

# Building with Nature; the ecosystem approach to hydraulic engineering

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## Introduction

With over 80% of the world's large population centres in vulnerable coastal, delta and river areas, the construction challenge in these areas is extraordinary. Trade and industry require new ports and infrastructure, citizens require housing, rivers require space to flood, and all will have to be protected from and harmonised with nature and the effects of climate change and sea-level rise.

A traditional approach is to make an Environmental Impact Assessment of a project that is designed from a hydraulic engineering perspective. Our new approach is to design these projects on basis of the ecodynamics of the area; to ensure a perfect fit with nature from sketch.

The challenge demands many talents; research and technology; effort and experience; planning and finance; ambition and sympathy. Input is essential from all stakeholders; from owners, residents and policymakers to designers, contractors and project administrators. Ecological and economic interests have to be responsibly balanced. We are faced with the need to learn to build with nature, so that the natural and human world can sustainably co-exist.

## Building with Nature

The Dutch national programme Building with Nature targets discovering and developing all the know-how and expertise required to allow this to happen. To create state-of-the-art models for ecodynamic design. To permit the aims to be realised. Society will benefit in many ways: from improvements to administrative and policy-making processes, development of new business opportunities, establishing new positions in technological and scientific excellence, to provision of new and innovative design tools and consolidation of skills.

Within Building with Nature a paradigm shift in the realization of hydraulic engineering works is evolving. The new, ecosystem-based approach is:

- I. understand ecosystem functioning.
- II. plan a project or activity in coherence with other functions, such as coastal defense, aquaculture, sand and gravel extraction, land reclamation, nature development or restoration, etc.
- III. determine how natural processes can be used and stimulated to achieve your goals.

- IV. monitor the environment during execution based on risk-assessment and statistical analysis giving room for adaptation of the monitoring and the project execution itself.

A result of the paradigm shift is that ecosystem knowledge gets a role at the front of infrastructural planning and design. This gives way to an offensive approach (optimize full economic and ecologic potential) instead of a defensive approach (minimize environmental impacts).

## EcoShape

EcoShape is a consortium of Dutch specialists with a rich history of solving coastal infrastructural challenges in the Netherlands and abroad. As custodians of this knowledge inheritance of past land reclamation, sea and river defences, dike building, dredging and protecting nature, EcoShape will provide its knowledge resources for the benefit of sustainable coastal development - anywhere in the world it may be needed.