IPIECA

International Association of Oil & Gas Producers

# Biodiversity and ecosystem services fundamentals

## Guidance document for the oil and gas industry

Biodiversity and ecosystem services

THE GLOBAL OIL AND GAS INDUSTRY ASSOCIATION FOR ENVIRONMENTAL AND SOCIAL ISSUES

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## Guidance document for the oil and gas industry


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The global oil and gas industry association for environmental and social issues

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# Contents




## ACKNOWLEDGEMENTS

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# Executive summary

This document provides guidance for the management of biodiversity and ecosystem services (BES) impacts, dependencies, risks and opportunities in the oil and gas sector. It sets out a management framework comprised of six interrelated BES management practices along with an overview of tools for application within these practices, examples (case studies) of how these are being applied, and references for more detailed guidance.

The importance of effective BES performance within the oil and gas industry is widely recognized and acknowledged in various products and outputs from the Energy and Biodiversity Initiative (EBI), IPIECA, UN Global Compact and IUCN. With increased understanding of the value of biodiversity and the services that natural systems provide, governments, lending institutions and companies have recognized that BES management can be critically important in meeting stakeholder expectations, avoiding costly redesigns and project delays, maintaining licence to operate, and gaining access to new business opportunities.

Oil and gas exploration, development and production activities can affect the natural and social environments in which they take place, including potential and actual impacts on biodiversity and the natural resources on which local communities depend. Industry operations and activities may also rely on ecosystem services (see Box 1 for definitions) provided by the natural environment, such as freshwater supply or coastal storm-surge protection. Such potential and actual impacts and dependencies, and the consequent need to manage risk, are important factors and should be considered at appropriate spatial scales across the life cycle of industry assets.

This guidance document brings together information essential to informing BES strategy development and decision making at the corporate level and at the key stages of an asset life cycle for any type of operation or environmental context.

**Box 1 Ecosystem services: the benefits that ecosystems contribute towards human well-being**
(Millennium Ecosystem Assessment, 2005[1])

The concept of ecosystem goods and services is synonymous with ecosystem services, which can be divided into four categories:

1. Provisioning services—products or goods such as water, fish, or timber.
2. Regulating services—ecosystem functions such as flood control and climate regulation.
3. Cultural services—non-material benefits such as recreational, aesthetic and spiritual benefits.
4. Supporting services—fundamental processes such as nutrient cycling and photosynthesis that support the above three categories.

Source: Based on World Resources Institute (WRI) materials

## HOW THIS GUIDANCE IS STRUCTURED

The guidance is structured around six interrelated management practices, which together provide a framework for management of BES across the oil and gas asset life cycle, from exploration and development through operations to decommissioning and retirement (see Figure 1 on page 4). The six interlinked management practices[2] are:

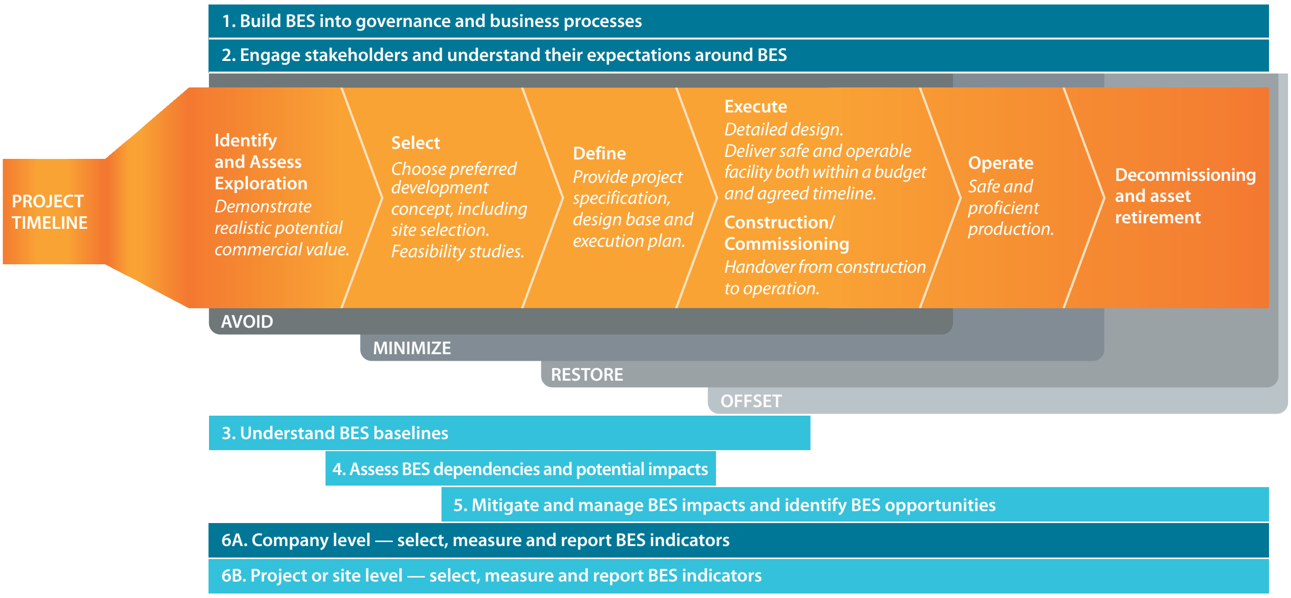
1. Build BES into governance and business processes.
2. Engage stakeholders and understand their expectations around BES.
3. Understand BES baselines.
4. Assess BES dependencies and potential impacts.
5. Mitigate and manage BES impacts and identify BES opportunities.
6. Select, measure and report BES performance indicators.

[1] Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, D.C. www.millenniumassessment.org/documents/document.356.aspx.pdf

[2] Connick, S. *et al.* (2014). A Biodiversity and Ecosystem Services Management Framework for the Oil and Gas Sector. Paper prepared for presentation at the Society of Petroleum Engineers (SPE) *International Conference on Health, Safety and Environment*, Long Beach, California, USA, 17–19 March 2014. www.ipieca.org/system/files/uploads/FINAL_SPE_168421_BES_Management_Framework.pdf

Figure 1 The six BES management practices depicted in relation to the project timeline. Practices 3, 4 and 5 are applied at the project level, and are phased. Practices 1, 2 and 6 are applied at both company and project levels, and are continuous.)

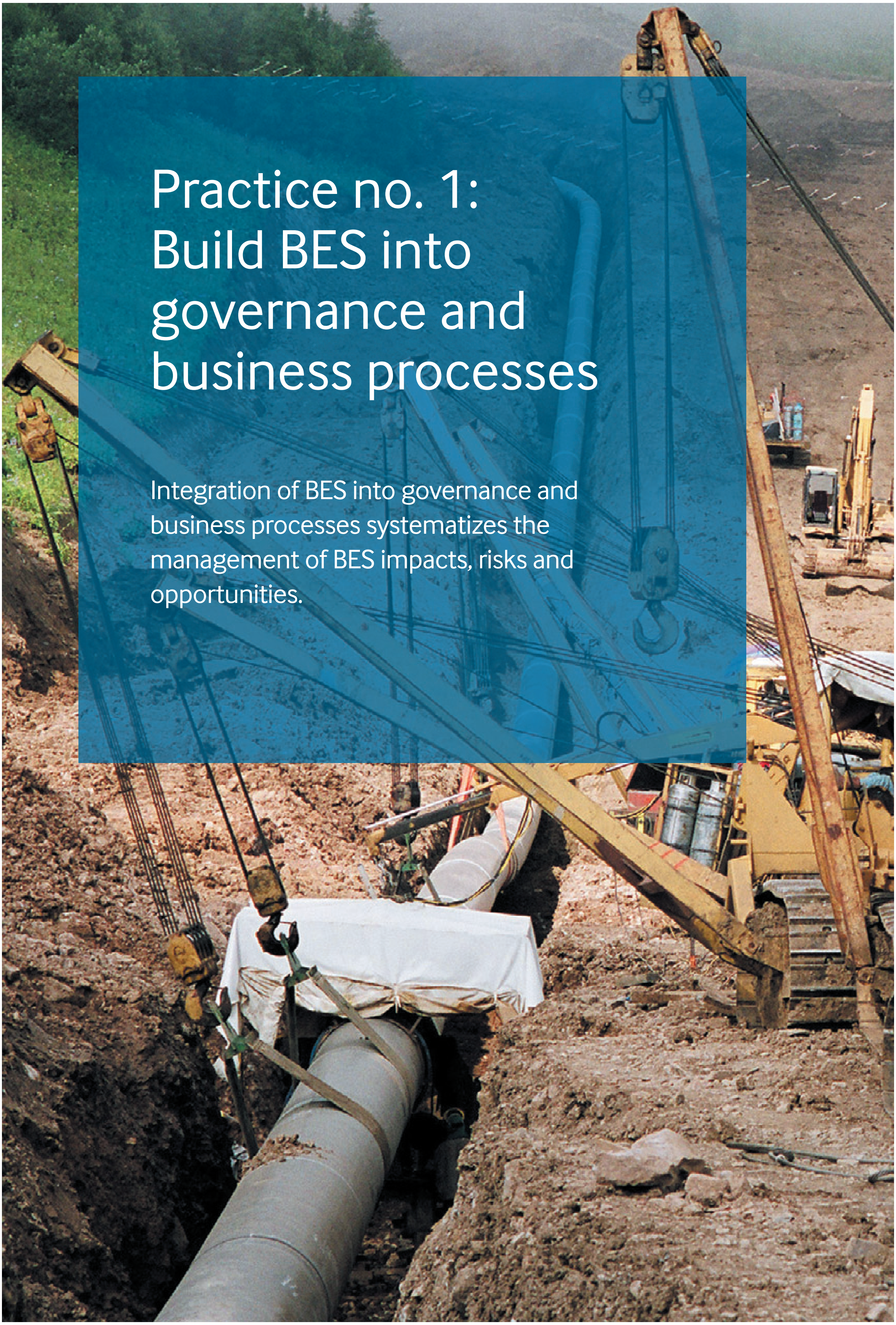
(Adapted from CSBI, 2014[3]).




