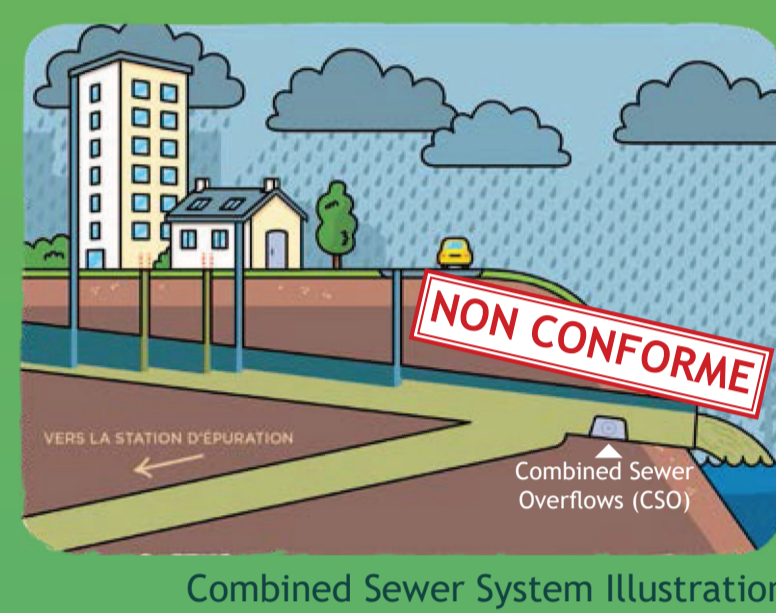
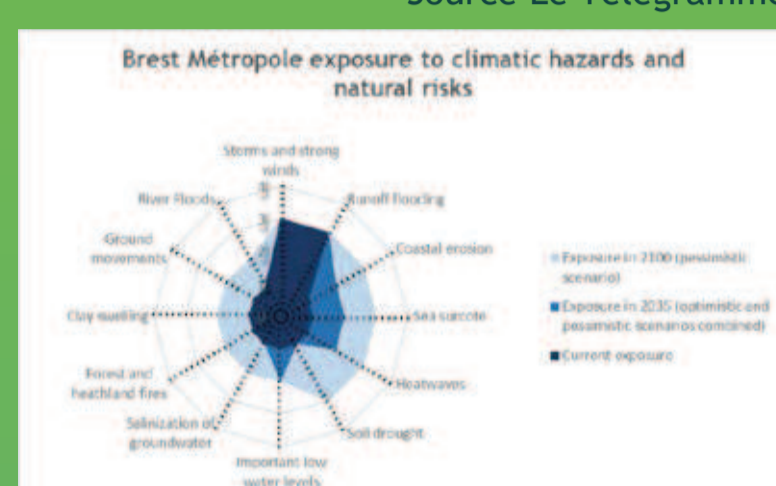
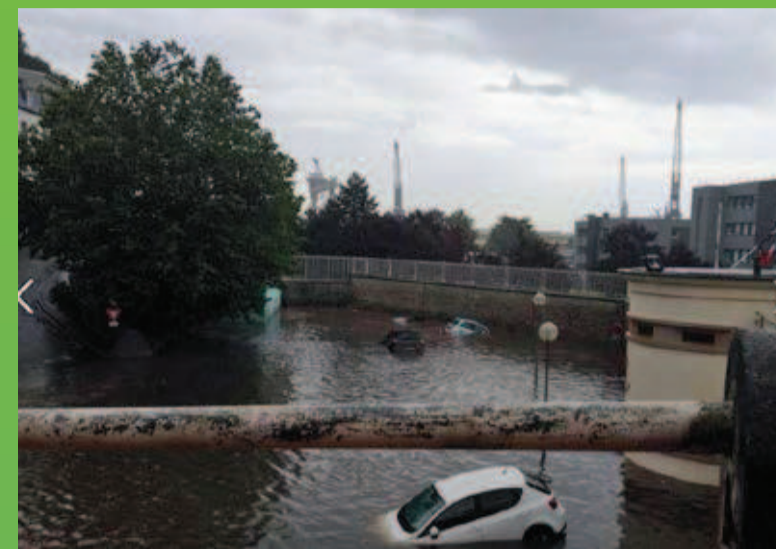


