

Conservation news

Launch of innovative guidance to protect marine biodiversity and ecosystem services

Fauna & Flora International (FFI) has developed guidance for the oil and gas sector to protect marine biodiversity and ecosystem services. The guidance is designed to help operators identify and prioritize marine biodiversity and ecosystem services, determine impacts from their activities, and select suitable measures to avoid, minimize, restore and, where appropriate, offset these impacts. This guidance is the first to address oil and gas in the marine environment and will be officially launched at the IUCN World Conservation Congress in September 2016.

Oceans produce more than half of the oxygen in the atmosphere and absorb carbon. The coastal environment provides food for over 3 billion people and supports the livelihoods of over 200 million people. Awareness of the importance of marine habitats for biodiversity and ecosystem services is growing, yet the oceans are under threat from pollution, overfishing and degradation.

It is within this context that the extractive energy sector is increasingly turning to oil and gas reserves offshore to meet rising energy demands; currently over a third of oil and gas is extracted from offshore sources and this is expected to increase. Marine oil and gas developments and their effects on marine biodiversity and ecosystem services are subject to increasing scrutiny at local, national and international levels, and operations face reputational, operational and financial risks. National policy and legislation, lender safeguards, and company commitments are further driving improvements in the mitigation and management of impacts. However, little guidance exists on how to apply, monitor and enforce existing standards and policies in a marine context.

FFI's good practice guidance provides pragmatic advice for identifying, mitigating and managing risks and impacts on marine biodiversity and ecosystem services for oil and gas developments. The mitigation hierarchy is central to the application of this guidance, which describes potential impacts and preventative mitigations (avoidance and minimization) at each phase in the oil and gas project cycle. Supporting activities such as shipping are also assessed. For each phase of the project cycle a table identifying activities, potential impacts, and known avoidance and minimization measures is presented.

Remedial mitigations, in the form of restoration and offsetting, are presented in dedicated sections. The challenges and opportunities for marine ecosystem restoration are discussed in the context of recent progress in ecological restoration research. Restoration case studies for a range of high value habitats, including mangrove, sea grass and coral reefs, are drawn upon.

Policy and legislation increasingly incorporate commitments to no net loss of biodiversity, and require or allow biodiversity offsets and/or compensation. The guidance considers the potential for marine biodiversity offsetting or compensation to address the residual impacts of project development after all avoidance, minimization and restoration measures have been applied. Specific considerations for the marine environment are considered and a selection of case studies illustrate current opportunities and challenges in marine biodiversity offsetting.

This good practice guidance is evidence-based and draws on the best available science and practice from leading oil and gas companies, impact assessment practitioners, research organizations, finance sector experts and marine biodiversity and ecosystem service specialists. Current good practice approaches are explored alongside new and innovative opportunities for impact mitigation.

This guidance is an essential reference for oil and gas operators, particularly those located in marine environments with high biodiversity value and/or where there are operational and stakeholder dependencies on ecosystem services, and where measures to avoid, minimize, restore and offset impacts on marine biodiversity and ecosystem services are being applied to achieve no net loss or a net gain. It is also a valuable resource for impact assessment practitioners, marine biodiversity and ecosystem service specialists, lender banks and auditors, policy makers and regulatory agencies involved with oil and gas sector interests in the marine environment.

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Good management of biodiversity and ecosystem services makes economic sense for farmers and agricultural supply chains

A growing body of research and practice from Brazil and elsewhere demonstrates that many components of biodiversity benefit agricultural production and also generate benefits for wider society. Well-planned management of biodiversity both within and beyond the farm makes farming landscapes more resilient, more cost effective, more sustainable and more productive.

The Atlantic rainforest of eastern Brazil has exceptional levels of diversity and endemism but less than 15% of its original extent remains. Most of the remaining, highly fragmented forest is on privately owned land, much of which is on smallholder family farms. These farms, which are

critical to many international commodity supply chains, are key to the conservation of the biome.