Each management practice is addressed in its own section, which explains what the practice involves and the rationale for it. Where the discussion touches on well-established business processes (e.g. mechanisms for good corporate governance) the emphasis is on integration of BES issues rather than on describing the processes themselves. Guidance is also provided on current and evolving good practice for implementation with respect to BES management, and key success factors relating to, for example, scale, timing and types of resources employed. Each section offers short, illustrative case studies and information on additional resources that are available to assist companies in developing BES management, integrating it with existing processes, and continually driving improvement.

This guidance is designed to align with, and be complementary to, other IPIECA-IOGP related publications and guidance on BES and BES impact assessment and risk management. Where appropriate links are made between the management practices and the IPIECA-IOGP guidance note entitled *Managing Biodiversity & Ecosystem Services (BES) issues along the asset lifecycle in any environment: 10 Tips for Success in the Oil and Gas Industry*.

3 CSBI (2014). *Timeline Tool*. www.csbi.org.uk/tools-and-guidance/timeline-tool



# Practice no. 1: Build BES into governance and business processes

Integration of BES into governance and business processes systematizes the management of BES impacts, risks and opportunities.

# Build BES into governance and business processes

## RATIONALE

BES impacts, risks and opportunities are more likely to be identified and managed successfully if there is a clear articulation of a company's high-level values and objectives, complemented by more detailed systems and processes for BES management at the business unit and project levels across the life cycle of assets. Companies typically use governance frameworks to establish company-wide policies, management systems, and processes and standards. Ultimately, such frameworks guide business practices at the project and asset level. The integration of BES into business policies, management systems, processes and standards promotes discipline and consistency in a company's effort to continually improve its performance regarding BES. When integrated into governance and business processes, BES good practice moves from being a matter of local regulation or individual project or business unit discretion towards becoming an expected and internally verifiable means of systematically addressing BES issues across all stages of an asset's life cycle.

## ELEMENTS OF GOOD PRACTICE

Company-wide policies are used to articulate a company's overall commitment and intention regarding its business practices. They may take the form of internal policies as well as external statements or positions. While such policies are by definition relatively general, the specific identification of BES within them can strengthen the case for BES management and performance throughout a company. The case study (below) illustrates how Shell has implemented a company-wide BES policy and how that translates into its BES management framework.

Companies use management systems, consisting of objectives, processes, standards and tools, to translate policy statements into action. BES can be incorporated into Environmental Management Systems (EMS) (EBI, 2003) or into a broader suite of corporate management systems (Karapetrovic and Casadesús, 2009; Bernado *et al.*, 2009). IOGP and IPIECA have developed guidance for companies seeking to develop an Operating Management System—an integrated framework to address a broad range of potential risks in oil and gas operations, including those arising in the areas of occupational safety and health, environmental and social responsibility, process safety, and quality and security (IOGP-IPIECA, 2014). Such integrated systems facilitate management of interrelated issues such as the social and environmental dimensions of ES.

Within a management system, specific processes, standards and tools will be applicable to company activities at the asset and project levels, and are applied in a fit-for-purpose, risk-based manner. These processes, standards and tools should provide a systematic and consistent approach to BES management that is aligned with Management Practices nos. 1–5. In addition, Practice no. 6—*Select, measure and report BES performance indicators*—can provide important information on BES performance at site level and company level. This information can be used to assess the effectiveness of the processes, standards, tools and governance mechanisms in place, and identify focus areas for continual improvement—see Tip 10, 'Monitor, adapt and improve' (IPIECA-IOGP, 2014).

## CASE STUDY

### Shell's global approach to biodiversity and ecosystem services (BES) management

*Shell has implemented a Global Biodiversity Standard to identify and manage impacts and dependencies on globally important biodiversity and priority ES during planning and operations, and at decommissioning.*

### Situation

Managing BES is an important factor for Shell when considering any major new project, and the company launched its first Biodiversity Standard back in 2001. The Standard includes commitments not to explore for, or develop, oil and gas resources in natural World Heritage Sites and to publicly report on activities in IUCN Protected Areas Categories I–IV.

In addition, the Standard mandates projects to identify potential BES risks and opportunities and to manage impacts following the mitigation hierarchy (avoid, minimize, reinstate[4]). If an area is rich in biodiversity i.e. contains critical habitat[5] and a Shell project is identified as potentially having an impact, as defined by the impact assessment process, Shell will engage appropriate experts and stakeholders to develop a Biodiversity Action Plan (BAP). Possible impacts and dependencies on ES are also considered in this process.

## Outcome

The Biodiversity Standard assists Shell in the following:

- **Early project screening of biodiversity, ES and habitat sensitivities:** through the Proteus partnership Shell leverages the information in the Integrated Biodiversity Assessment Tool (IBAT), which includes Key Biodiversity Areas, The IUCN Red List of Threatened Species and the World Database on Protected Areas (WDPA). This information is used to prioritize/deprioritize certain areas as locations for new facilities. In screening, Shell would also seek to identify which ES are being provided and used within the project area.
- **Assessment of potential critical habitats:** this specific application of the previous point uses the IFC definition, which links to the criteria for Key Biodiversity Areas, the IUCN Red List of Threatened Species, and protected areas. Critical habitat is used to identify areas that should be avoided or where upgraded operational practices need to be applied. An in-house tool facilitates the identification of potential critical habitat areas.
- **Impact assessment baselines:** threatened species, unique ecosystems, priority ES, and protected areas are identified and documented in all impact assessments. The global data collated in the processes above are augmented by local knowledge (e.g. baseline surveys, local experts and local traditional knowledge).
- **Impact mitigation:** the framework has helped identify early in the project life-cycle opportunities for appropriate application of the Mitigation Hierarchy with potential long-term savings. Support is available from appropriate subject matter experts to help develop suitable mitigation measures, including sharing experiences from other projects.
- **Sustainability reporting:** Shell uses global data sets, such as the WDPA, to report on biodiversity indicators, specifically for Shell activities in protected areas in IUCN management categories I–IV.

4 Reinstatement refers to restoration and rehabilitation activities (see Footnote 8).

5 As per the International Finance Corporation (IFC) Performance Standard 6 definition (2012).

## KEY RESOURCES AND REFERENCES

Further information and guidance on building BES into governance and business processes can be found in the following documents.

Bernardo, M., Casadesús, M., Karapetrovic, S. and Heras, I. (2009). How integrated are environmental, quality and other standardized management systems? An empirical study. In *Journal of Cleaner Production*, Volume 17, Issue 8, pp. 742-750.

CSBI (2014). *Timeline Tool*. www.csbi.org.uk/tools-and-guidance/timeline-tool

EBI (2003). *Integrating Biodiversity into Environmental Management Systems*. Energy and Biodiversity Initiative. www.theebi.org/pdfs/ems.pdf

IPIECA-IOGP (2005). *A guide to developing Biodiversity Action Plans (BAP) for the oil and gas sector*. www.ipieca.org/publication/guide-developing-biodiversity-action-plans-oil-and-gas-sector

IPIECA-IOGP (2014). *Managing Biodiversity & Ecosystem Services (BES) issues along the asset lifecycle in any environment: 10 Tips for Success in the Oil and Gas Industry*. www.ipieca.org/publication/managing-biodiversity-ecosystem-services-bes-issues-along-asset-lifecycle-any-environmen

IOGP-IPIECA (2014). *Operating Management System Framework for controlling risk and delivering high performance in the oil and gas industry*. IOGP Report 510. www.ogp.org.uk/pubs/510.pdf

Houdet, J. (2008). *Integrating biodiversity into business strategies*. The Biodiversity Accountability Framework. www.veolia.com/sites/g/files/dvc181/f/assets/documents/2014/04/guide-oree-frb-en.pdf

Karapetrovic, S. and Casadesús, M. (2009). Implementing environmental with other standardized management systems: scope, sequence, time and integration. In *Journal of Cleaner Production*, Volume 17, Issue 5, pp. 533-540.