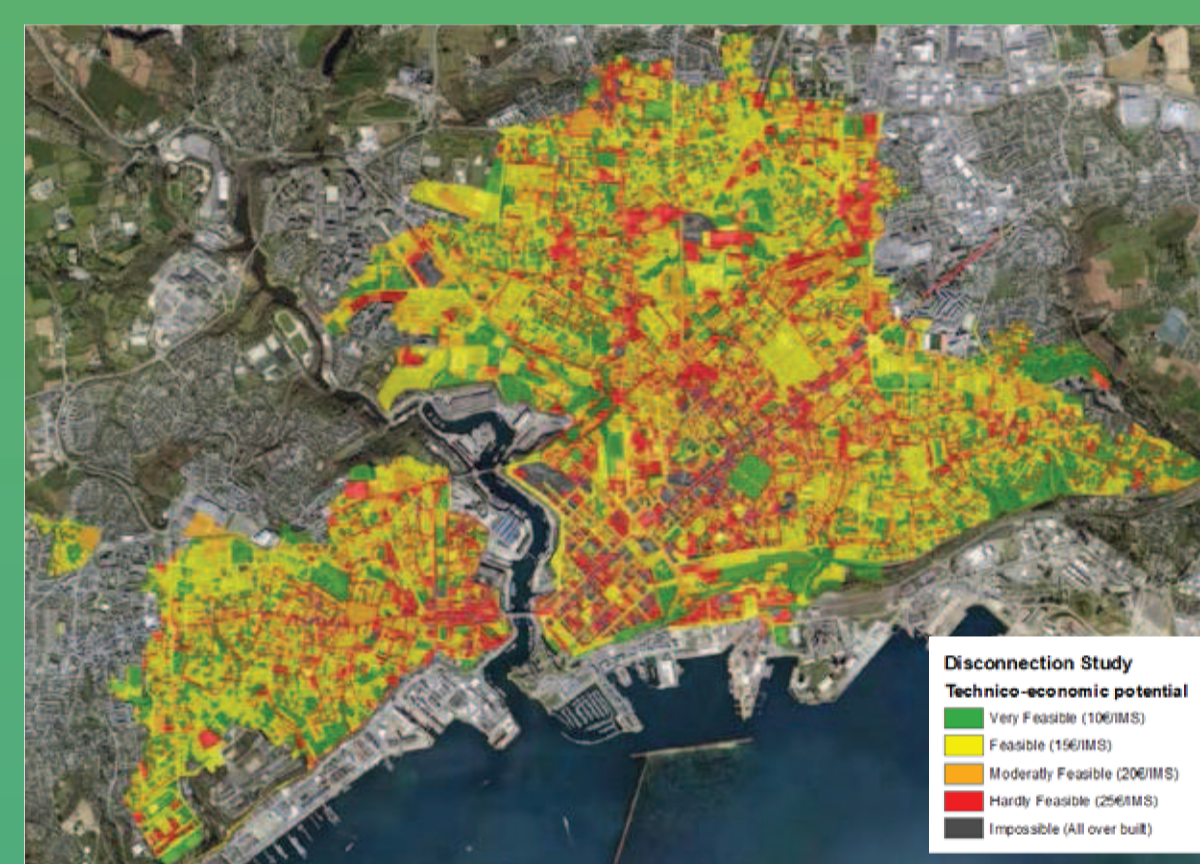
Grow Green Brest

General context

Brest metropole has to face numerous environmental challenges, particularly those about the combined sewer overflows and flooding. Small urbanised watershed have a very fast response and causes very sudden flooding in the neighbourhoods which are built as topographic basin partly due to reconstruction after World War II, and those which have been built in main axes of runoff. Since 2008, heavy rains caused flooding in different parts of the city generating damages on housing and commercial activities. The whole city drainage has been built on the frequency of occurrence of 1 for ten years. Early signs of the climate change appears, 6 intense period of rainfall have been recorded and evaluated as thirty to hundred years return periods since 2008. The number of contentious appeal is increasing due to the replication of these phenomenon. In 