolved oxygen and lower chlorophyll-a after channel cleaning and hydrotechnical fixes (evidence of reduced eutrophication).
Turbidity: Reduced turbidity associated with less sediment resuspension after the 2021 sea-lock repair.

Soil quality overall improvements

N/A info

Ecosystem erosion control

Oui

Biophysical impacts: Others

Ecosystem impact climate regulation

Increased permanent biomass

Information on ecosystem impact climate regulation

Carbon capture in reed biomass; Improvement of local climate in City of Burgas

Lessons Learned

Key lessons

Partnership with local business benefiting from the restoration is key success factor and prerequisite for sustainability of NWRM functioning. At Atanasovsko, the salt-pan operator (Black Sea Salinas) co-led works and now mechanises routine upkeep; the project itself stresses that long-term success also depends on the state owners (MoEW/RIEW Burgas) clearly playing their role.

Hydrological control is the cornerstone. Rebuilding three major earth dikes, restoring mini-dikes, cleaning internal channels and repairing the main sea sluice in 2021 multiplied water exchange more than fourfold, stabilised levels/salinity and improved oxygen while lowering chlorophyll-a.

Managing freshwater inputs is as important as internal works. Cleaning 23 km of the bypass/perimeter channel to divert river inflows protected lagoon salinity and reduced nutrient-loaded water reaching the basins.

Design monitoring before and during works to steer adaptive management. The team created the lake's first comprehensive monitoring scheme (with innovations like drones and photo-traps), using results to target measures and assess habitat/species responses.

Simple, scalable techniques can cut costs and disturbance. Restoring mini-dikes with a compact mini-excavator shortened work time, eased future maintenance and reduced human presence during breeding—proof that small technical choices shape ecological outcomes.

Governance and coordination are non-negotiable. Implementation required precise coordination among authorities, ecologists, technologists and contractors; going forward the project calls for a clear allocation of responsibilities and an integrated management plan for the Natura 2000 site.

Plan for extremes and climate-proof visitor infrastructure. Severe flooding in late 2023 destroyed the "symBiotic" space, underlining the need to design access/education facilities and O&M regimes for intensifying events.

Biodiversity can respond quickly when hydrology and habitat structure are right. Ruppia maritima re-established (with TERFS/Chimove and natural spread after earthen dikes), and Greater Flamingo bred successfully in 2024 ; gains that still depend on careful water-level control.

Barriers

Barrier type	Barrier role	Comments
Lacking financing sources	Main barrier	Before acquisition of LIFE+ funding it was not possible for the Salinas to invest such resources.
Limited staff and consultant knowledge	Secondary barrier	—

Drivers

Driver type	Driver role	Comments
Organisation committed to it	Main driver	Consortium of environmental organizations, Municipality and Salinas operator
Legal obligations	Secondary driver	—

Success factors

Success factor type	Success factor role
Attitude of decision makers	Main factor
Financing possibilities	Main factor
Attitude of relevant stakeholders	Secondary factor

Transferability

Highly transferable to managed coastal lagoons/saltpans: restoring dykes/sluices, cleaning channels, and using mini-dikes/mini-excavators can quickly improve water regime and biodiversity while cutting costs. Watch for: a committed operator and O&M funding; freshwater/nutrient inflows; design for extremes; scheduling outside breeding; sediment quality and salinity targets; and a monitoring scheme to adapt water-level control.

Sources

Sources

Salt of Life - Urgent Measures to Restore and Secure Long-term Preservation of the Atanasovsko Lake Coastal Lagoon

The Salt of Life

Layman’s Report of Salt of Life Project

Layman Report of the Lagoon of LIFE Project

What did we do for Atanasovsko Lake

Lagoon of LIFE (project page)

What are the hot issues and successes of Lake Atanasovsko

Проекти по програма LIFE+ (LIFE+ Projects)

Екипът на проекта „Лагуната на живота“... (The “Lagoon of Life” team performs important conservation activities at Atanasovsko Lake)