Rainey, H. *et al.* (2015). A review of corporate goals of No Net Loss and Net Positive Impact on biodiversity. In *Oryx* Volume 49, Issue 2, pp. 232-238. http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=9625776&fulltextType=RA&fileId=S0030605313001476

Rio Tinto and Earthwatch (2006). *A Review of Biodiversity Conservation Performance Measures*. https://www.cbd.int/doc/case-studies/suse/cs-suse-024-earthwatch-en.pdf

UN Global Compact and IUCN (2012). *A Framework for Corporate Action on Biodiversity and Ecosystem Services*. https://www.unglobalcompact.org/docs/issues_doc/Environment/BES_Framework.pdf

Whatling, D. R., Hedges, P. D., Brown, R. and Fermor, P. (2010). Corporate responsibility reporting of biodiversity in the supply chain. In *International Journal of Innovation and Sustainable Development*, Volume 5, Number 1, pp. 51-64. 10.1504/IJISD.2010.034557

# Practice no. 2: Engage stakeholders and understand their expectations around BES

Stakeholder engagement is an ongoing exchange through which a company communicates with, learns from and responds to key stakeholders. It enhances company understanding of stakeholders' expectations about BES, and stakeholders' understanding of company efforts to meet their expectations.

# Engage stakeholders and understand their expectations around BES

## RATIONALE

Stakeholders are individuals, groups and organizations that may have an interest in, or are affected by, a company's activities. Stakeholder engagement is a widely used tool for identifying and managing potential business risks and opportunities. Integrating BES into stakeholder engagement is important for better understanding a company's potential and actual impacts on communities and the environment, and for identifying opportunities to address BES issues in alignment with stakeholders' interests. Stakeholder engagement related to BES can be conducted at a corporate level, as well as at a project or asset/site level, and should be sustained throughout the life cycle of an asset.

At a corporate level, stakeholder engagement is important to informing Practice no. 1—*Build BES into governance and business processes*. Engaging with BES experts and organizations, such as multinational conservation NGOs or internationally respected academics and research institutions, at the corporate level helps companies understand broader stakeholder community expectations, provides insights on emerging trends in BES practice and science, and provides a forum for communicating a company's performance. More formal strategic partnerships or relationships that companies or trade associations may have can also be useful. Examples of such partnerships include IPIECA's strategic relationship with the UNEP World Conservation Monitoring Centre, and the Cross-Sector Biodiversity Initiative (CSBI), a collaboration among the mining and oil and gas industries and project financing institutions.

At a project or asset/site level, stakeholder engagement provides valuable input to Practices nos. 3, 4, 5 and 6, as a company determines a project's BES baseline, assesses potential dependencies and potential and actual impacts, plans and implements risk management measures, and monitors ongoing performance. Stakeholder engagement is an important step in understanding how local communities value and use natural resources (e.g. location of fishing grounds), including those on which a company's operations may rely (e.g. water supply), and how a company's activities may affect the quality and quantity of, or access to, such resources. It can also lead to the identification of opportunities to make a positive contribution to the conservation of BES. Engaging stakeholders early, often and throughout the life cycle of an asset can help companies anticipate and avoid potential conflicts relating to natural resource use, which otherwise might lead to an increase in cost due to project delays, shutdowns and reputational impacts (see the case study on ExxonMobil's engagement with Beaufort Sea whaling communities on page 13).

Stakeholder engagement at the project or asset level will typically address broader social and health risk management beyond BES, such as economic, social and community health considerations. The IPIECA-IOGP document entitled *Ecosystem services guidance: Biodiversity and ecosystem services guide and checklists* (2011) provides detailed guidance on BES identification and management by project phase and habitat type. With respect to ES, stakeholder engagement can be used to supplement and ground-truth information obtained from desktop studies on cultural, provisioning and even regulating services. For example, interviews with local hunters and fishers can indicate the presence of particular species and areas where they are found, as well as which species communities rely on for food. Information derived from such interviews can inform both the BES baseline (Practice no. 3) and the assessment of BES dependencies and impacts (Practice no. 4). For example, if a community is largely dependent on fish for protein, a company should assess its potential to affect access to, or impact on, the quality of fisheries (e.g. through potential and actual impacts on fish spawning or nursery habitat). Such engagements may also elicit information on existing threats to habitats and/or concerns that local resource users may have about how a company's activities might affect their livelihoods. Useful information on local or regional use of ES may also come from national and international organizations concerned with land rights, human rights, and indigenous and local community issues. Stakeholders can identify sites of cultural significance that a company should consider avoiding. Engagement with scientists and NGOs operating at a regional level may provide contextual information regarding historical trends and existing threats to species and habitats, and hydrological patterns (e.g. droughts and floods, and projections for future water demand). Coordination and often integration of the different aspects of stakeholder engagement (i.e. environmental, social and community health) among the relevant company teams can enhance understanding of how stakeholders value and use BES, and what their expectations are concerning a company's role in BES management.

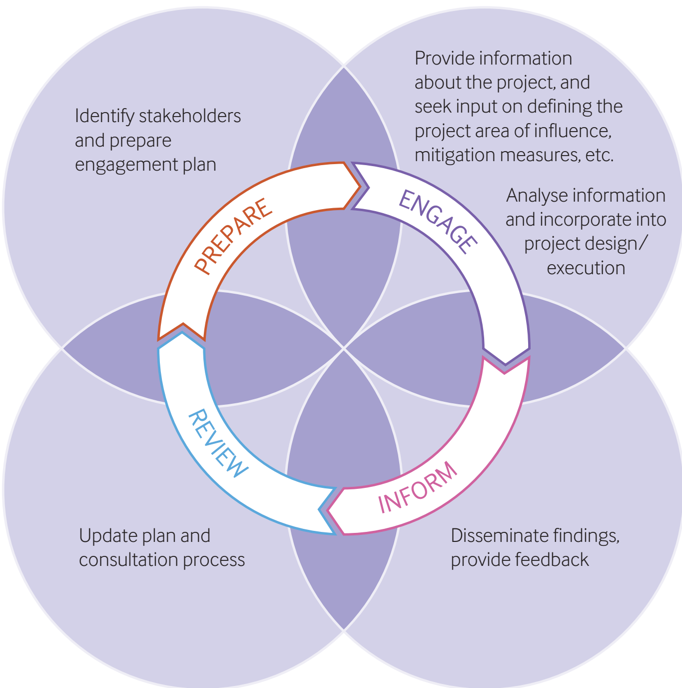
## ELEMENTS OF GOOD PRACTICE

Stakeholder engagement consists of a continual cycle of outreach, communication and learning in four steps—prepare, engage, inform and review—as depicted in Figure 2 (IOGP, 2014). Stakeholder engagement is most effective when initiated early and sustained over time, with open lines of communication being maintained with key stakeholders (see Tip 5, 'Consult openly and in a participative manner', IPIECA-IOGP, 2014). At the project level, effective stakeholder engagement begins prior to access or at the start of physical activity and continues throughout the asset life cycle.

### Prepare: identify stakeholders and prepare engagement plan

The first step is to prepare for stakeholder engagement by identifying stakeholders and developing an appropriate engagement plan. For BES issues, a comprehensive range of stakeholders should be considered. These may include community members, individuals with regional interests, applicable levels of local and national governments, and national or international academics and NGOs involved in BES management and policy. Stakeholders most likely to be concerned about BES ('BES stakeholders') are those for whom impacts on BES might affect their livelihoods, culture or safety, access to food and other resources, or area of governance responsibility (e.g. researchers). As a company develops and new information emerges, strategies change, or as a project or activity progresses, new stakeholders may emerge and existing ones may increase or decline in importance over the life cycle of an asset.

Figure 2 Stakeholder engagement cycle
Source: IOGP, 2014[6]




[6] Overview of IOGP's Environment-Social-Health Risk and Impact Management process (p. 40).