2015, the French law impose to reduce the combined sewer overflows to less than 5% of the collected volume. That is why Brest metropole chose to explore how nature based solutions could be a response to these 2 major issues, being heard that NBS developed to face one of these issues would participate to the other.



Nature Based Solutions potential for Stormwater management



In order to evaluate if it was possible to reach the objectives of the sanitation system compliance using Nature Based Solutions, every part of the Combined sewer area (1500 ha) has been rated.

The rating system relies on expert say concerning : How much money should we spend if we want to infiltrate the rain water of this area ?

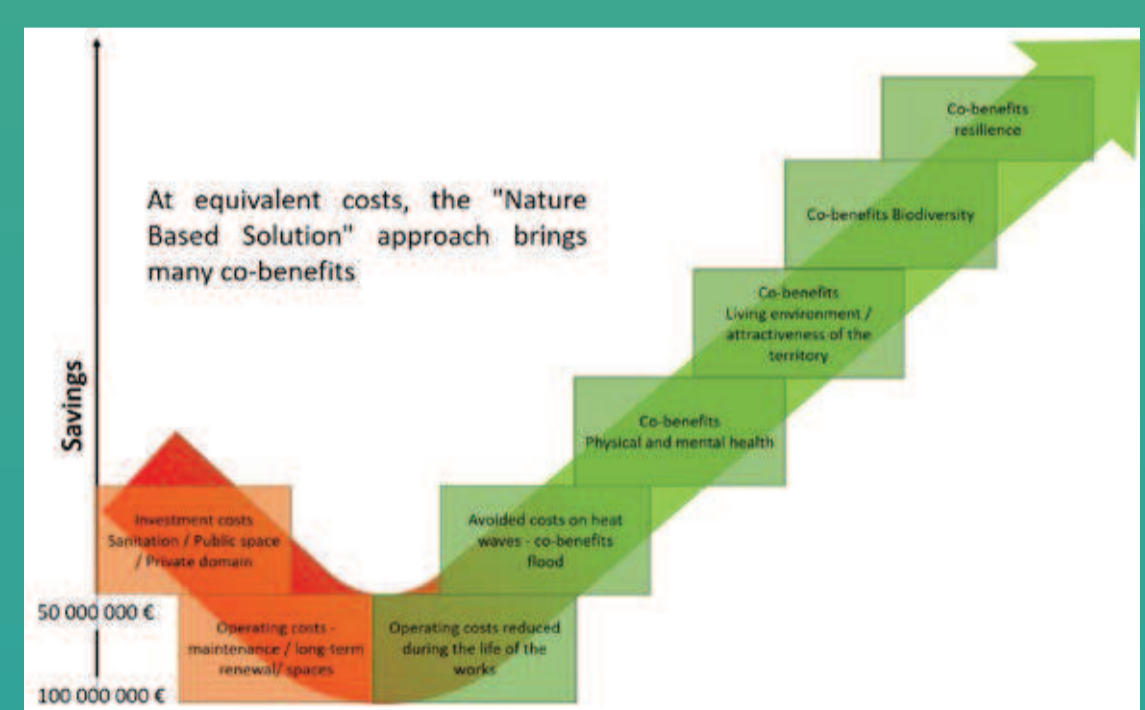
The rate scale goes from 10€/impervious meter square (IMS) to 25€/IMS.

Balancing grey and green solutions to fit sanitation compliance and flood risk mitigation.

