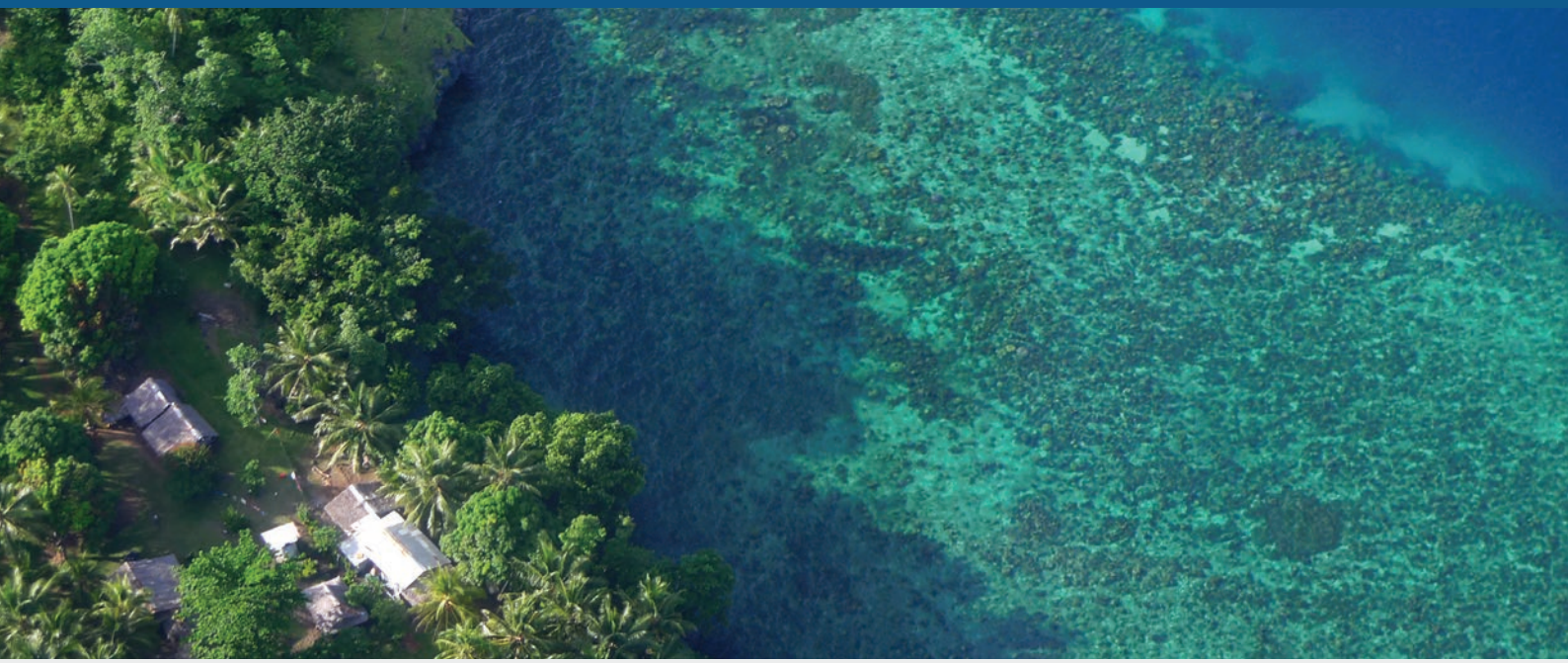

ENVIRONMENT AND ECOSYSTEMS

Facilitating environmentally sustainable projects in water environments

Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history. More than 60% of global ecosystem services are currently degraded or being used unsustainably. With our ecosystem-based approach, we solve ecological and environmental challenges worldwide. Our services cater to various projects. These include marine and coastal developments, resource exploration and production, water and wastewater management as well as restoration and conservation initiatives.

THE CHALLENGES

- Alleviating environmental pollution and degradation
- Coping with the impact of climate change on ecosystems
- Making sense of monitoring and modelling data to facilitate timely and holistic decisions
- Conserving and restoring biodiversity in water environments
- Meeting increasingly strict environmental requirements/legislations
- Addressing heightened community/NGO concerns about developments
- Optimising project design and water use to improve environmental sustainability

OUR APPROACH

At DHI, we adopt a holistic approach to solving environmental and ecosystem challenges. We first seek to understand the technical details of the challenge and the ecological, physical and chemical processes involved. We then incorporate the latest scientific and technological advances into a solution. This helps to solve the specific challenges you face within the broader context of the ecosystem. We also ensure long-term sustainability of the solution, by transferring our knowledge and skills to you.