Once stakeholders have been identified, an analysis should be conducted to identify, prioritize and plan engagements with them. This analysis often includes a desktop assessment of the stakeholders' interests in BES in relation to the company's activities to determine the likely importance of, and need for, engagement, as well as to help focus the planning for engagement. Stakeholders prioritized for engagement are often referred to as 'key' stakeholders. This categorization is dependent upon the scale, scope and phase of a project. For example, in developing a company-wide standard or policy for BES management, a company may choose to engage stakeholders that operate at the same scale, such as a national-level conservation NGO, research or academic institution for a company operating at a national level, or multinational NGO(s) and internationally respected research or academic institutions for a company operating globally. At an asset or project level the emphasis is more likely to be on engagement with local and national stakeholders, though international ones may be relevant should the potential or actual impacts on BES be of global concern or high profile. Early in a project's development, stakeholder engagement can be used to inform Practice no. 3—*Understand BES baselines*. At this stage, stakeholders having knowledge of biodiversity distribution and local dependencies on provisioning and cultural ES would be prioritized for engagement.

A stakeholder engagement plan (SEP) should be developed based on the stakeholder identification and analysis process. A SEP should set out clear objectives, outline how key stakeholders will be consulted (e.g. method, frequency, etc.) and how their feedback will be documented, analysed and acted upon. Stakeholder engagement related to BES should be well integrated with that being done in support of community outreach, especially where the same stakeholders have been identified. A SEP might consider whether consultation should be led by company environment, social, or public relations teams, how to incorporate findings into project activities (such as impact assessment), and when findings might warrant further investigation. For example, initial consultations with local BES stakeholders may reveal a high level of dependency on natural resources such as coastal fisheries or forest products. In such cases, a more thorough assessment of natural resource use and dependencies may be needed to fully understand the BES baseline and potential for impact.

### Engage: provide information, seek input and undertake dialogue on key issues

Stakeholder engagement should seek to develop relationships, communicate company plans, understand and act (as appropriate) on stakeholder concerns, as well as collect data and information on BES-specific aspects. Stakeholders should be consulted as part of baseline data collection (see Practice no. 3). Local stakeholder engagement is vital to understand ES use, to identify priority ES and to understand who the main ES beneficiaries are (see case study on Repsol's stakeholder consultation in Colombia on page 14). In addition, stakeholders might have knowledge of priority biodiversity features. Such interactions provide a lens for identifying the main areas for continued engagement.

Stakeholder engagement also includes sharing information with key stakeholders on project or company plans and activities. Typically, BES information is of a non-competitive nature, so sharing it can engender positive engagement. Engaging with stakeholders, where appropriate, about the results of baseline studies or impact assessments can be a good opportunity to build trust and obtain feedback on how accurate and useful the findings are.

### Inform: disseminate findings and provide feedback

Stakeholder input and responses to feedback should be documented, monitored and shared internally to help inform BES issue management. A systematic approach for managing stakeholder interactions that tracks and logs engagement activities, including their impact on decisions relating to project design, execution and operations, is recommended. Care should be taken when making commitments to stakeholders to ensure that expectations are not raised. Once commitments are approved by the project team and the project's legal advisors it may be decided to share these outcomes with external stakeholders. Communication with stakeholders should continue during the full life cycle of an asset. As part of a wider company communications and stakeholder engagement strategy a procedure for grievances/complaints should be included; see IPIECA's guidance document on *Community grievance mechanisms in the oil and gas industry* (IPIECA, 2015).

Companies can also choose to publish baseline studies in the scientific literature. Some assets operate in areas that have historically seen little research, and the socio-ecology of the area may be poorly known. Baseline survey and monitoring data from oil and gas operations can help build the knowledge base globally and locally, and making such data publically available can improve a company's reputation and profile. The Marine Geospatial Bibliography provides an example of a knowledge-sharing platform collecting and making available scientific knowledge relating to biodiversity and ecosystems in marine environments for industry, science and the public.

### Review: update the plan and consultation process

As with other processes aimed at continuous improvement, it is important that findings from stakeholder engagement are acted on as far as reasonably possible, and that information is fed back to inform actions to manage BES impacts and their related risks. These findings might result in actions that place additional financial costs and constraints on a project. There may nonetheless be a good business case for accepting such additional costs. Completion of the stakeholder engagement process will also help to identify opportunities to further improve the engagement strategy as well as future engagement activities.

## CASE STUDY

### ExxonMobil—piloting improved marine communication on Alaska's North Slope

*Situation*
Subsistence whaling is arguably the most important and culturally significant activity of the year for the indigenous peoples of Alaska's North Slope. In some cases, these subsistence hunts can occur in close proximity to marine activities undertaken by the oil and gas industry, academia, tourism companies, and/or other North Slope communities. ExxonMobil's Point Thomson Project, along with other oil and gas industry operators, has voluntarily participated in an annual Conflict Avoidance Agreement (CAA) with the Beaufort Sea whaling communities, which outlines protocols for marine activities (e.g. commitments on timing, location and speed of vessels). Nevertheless, increasing Arctic marine traffic brings new vessel operators into the mix that may be unaware of these important subsistence activities.

Village subsistence whaling crews

Participation in the CAA includes funding communication centres (Com Centres) which rely on very-high frequency (VHF) radio to communicate with industry vessels, the shore and whaling crews. Often complicated by background noise or static, voice communication alone can leave open the risk for vessel collisions and/or misidentification in adverse weather. Additionally, the variability in North Slope weather can present safety challenges for smaller subsistence whaling vessels.

*Action*
The Point Thomson Project partnered with the Marine Exchange of Alaska, a non-profit maritime organization, to pilot two pieces of equipment—AIS transceivers and

Deadhorse Com Centre vessel tracking training

Delorme InReach units—and associated vessel tracking software. These devices include radio- and satellite-based communication capabilities in addition to spatial visibility of the North Alaska coastal waters.

Delorme Communication Device

Through multi-day training sessions in the Kaktovik and Deadhorse Com Centres, operators learned how to monitor real-time location feeds of village whaling fleets, track marine vessel traffic in the region, and manage two-way communication via text messaging and email with the whaling crews.

*Outcome*
In the 2014 and 2015 whaling seasons, the expanded capabilities were used to identify non-industry vessels, communicate logistics with the North Slope Borough, and inform whaling crews about nearby vessel traffic. The Project's efforts have been highlighted by the US Coast Guard, Alaska Federal Delegation, North Slope Borough, and other coastal stakeholders. Most importantly, these upgrades provide more efficient and effective technology leading to improved safety.

## CASE STUDY

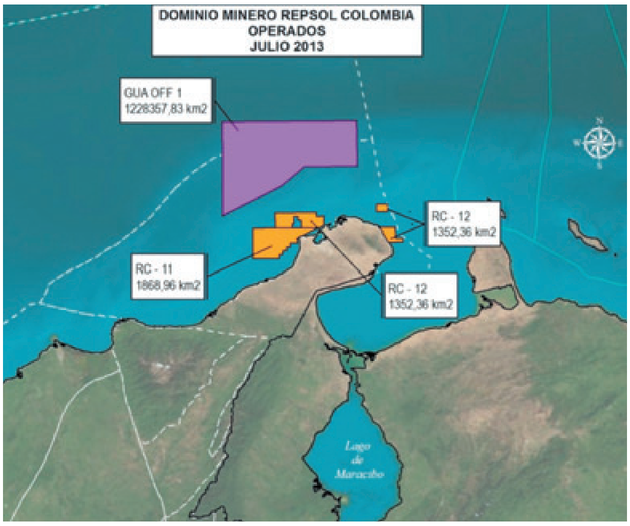
### Early and cross-company stakeholder engagement—Repsol's experience

*Situation*
Repsol maps stakeholders systematically, applying the AA1000 Standard at three levels: corporate-wide, country-level and in the main operating facilities. The AA1000 Stakeholder Engagement Standard provides a principles-based, open-source framework for quality stakeholder engagement and supports the AA1000 Accountability Principles Standard *Foundation Principle of Inclusivity*. It can be used as a 'stand-alone' standard, or as a mechanism to achieve the stakeholder requirements of other standards, including the Global Reporting Initiative (GRI) G4 Guidelines and ISO 26000 (Social Responsibility Guidance Standard). Based on this, Repsol conducts interviews with stakeholders, obtaining a specific list of their concerns and expectations in relation to the company's ethical, social and environmental performance.

Repsol's stakeholders engagement with Wayúu communities

*Action*
One example of this is the seismic acquisition project on the east coast of the Guajira Peninsula in Colombia, an area inhabited by Wayúu communities with a distinct cultural identity. Repsol engaged communities in the environmental impact assessment and jointly defined the management plan.

*Outcome*
Repsol, through successful stakeholder engagement, was able to access their knowledge of their territory, and subsequently identified potential impacts and proposed management measures. As a result, agreements were brokered that made the project environmentally and socially feasible.