Along the path of the Growgreen project, two studies were carried out in parallel :
 1) A study based on the use of so-called grey solutions (storage basins downstream) to reach sanitation compliance. This study integrated a lot of parameters such as : rainfall model, pollution concentration, hydraulic model, environmental impact study...
 2) The Nature Based Solutions potential for Stormwater management study which aimed to reach the sanitation compliance by acting at the root (upstream) : Reducing runoff areas.

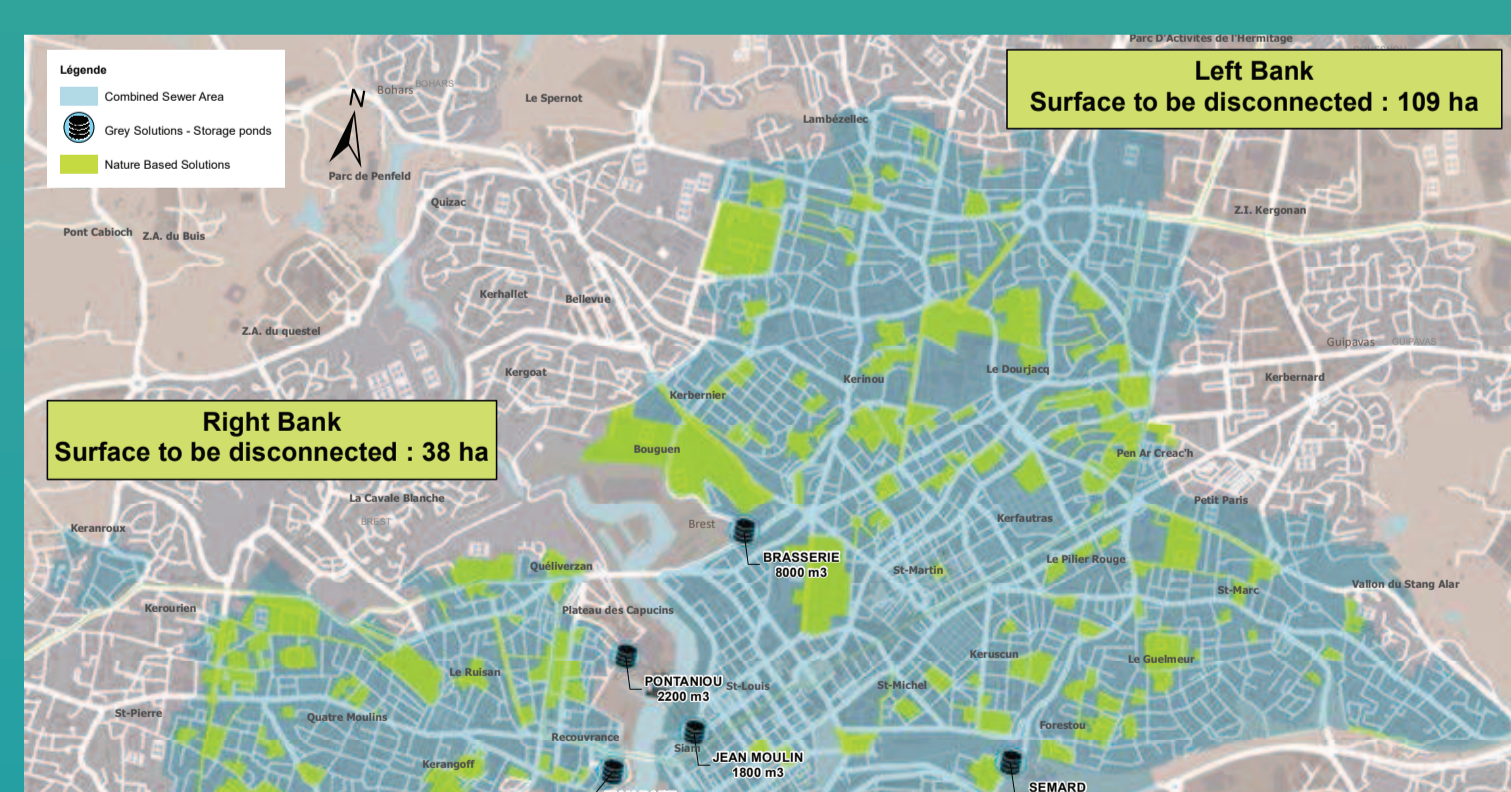


These 2 studies were consolidated in 2021 in a multicriteria analysis tool developed by the MEDISA consortium. This tool permitted to evaluate the different mixed scenarios (gradation of NBS managed areas ratio versus Basins volume) by using Key Performance Indicators.



Main indicators where : Average annual cost, Nautical activity Impact, Ecosystem Impact, Social Impact, Implementation schedule, Risk and Economic activity.

Brest metropole action plan



Brest metropole took the decision to face the sanitation system compliance by making equal financial efforts upstream and downstream. 25 Million Euros will be spent on Nature Based Solutions within the next 15 years and will benefit to inundations mitigation.



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Trainings and Brainstroming

Brest metropole organised training sessions in order to empower about 200 officers about climate change adaptation and sanitation compliance issues. Different workshops were organised to evaluate the impact of the Strategy under construction on departments activities. Other workshop sessions took place on the definition of common design criterias of different technics from the Growgreen compendium.



Local Working Group

Daylighting river Spernot

Brest metropole had inundation troubles on the buried river Spernot with several properties impacted. Biodiversity and Landscape issues were taken into account in the design of the hydraulic facility. This project has been one of the first very transversal conception of public spaces, engaging Proximity, Green spaces, Biodiversity, Storm water and the road and Infrastructure departments. This park which was very confidential is now attracting a lot more people. The playgrounds were also restored and the river has been returned to his bed with the help of schoolchildren's.



Keravelloc Garden

Grey + Green solutions

