



Sub-department of  
Environmental Technology

# Minimizing the impact of a potential oil spill on the ecosystem services of St Eustatius

Sept 2012 - 2016

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## Motivation

When an oil spill occurs responsible authorities can choose from a number of response options to reduce the adverse impact on ecosystems and related economic interests. The awareness that healthy ecosystems are important for human well-being and prosperity has given rise to the interdisciplinary science of ecosystem services. The ecosystem services approach allows translation of adverse effects of (anthropogenic) pressure on ecosystems into impaired provisioning of these services. When a spill occurs, a response option to protect one service may negatively influence other ecosystem services. An example is the application of oil spill dispersants to prevent an oil slick from smothering birds, mangroves or marshes yet this decision will increase exposure of organisms in the water column. In addition, there are indications that under particular conditions dispersants can enhance the sedimentation of oil, resulting in the smothering of benthic ecosystems (as may have been the case in the Deepwater Horizon blow-out). Having knowledge of the ecosystem services present, understanding of how ecosystems provide these services by linking them to quantifiable key ecological parameters, and revealing how emergency responses will affect these services under specific spill conditions is the basis of a Net Environmental and Economic Benefit Analysis (NEEBA)-based decision support tool (DST). This project aims to apply the ecosystem services approach and to develop a NEEBA-based DST to optimize the response in case of an oil spill around the Dutch Caribbean island St Eustatius.

## Research challenge

The application of the ecosystem services approach for deciding on a proper oil spill response has not yet been done before for a specific marine area. The most challenging aspects are 1) linking services to quantifiable ecological functions or processes, 2) quantification of the impact in terms of reduced service provision and 3) provide an approach to weigh the consequences of different response options. The Dutch Caribbean island St Eustatius was chosen as a case study location as the marine ecosystem and associated biodiversity offer several ecosystem services and oil spill risks occur due to the presence of an oil terminal and related oil shipping.

Ultimately, this approach could become a framework for location-specific Decision Support Tools to allow fast and rational response in case of oil spills, taking into account different spill and response scenarios, with the purpose to minimize the net impact on ecosystem services. This project is performed in collaboration with the C-IMAGE funded PhD projects of S. Rahsepar, J v Eenennaam and M. Zeinstra, and is funded by the TripleP@Sea innovation program of Wageningen UR (KB-14-007)



Example of a tanker spill incident



St Eustatius



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