Repsol operated assets offshore Colombia

## KEY RESOURCES AND REFERENCES

The following guidance documents developed by the IPIECA-IOGP BES Working Group include stakeholder engagement considerations for BES issues:

IOGP-IPIECA (2007). *An ecosystem approach to oil and gas industry biodiversity conservation.* www.ipieca.org/publication/ecosystem-approach-oil-and-gas-industry-biodiversity-conservation

IOGP-IPIECA (2012). *Ecosystems: integrating biodiversity and ecosystem services into business practices.* www.ipieca.org/publication/ecosystems-integrating-biodiversity-and-ecosystem-services-business-practices

IPIECA (2015). *Community grievance mechanisms in the oil and gas industry. A manual for implementing operational-level grievance mechanisms and designing corporate frameworks.* www.ipieca.org/publication/community-grievance-mechanisms-oil-and-gas-industry-manual-implementing-operational-leve

IPIECA-IOGP (2011). *Ecosystem services guidance: Biodiversity and ecosystem services guide and checklists.* www.ipieca.org/publication/ecosystem-services-guidance-biodiversity-and-ecosystem-services-guide

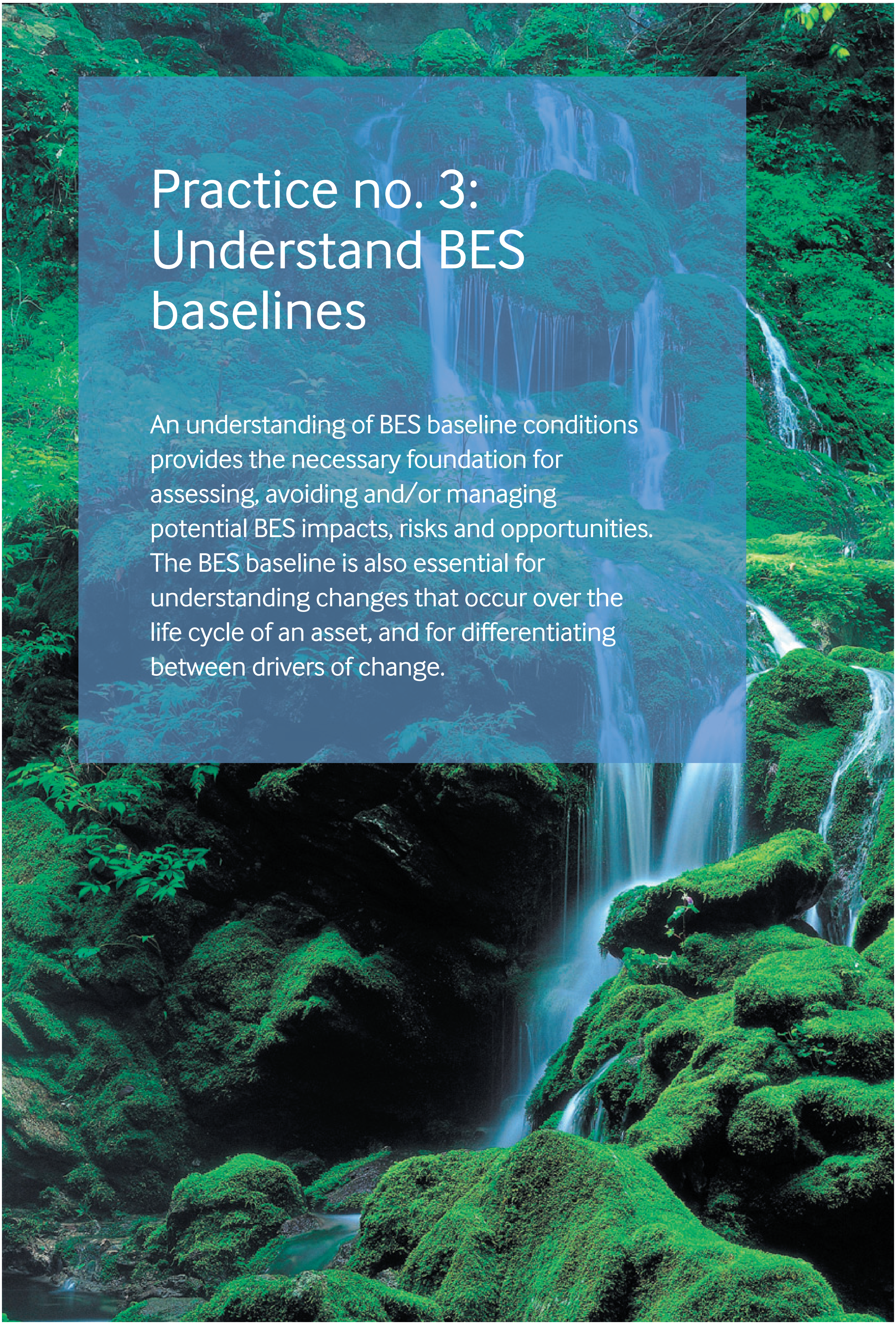
Reasonably comprehensive guidance is available on how to engage with stakeholders, particularly at a local level as part of community relations. Less guidance is available regarding BES stakeholders specifically, or on working with stakeholders at a national or international scale; however, the same basic principles of engagement apply. Recommended references include:

ARPEL (2011). *Stakeholder Engagement Manual. Corporate Social Responsibility Management System.* www.arpel.org/library/publications/group/corporate-social-responsibility-management-system

API (2014). *Community Engagement Guidelines.* ANSI/API BULLETIN 100-3. First edition. www.api.org/news-and-media/news/newsitems/2014/july-2014/~/media/Files/Policy/Exploration/100-3_e1.pdf

IOGP (2014). *Overview of IOGP's Environment-Social-Health Risk and Impact Management Process.* www.ogp.org.uk/pubs/529.pdf

International Finance Corporation (2007). *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets.* www.ifc.org/wps/wcm/connect/938f1a0048855805beacfe6a6515bb18/IFC_StakeholderEngagement.pdf?MOD=AJPERES



# Practice no. 3: Understand BES baselines

An understanding of BES baseline conditions provides the necessary foundation for assessing, avoiding and/or managing potential BES impacts, risks and opportunities. The BES baseline is also essential for understanding changes that occur over the life cycle of an asset, and for differentiating between drivers of change.

# Understand BES baselines

## RATIONALE

A BES baseline is a qualitative and/or quantitative description of the biodiversity and ES values occurring at a site, including their current condition, trends and uses before a project commences (Gullison *et al.*, 2015). The baseline describes the status against which potential changes resulting from a project are assessed to develop avoidance and management actions, and against which change is monitored and measured during and after project execution. A robust understanding of the BES baseline conditions, as well as an informed understanding of how natural variability or different human activities may change this baseline over time, provides the foundation for BES management and monitoring.

A BES baseline provides essential information needed to assess BES dependencies and potential and actual impacts (Practice no. 4) and underlies the selection of measures for mitigating and managing BES impacts and identifying BES opportunities (Practice no. 5). Determining and documenting the BES baseline also informs the basis for a BES monitoring programme across the life cycle of an asset (Practice no. 6).

Advantages of effective BES baseline assessments include early identification of sensitive locations (see Tip 4, 'Locate and assess sensitive areas', IPIECA-IOGP, 2014) in support of project siting decisions. Avoidance of potential and actual impacts and early integration of mitigation into project concept development, siting and design brings cost savings from a reduction in mitigation measures and needs for redesign due to BES constraints identified at a later stage. Well-designed baseline studies provide the foundation for meaningful long-term BES monitoring, including monitoring actual impacts as well as the effectiveness of mitigation measures, and can help protect companies from unfounded allegations of BES damage or decline. The case study on page 20 illustrates how baseline surveys informed mitigation strategies in a sensitive desert ecosystem.

## ELEMENTS OF GOOD PRACTICE

Timely investment in understanding the BES baseline early in a project underpins cost-effective mitigation and helps companies avoid BES-related project delays as well as problems in later stages of the asset life cycle. BES baseline studies provide information about the biodiversity that may be affected by a project before it begins, and the services that people and businesses derive from the environment. Developing a robust baseline may involve:

- identifying and prioritizing the most important biodiversity features and ES found in the area of influence of a proposed project;
- providing information needed to support the assessment of impacts and future monitoring (e.g. information about potential indicator populations); and
- providing information needed to support the development and implementation of management and mitigation planning.

Baseline studies (or surveys) should be designed to **meet project needs**, and should be proportionate to the potential impacts and focused on material risks. The level of detail required should be evaluated at the scoping stage, taking into account project context and drivers, such as stakeholder's interests and expectations as well as the regulatory or lender requirements. For ES, projects might have specific dependencies, such as reliance on water supply, and may benefit indirectly from services provided by ecosystems (e.g. waste assimilation capacity). Establishing baselines for ES may involve biophysical (or environmental), socio-economic and/or cultural surveys.