Improving the protection of the natural environment by minimizing the discharge of untreated wastewater from the combined sewer system, reducing the vulnerability of an entire sector of Brest to flooding : inaugurated at the end of September 2022, the flood park of Kertatupage should capture on its own approximately 50% of the Kerinou watershed. More than simple hydraulic structures, the developments carried out by Brest Métropole and Eau du Ponant also constitute a breathing space accessible to the public, where to discover the natural heritage nestled in the heart of these approximately two hectares (bats, salamanders, washhouses rehabilitated, rivers daylighted...)



Kertatupage Flood Park

Pooling resources

Every public space development project is an opportunity to integrate nature based solutions for stormwater infiltration. In 2021, an extension of the viban heating network was the opportunity to experiment the infiltration of storm water in the trench created for this purpose. It allowed to subtract 5700 square meters of surface which contributing to the runoff. The project has evidenced a possibility to mutualize equipments, materials and give more consistency to the public action.



Kermaria Street

Revegetating schoolyards

The city of Brest has invested itself in a schoolyards renovation program consistent with a guide called "Reference School Yard". One of the major axes is : "the schoolyard, a space respecting the environment through access to Nature and the development of Biodiversity". The new schoolyards are co-designed by the users (pupils, parents, educational team) on the one hand and by a multidisciplinary "public space" technical team on the other hand. Implementation on Dukas and Kerhoas schoolyards was completed in 2022 ; the newly created green spaces allow infiltration of stormwater of the whole school.



Dukas and Kerhoas Schools

Raising awareness

Brest metropole developed educational tools in order to raise people awareness about the sanitation system and what they can do to lesser their impact on nature. The main issues tackled are waste pollutions, combined sewer overflows and inundations. Awareness raising actions took place in different events such as Science Festival, Climat Declic, World water day... To improve the impact of these actions, Brest metropole conducted rain harvesting campaigns in 2021 and 2022. Rain barrels were provided at preferential cost observe people had to assist to a sensitization training and had to disconnect their gutter from the sewage network.



Citizen engagement

Ecole Kerhoas