In recognition of the roles of farmers and corporations in biodiversity conservation, Fauna & Flora International, Souza Cruz (a subsidiary of British American Tobacco) and the Brazilian NGO Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental (Society for Wildlife Research and Environmental Education) partnered with 17 smallholder farmers in Paula Freitas municipality, Paraná, in a 4-year project *Parcerias pela Biodiversidade* (Partners for Biodiversity), which was completed in December 2015. The partners built knowledge of financial and legislative frameworks, enabling and constraining factors for farmers, and the costs and benefits of practical interventions to improve biodiversity and ecosystem services on farms. Interventions included forest restoration, enhancing habitat for pollinators, removal of invasive species, and management of crops to reduce fertilizer use. The results demonstrate that costs of interventions, particularly restoration, are significantly less than previously reported. For example, tree-planting restoration techniques, which include labour costs for planting, maintenance for 2 years and native seedlings from local state nurseries, were found to be cheaper (BRL 6,100, USD 1,610, per ha) than expected. This can be explained in part by not using agrochemicals and by implementation being carried out by farmers and hired labour rather than project staff. In addition, fencing (at USD 200–300 per 100 m, including labour) to exclude livestock can result in significant early natural forest regeneration in areas with previous low-impact land use. Monitoring from 2013 to date by farmers and project staff demonstrated the success of these actions: < 10% mortality of planted seedlings, good average growth (2 m) of diverse native plants in naturally regenerating areas, 23% increase in maize yield and 25% reduction in urea application by using inoculants, and a reported increase in fruit yield as a result of an increase in pollinators.

We used *InVEST* to map and value some key ecosystem services influenced by the interventions. The models for carbon, crop pollination, and sediment and nutrient retention spatially prioritized areas to improve ecosystem services and estimate economic gains by comparing the pre-project land-use scenario with two riparian forest restoration scenarios (10 and 30 m wide buffers). Estimated revenues derived from reduced costs of soil recovery, water treatment and dredging, and value of carbon credits, represented total potential annual gains of USD 509,000 and 177,000 in the 30- and 10-m scenarios, respectively. Including the opportunity cost of forgoing usual economic activity in riparian zones, the potential annual ecosystem service benefits from the 30- and 10-m scenarios equate to USD 750 and 270 per farm, respectively.

The Brazilian Forest Code requires that landowners maintain or restore forest in areas delivering ecosystem services. The project demonstrated clear economic benefits for

complying with and going beyond the requirements of the Forest Code. To realize these benefits, frameworks such as payments for ecosystem services need to be established. Such mechanisms are increasingly used in Brazil and elsewhere as the economic case for biodiversity management in farming landscapes becomes recognized. The frameworks are most effective when private landowners, NGOs, government agencies and companies form partnerships to realize common, sustainable land management goals.

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17th Student Conference on Conservation Science

'There is a darkness threatening the biodiversity of this planet. There is one generation that can act.' No, not a line from a new blockbuster film, but the words of the RSPB's Chief Executive as he opened the 17th Student Conference on Conservation Science (SCCS).

More so than in perhaps any other field in biology, young conservationists may feel overwhelmed by the tasks that lie ahead. Conservation is poised to become increasingly interdisciplinary, international and ambitious, and it must also gather pace. It is encouraging therefore to see the SCCS in its 17th year, with 161 graduate student delegates (including myself) attending the most recent conference on 24–26 March 2016 in the Department of Zoology, University of Cambridge, UK.

A varied programme of plenary lectures stimulated discussion covering the length and breadth of conservation, from fieldwork to policy and business. Taylor Ricketts of the University of Vermont, USA, took the much-discussed topics of ecosystem services and pollinators and through elegant field studies provided a new and quantified perspective. Nancy Knowlton of the Smithsonian Institution, USA,



New friendships developing at the 17th Student Conference on Conservation Science, Cambridge, UK. Copyright Gorm Shackelford