### An iterative approach to understanding BES baselines

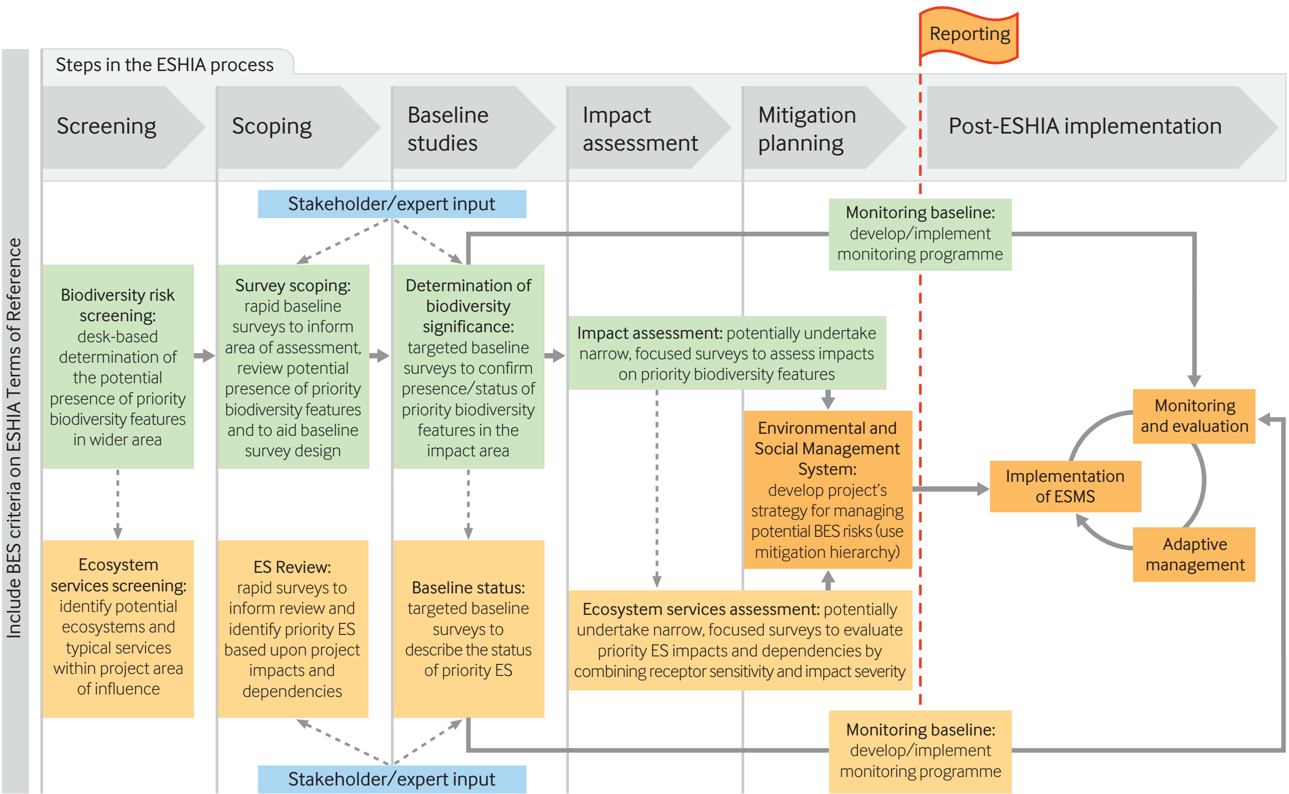
A company will typically adopt an iterative approach to developing an understanding of BES baseline conditions, using screening assessments to capture a relatively coarse level of detail likely to be needed in the early stages of a project, and augmenting those with more detailed assessments to capture the precision needed to inform mitigation planning as a project progresses.

At the exploration and feasibility assessment/concept selection stages of a project, prior to front-end engineering and design (FEED), a screening assessment over a broad potential project area for the presence or absence of key ES, sensitive species and habitats is conducted.  This assessment provides an indication of the potential magnitude of BES risks, threats, value and expected changes over time as well as the degree of BES planning and management that may be needed overall. This information can be obtained from desktop studies, initial stakeholder engagement and/or rapid surveys. Depending on the sensitivities identified in the screening assessment, more detailed information may be needed to inform the selection of facility locations.

In these earlier stages of project planning, a landscape-scale approach to understanding BES baseline conditions can provide important context for informing the assessment of potential BES dependencies and impacts (Practice no. 4), the mitigation and management of BES impacts and their related risks, and the identification of BES opportunities. See Tip 3, 'Consider the big picture' and Tip 6, 'Think about whole landscape' (IPIECA-IOGP, 2014). A landscape-scale perspective provides important context for understanding BES baseline conditions, including an understanding of how ecological features are interconnected on the landscape, and insight on the areas that provide ES and the location of users or beneficiaries.

As project planning progresses during FEED, more detailed and site-specific BES baseline information may be needed, such as quantitative surveys in select sample areas using specific biodiversity indicators and sampling protocols. The selection and design of more detailed surveys should be aimed at filling any substantive BES data gaps that potentially represent the most significant risks. These may be significant risks to business continuity, or risks which are of high importance intrinsically and/or to stakeholders, and may be significantly impacted. To enable monitoring of change

Figure 3  Basic steps involved in developing a biodiversity baseline study as part of an ESHIA



over time, initial monitoring surveys should be designed to allow for replication, and where possible should include a 'control' baseline for future comparison.

## Steps in the development of a BES baseline study

Specific guidance and details on the development and implementation of biodiversity baseline studies is provided in the European Bank for Reconstruction and Development (EBRD)/CSBI guidance, *Good Practices for the Collection of Biodiversity Baseline Data* (Gullison *et al.*, 2015). The steps involved in developing a BES baseline for a project depend upon the BES-specific values present in the project area of influence, the sensitivity of the values to the potential and actual project-attributable impacts, as well as regulatory, lender (for externally financed projects) and corporate requirements. Figure 3 on page 19 outlines the basic steps involved in developing a biodiversity baseline. The outcomes from the initial BES baseline analysis may identify the need for further field surveys.

## Expertise and timing

Biodiversity and ES can be linked; however, different survey techniques and expertise may be used to develop an understanding of biodiversity and ES baseline conditions. Biodiversity baseline surveys are typically carried out by scientific experts with relevant field expertise. Measuring the baseline for regulating ES typically needs environmental experts (such as hydrologists or soil scientists). Surveys looking into the demand for cultural and provisioning ES are typically done by social or cultural experts, potentially with the support of ecologists to understand supply. ES surveys can help to identify qualitative aspects, such as why or how a particular service is used (by including a description of the underlying ecosystem structure and functionality), as well as quantitative measures of the level of supply of a service or the use and benefit derived (monetary and non-monetary). Depending on context and need, more detailed surveys could be useful to investigate whether any substitutes for a service are available, how services have changed over time, and what the main drivers of change are. If implementing good practice, companies engaged in an Environmental, Social and Health Impact Assessment (ESHIA) are likely to be collecting much or all of the necessary information to complete the ES component of a BES baseline as part of their work on social impacts and local community engagement.

However, the extent of collaboration and coordination needed between social and biodiversity teams may require proactive planning to ensure that relevant data are collected and shared, and important links between biodiversity and ES receive appropriate attention.

Where extensive and detailed BES baseline surveys are needed, early planning is essential. BES surveys may need to be done during a specific season, over several seasons, or be repeated over several years. They may need to cover extensive areas and a wide range of species, habitat types and ES. A survey may be reliant on one or more specialists that must be contracted months in advance due to high demand for their services.

## CASE STUDY

### Total EP Libye—biodiversity baseline in a desert milieu: Libya's Murzuq basin, North Africa

*Situation*

Block NC191 is located in the Murzuq basin some 800 km south of Tripoli. Total carried out a 2D seismic acquisition campaign covering three distinct geomorphological units: (1) the sand dunes (ergs) of the Murzuq desert in the east of the block; (2) the rocky Messak plateau; and (3) the Tayta reg gravel plain in the west. The landscapes are extremely varied and exceptionally beautiful, with undulating sand dunes and rocky plateaus bordered by high sandstone cliffs.

In this harsh desert environment, biodiversity is concentrated in the numerous wadis that have been carved into the Messak plateau. These environmental niches are home to remarkable flora and fauna. They also contain some exceptionally rich archaeological sites, mainly from the Palaeolithic and Neolithic periods.

*Action*

Due to the sensitivity of the area, which was also quite unknown in terms of biodiversity, a comprehensive environmental baseline survey was carried out involving Libyan and French experts, including a zoologist, ecologist, botanist, entomologist and environmentalist. Survey results highlighted the importance of the wadis for biodiversity, including rare flora and fauna that represent vestiges of earlier wetter climatic episodes. This varied but endangered flora and fauna, of both Mediterranean and African composition, bears witness to a more humid past, and now depends for its survival on scattered rainfall and resulting floodwater.