OUR SOLUTIONS

- Biodiversity and ecosystem processes (tropical, temperate and sub-Arctic)
- Environmental Impact Assessment (EIA) and sustainability principles
- Advice on sustainable infrastructure development and resource extraction techniques
- Best practice mitigation, compensation and offset options
- Numerical modelling (including ecological, agent-based and habitat modelling)
- Advanced monitoring techniques
- Environmental mitigation and ecosystem-based management techniques
- Software customisation (including models and data portals)

THE ULTIMATE GOAL

SOUND AND ENVIRONMENTALLY SUSTAINABLE PROJECTS

OUR EXPERTISE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

To ensure scientifically rigorous assessments of the potential impacts of proposed developments, we offer several services including:

- environmental baseline studies
- habitat and biodiversity mapping
- habitat modelling
- remote sensing
- impact of underwater noise
- laboratory analyses (chemical and ecotoxicity)
- numerical and physical modelling
- rapid, detailed and strategic assessment of environmental impacts
- mitigation, compensation and environmental management plans

ENVIRONMENTAL MONITORING AND MANAGEMENT PROGRAMME (EMMP)

To minimise impacts from marine infrastructure projects, we offer the following specialist services:

- proactive, adaptive feedback management of dredging and reclamation activities
- dredge and reclamation plan optimisation
- monitoring of water quality, hydrodynamics, sediment spill and ecosystem responses
- remote sensing of suspended sediment plumes
- forecast and hindcast modelling of dredging and reclamation activities and Metocean conditions
- web-based data portal for synthesis of monitoring and modelling data

ECOSYSTEM-BASED MANAGEMENT

We offer the following services to promote a holistic approach to environmental management:

- Integrated Management Plans (including coastal zone management, wetland management and river basin management)
- marine spatial planning
- ecological forecast modelling
- implementation of EU conventions (such as the Water Framework Directive, Marine Strategy Framework Directive, Natura 2000, and Habitat Directives) and international conventions (for example Convention on Biological Diversity, OSPAR and Ramsar)

DECISION SUPPORT SYSTEMS (DSS)

To give decision-makers a simple and effective overview of complex ecological processes, we provide:

- data assimilation and online data management systems (such as water quality sensor data, water level data and current speed data)
- operational forecast systems (for example, our Bathing Water Forecast, Flood Forecast and Metocean Forecast for vessel operations)
- operational environmental management systems (including Oil Spill Response System, Waste Water Discharge Optimisation System and Dredge Environmental Management System)

RECREATIONAL AND BATHING WATER MANAGEMENT

In order to assure local authorities and the general public that they can safely enjoy the marine environment, we offer:

- ecological modelling of risks to human health (including pathogens and toxic algal blooms)
- operational forecasting of bathing water quality (with delivery via iPhone application, Facebook and a dedicated website)

> “ Over the past 50 years, humans have changed ecosystems **more rapidly and extensively** than in any comparable period of time in human history

CASE STORIES

The Fehmarnbelt Fixed Link is being developed to connect the northern part of Germany to the eastern part of Denmark. We carried out the background environmental investigations and marine EIA of this major project. This provided a firm, environmentally safe basis, reducing the need for future monitoring and addressing all issues of relevance for the approval process with the environmental authorities.

Shell’s Bukom refinery, located off the south west of Singapore’s mainland, needed to expand its facilities. This expansion necessitated the reclamation of three islands to create more land. The ecosystem of the area, hosting a rich diversity of terrestrial and marine flora and fauna, needed to be safeguarded. We made this possible by carrying out a coral relocation program of more than 3,500 colonies as well as proactively managing the environmental performance of the works.

With our help, the city of Copenhagen succeeded in providing locals and visitors a recreational bathing area in the very heart of the city. Our solution — dynamic models, early detection of pollution threats and reliable water quality forecasts. This new, safe and well-managed recreational water area helped to increase the inflow of tourists into Copenhagen.

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