



## **RiverCare: towards self-sustaining multifunctional rivers**

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Rivers are inherently dynamic water systems involving complex interactions among hydrodynamics, morphology and ecology. In many deltas around the world lowland rivers are intensively managed to meet objectives like safety, navigation, hydropower and water supply. With the increasing pressure of growing population and climate change it will become even more challenging to reach or maintain these objectives and probably also more demanding from a management point of view. In the meantime there is a growing awareness that rivers are natural systems and that, rather than further regulation works, the dynamic natural processes should be better utilized (or restored) to reach the multifunctional objectives. Currently many integrated river management projects are initiated all over the world, in large rivers as well as streams. Examples of large scale projects in the Netherlands are 'Room for the River' (Rhine), the 'Maaswerken' (Meuse), the Deltaprogramme and projects originating from the European Water Framework Directive (WFD). These projects include innovative measures executed never before on this scale and include for example longitudinal training dams, side channels, removal of bank protection, re-meandering of streams, dredging/nourishment and floodplain rehabilitation. Although estimates have been made on the effects of these measures for many of the individual projects, the overall effects on the various management objectives remains uncertain, especially if all projects are considered in connection. For all stakeholders with vested interests in the river system it is important to know how that system evolves at intermediate and longer time scales (10 to 100 years) and what the consequences will be for the various river functions. If the total, integrated response of the system can be predicted, the system may be managed in a more effective way, making optimum use of natural processes. In this way, maintenance costs may be reduced, the system remains more natural and more self-sustaining and ecosystem services such as safety, navigability, biodiversity and climate buffering can be safeguarded or even enhanced. The unprecedented extent of these interventions, together with comprehensive in-situ monitoring now offer an excellent opportunity to gain extensive knowledge about their intermediate and long-term impacts. RiverCare is a large research programme that will start in 2014 in which 5 universities, the Ministry of Infrastructure and Environment, Deltares, consultancy firms and other public and private parties collaborate to get a better understanding of the fundamental processes that drive geomorphological changes, predict the intermediate and long-term developments, make uncertainties explicit and reduce them where possible and develop best practices to reduce the maintenance costs and increase the benefits of interventions. The projects currently or soon to be carried out in the Netherlands provide a unique opportunity to achieve these objectives and use the results to develop or improve models, guidelines and tools that can be used for river management in the Netherlands and abroad.