Two herbaria were developed to help characterize plant species and communities. Special attention was paid to identifying any endemic, rare or endangered species, particularly those sensitive to changes in environmental conditions and that could be threatened by the project's proposed seismic activity. The faunal assemblage is characterized by its ability to withstand the harsh desert conditions, with high daytime temperatures, sparse vegetation and only sporadic availability of water.

The baseline surveys helped to shape impact mitigation measures, including:

- Modifying the path of seismic lines to minimize the number of wadi crossings, and reusing former seismic line routes. Cutting of trees and creepers was avoided. Removal of flora and fauna was prohibited.
- Prohibiting the use of bulldozers to avoid any modification of water flows, and limiting all access roads to a single track (see photo below). A strict management plan was implemented.
- Restoration, at the end of the acquisition, of lines, paths and camp sites, mainly to limit the visual impact.

*Outcome*

An on-site assessment was carried out by the same environmental experts to verify that measures had been appropriately carried out. The high quality of the environmental baseline and implementation of strict mitigation measures kept loss of biodiversity to undetectable levels. The biological inventory also had the positive result of raising awareness of this rich and sensitive environment.


Seismic data acquisition on Block NC191

## KEY RESOURCES AND REFERENCES

Further information and guidance on determining BES baseline conditions can be found in the following documents:

CBD (2006). *Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment*. CBD Technical Series No. 26. www.cbd.int/doc/publications/cbd-ts-26-en.pdf

EBI (2003). *Integrating Biodiversity into Environmental and Social Impact Assessment Processes.* www.theebi.org/pdfs/esia.pdf

Gullison, R. E, Hardner, J., Anstee, S. and Meyer, M. (2015.) *Good Practices for the Collection of Biodiversity Baseline Data*. Prepared for the Multilateral Financing Institutions Biodiversity Working Group and Cross-Sector Biodiversity Initiative. www.csbi.org.uk/tools-and-guidance/biodiversity-data-collection/

Houdet, J. (2008). *Integrating biodiversity into business strategies. The Biodiversity Accountability Framework.* www.veolia.com/sites/g/files/dvc181/f/assets/documents/2014/04/guide-oree-frb-en.pdf

IPIECA (2011). *Ecosystem Services Guidance. Biodiversity and ecosystem services guide and checklists.* www.ipieca.org/publication/ecosystem-services-guidance

IPIECA-IOGP (2014). *Managing Biodiversity & Ecosystem Services (BES) issues along the asset lifecycle in any environment: 10 Tips for Success in the Oil and Gas Industry*. www.ipieca.org/publication/managing-biodiversity-ecosystem-services-bes-issues-along-asset-lifecycle-any-environmen

The Biodiversity Consultancy (2014). *Biodiversity Baselines*. www.thebiodiversityconsultancy.com/wp-content/uploads/2014/06/Biodiversity_baselines_June_2014.pdf

UN Global Compact and IUCN (2012). *A Framework for Corporate Action on Biodiversity and Ecosystem Services.* www.unglobalcompact.org/docs/issues_doc/Environment/BES_Framework.pdf

Werner, S. R., Spurgeon, J. P. G., Isaksen, G. H., Smith, J. P., Springer, N. K., Gettleson, D. A., Guessan, L. N. and Dupont, J. M. (2014). Rapid prioritization of marine ecosystem services and ecosystem indicators. In *Marine Policy,* Volume 50, pp. 178-189. www.sciencedirect.com/science/article/pii/S0308597X1400092X

WRI (2013). *Corporate Ecosystem Services Review, Weaving Ecosystem Services into Impact Assessment. A Step-By-Step Method.* (Version 1.0) and *Weaving Ecosystem Services into Impact Assessment. Technical Appendix* (Version 1.0).
World Resources Institute, Washington D.C., USA. www.wri.org/publication/weaving-ecosystem-services-into-impact-assessment

# Practice no. 4: Assess BES dependencies and potential impacts

Assessment of BES dependencies and potential and actual impacts enables the identification of effective BES management and mitigation options for implementation during project design, construction, operations and end-of-asset life cycle.

# Assess BES dependencies and potential impacts

## RATIONALE

Company assessments of BES dependencies and potential impacts are typically conducted as a part of an ESHIA process for project planning and development. IOGP has developed flexible guidance—Environmental-Social-Health Risk and Impact Management Process (e-SHRIMP)—to systematically assess and manage the full range of a project's environmental, social and health aspects and impacts (which includes BES) and related risks throughout the upstream asset life cycle (IOGP, 2014).

The assessment of BES dependencies, and potential and actual impacts and their related risks begins early in project planning, preferably at the concept selection stage, and considers activities across the life cycle of the asset. The earlier an assessment is developed, the greater the opportunity to avoid potential impacts through siting and design decisions. The CSBI *Timeline Tool* can be useful in coordinating scheduling by aligning BES assessment and impact mitigation with project development timelines and milestones for design and finance (CSBI, 2014).

Assessment of ES should identify those on which a project will depend as well as those that it may impact (IPIECA-IOGP, 2011). As described in Practice no. 2, stakeholder engagement can also inform the focus of the assessment and improve understanding of the importance of BES to the community.

ESHIA is an iterative process that begins with the identification of oil and gas aspects[7] that could potentially depend on, or affect, BES. Related risks are then identified and their significance assessed, based on potential and actual impacts on people, the environment and/or operations. Where significant risks remain, risk management and mitigation measures are revisited and another iteration of the assessment is undertaken.

During an asset's life, new BES impacts and risks may arise, or previous impacts and risks may shift in significance. This could be due to changing environmental and socio-economic conditions, differences in impacts or mitigation outcomes versus predictions, or the modification or expansion of existing operations. If effective BES monitoring is in place (Practice no. 6) information on potential and actual impacts and the effectiveness of management and mitigation is also likely to improve. Periodic review and reassessment of BES impacts and risks is thus a prudent strategy and might be considered at the handover of constructed facilities to operations, facility modifications or expansions during the production phase, and decommissioning planning.

## ELEMENTS OF GOOD PRACTICE

### Identification of dependencies and potential and actual impacts and related risks

Several methods are available for identifying BES dependencies, impacts, risks and opportunities. The IPIECA-IOGP *Ecosystem services guidance* document provides a useful set of checklists that cover the different parts of the oil and gas exploration and production life cycle for various onshore and offshore habitats. The document highlights potential and actual impacts and related risks and opportunities, and provides guidance on measures for managing them. The WRI report entitled *Weaving Ecosystem Services into Impact Assessment* also provides a useful resource, outlining a six-step method to address project impacts, risks and dependencies as part of the impact assessment process. The EBI guide on *Negative Secondary Impacts from Oil and Gas Development* provides information on possible impacts on biodiversity.

[7] According to ISO 14001, environmental (and social) 'aspects' are '*activities, products or services that interact with the (physical, biological and human) environment*'.

To identify BES dependencies and potential and actual impacts and related risks, a practical starting point is to list the anticipated ways in which a project or operation may interact with the natural and socio-economic environment (i.e. by carrying out an environmental and socio-economic (and health) aspects assessment).

Aspects can, for example, include air emissions, water discharges or withdrawals, the construction and maintenance of infrastructure, noise and light emissions, land clearing, or other activities related to oil and gas operations that could directly or indirectly affect BES (Table 1). Depending on the aspects considered and the environmental and socio-economic conditions in which they occur, potential and actual impacts can be either positive (i.e. opportunities) or negative. Aspects can also include substances (i.e. 'products') that present a potential risk to BES (e.g. produced water, hydrocarbons), or services provided by the environment that support oil and gas operations (e.g. water, storm protection).

An emerging approach is the quantitative assessment of impacts and measurement of losses and gains. Where feasible, quantification promotes transparency and ensures that mitigation responses are appropriate and proportionate. It can help to shift the focus from process to outcomes and create a clearer picture for stakeholders. It also can provide evidence to support claims of achieving BES-related targets. However, a challenge associated with using this approach is that it requires agreement on quantitative measures describing BES losses and gains.

## Evaluation of BES risk

Various approaches exist to screen and evaluate the significance of BES risk. For example, historical experience and/or expert input can be used to categorize risk as higher or lower significance.

Good practice suggests that industry activities with the potential of higher risk or more severe impacts on BES be subjected to a thorough review process to identify plausible impact/risk mitigation and management measures.

There is no universally defined level of acceptable impact or risk. However, companies can use available guidance and good practices to assess impact/risk significance and to scale the potential and actual BES-related impact/risk associated with their activities (e.g. see the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance on ecological impact assessments). A more quantitative approach involves estimating the probability of occurrence and consequence severity for specific risk scenarios). An

Table 1 Potential and actual impacts and opportunities arising from project activities

| IMPACT TYPE | EXPLANATION | EXAMPLE | OIL AND GAS COMPANY RESPONSIBILITY |
|---|---|---|---|
| Direct (primary) | Direct impacts of project activity. | Road construction (clearing) removes or fragments habitat. | Full |
| Indirect (higher order) | 'Knock-on' effects of direct impacts. | Clearing vegetation leads to increased river sedimentation, degrading water quality. | |
| Indirect (induced) | Presence of project triggers third-party development and access with its impacts/risks and opportunities. | Road provides access into an area, thus increasing local timber harvesting and habitat loss. Road also provides better access for subsistence hunters, poachers, recreational users and researchers. | Partial<br>Adopt a collaborative approach to mitigate impacts and capitalize on opportunities. |
| Cumulative | Impacts and opportunities resulting from the combined effects of a project plus other activities, conditions and/or developments external to the project. | Habitat fragmentation and potential reduction in species diversity, but also increased access enabling research activities (e.g. wildlife monitoring) and the responsible use of ES. | |

impact and risk matrix can be used to assess the severity of an impact. Severity will be dependent on the level of BES sensitivity, ES value and use, BES resilience and rate of recovery, and the likelihood of occurrence.

The assessment of BES risk is an iterative process, repeated until mitigation or management measures have been identified that reduce the risk to an acceptable level (see Practice no. 5).

## Timing and resources

The assessment of actual and potential dependencies and impacts on BES and their related risks is an important element throughout an asset's life cycle. An initial risk screening may be required during the opportunity evaluation phase to inform management about potential BES challenges in regions of oil and gas interest and provide input into the corporate business planning process. A more detailed assessment should be performed at the beginning of the exploration phase, focused mainly on exploration works but also considering long-term BES risks that could arise if development and production activities proceed.

The most comprehensive assessment of BES dependencies, impacts and their related risks generally occurs during the project phase in association with concept selection and alternatives screening (Figure 4). This often forms the basis of an ESHIA carried out for regulatory, voluntary and/or lender compliance. Through iteration and expert input, this assessment usually provides the best opportunity for defining effective, long-term BES impact/risk mitigation and management strategies that can be developed and implemented over an asset's life (see Practice no. 5).

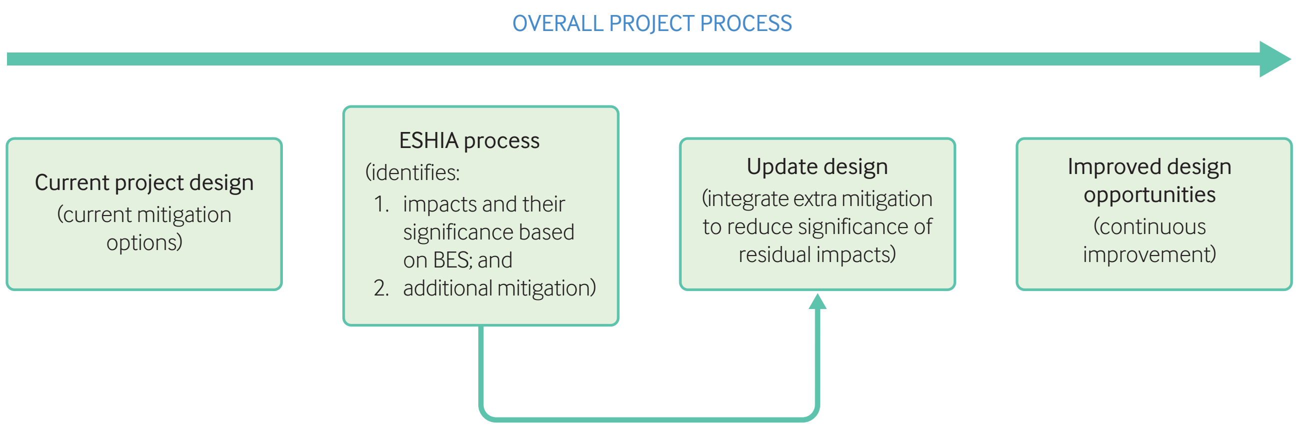
Effective assessment of BES impacts and their related risks (particularly when developing an ESHIA for a large development project) requires appropriate allocation of resources, including the necessary subject-matter and operational expertise. The availability and quality of data are often limiting factors. An assessment should therefore begin with a review of existing internal and external BES-related data and information to establish an appropriate baseline (see Practice no. 3).

## Communication and stewardship

A clearly defined communication and stewardship process is needed to communicate the assessment of BES dependencies and impacts findings to decision-makers, assign ownership and guide management decisions.

Depending on the significance of the identified impacts and risks and the financial implications associated with impact/risk management, different levels or lines of management may need to be informed and briefed on the assessment findings. To streamline this process, risk stewardship should be clearly defined. Responsibilities for follow-up, authorization levels for risk acceptance, and approval levels for the implementation of management actions must be assigned at the corporate, business-line

Figure 4 Example of project design and improvement using impact/risk assessment



and asset level. Assessors and team leaders of a BES impact/risk assessment should be aware of this information and communicate the assessment findings accordingly.

## CASE STUDY

### Repsol—ecosystem services review in the Amazonian rainforest

*Situation and action*
In the Peruvian Amazon, Repsol used an approach adapted from IPIECA-IOGP (2011) to review dependencies and impacts on ES at a landscape level. This study was conducted by Flora and Fauna International and the company's E&P Safety & Environment Division, with business unit directors and Safety & Environment (S&E) and social teams committed to an active role. Analysis showed that indigenous communities are dependent on 17 ES and the company on 10.

*Outcome*
Assessment early in the project life cycle helped the company to assess the risks around provision of ES to communities and to the project, providing opportunities for avoidance and minimization of impacts. For the 17 ES that communities depend on, 48 actions for avoiding and minimizing potential impacts were identified. Additional benefits from the assessment include improved management of relationships with local communities and increased collaboration between social and environmental project specialists.

Company engagement with local community

## KEY RESOURCES AND REFERENCES

Further information and guidance relevant to assessing BES impacts and dependencies can be found in the following documents:

CIEEM (2010). *Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal.* www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/EcIA_Guidelines/Final_EcIA_Marine_01_Dec_2010.pdf

CIEEM (2016). *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal.* Second Edition. www.cieem.net/data/files/Publications/EcIA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf

CSBI (2014). *Timeline Tool.* www.csbi.org.uk/tools-and-guidance/timeline-tool

IAIA (2005). *Biodiversity in Impact Assessment.* IAIA Special Publication Series No. 3. www.iaia.org/uploads/pdf/SP3.pdf

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EBI (2003). *Negative Secondary Impacts from Oil and Gas Development.* Energy and Biodiversity Initiative. www.theebi.org/pdfs/impacts.pdf

IFC (2012). *Performance Standard 1. Assessment and Management of Environmental and Social Risks and Impacts.* www.ifc.org/wps/wcm/connect/3be1a68049a78dc8b7e4f7a8c6a8312a/PS1_English_2012.pdf?MOD=AJPERES

IOGP (1997). *Principles for Impact Assessment: The environmental and social dimension.* IOGP Report 2.74/265 www.ogp.org.uk/pubs/265.pdf

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UNEP and E&P Forum (1997). *Environmental management in oil and gas exploration and production.* Joint E&P Forum/UNEP Technical Publication. www.ogp.org.uk/pubs/254.pdf

WBSCD (2011). *Guide to Corporate Ecosystem Valuation. A framework for improving corporate decision-making.* www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=104

World Bank (1999). *Environmental Assessment.* World Bank Operational Manual. Operational Policy OP4.01. http://siteresources.worldbank.org/INTFORESTS/Resources/OP401.pdf

World Bank (2001). *Natural Habitats.* World Bank Operational Manual. Operational Policy OP4.04. http://siteresources.worldbank.org/INTFORESTS/Resources/OP404.pdf

World Resources Institute (2012). *The Corporate Ecosystem Services Review. Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change.* www.wri.org/publication/corporate-ecosystem-services-review

WRI (2013). *Corporate Ecosystem Services Review, Weaving Ecosystem Services into Impact Assessment. A Step-By-Step Method.* (Version 1.0) and *Weaving Ecosystem Services into Impact Assessment. Technical Appendix* (Version 1.0). World Resources Institute, Washington D.C., USA. www.wri.org/publication/weaving-ecosystem-services-into-impact-assessment

# Practice no. 5: Mitigate and manage BES impacts and identify BES opportunities

Mitigating and managing BES impacts and their related risks, through appropriate application of the mitigation hierarchy, is central to reducing BES risks for a project or operation. This also allows identification of opportunities to improve BES through restoration[8] and enhancement efforts.

[8] In some host-countries/jurisdictions, the term 'restore' legally means to put a damaged attribute back to the exact state that it existed in prior to the damage occurring. In many instances, this is technically impossible, and if it is possible, the large incremental cost of achieving this does not result in significant incremental environmental and/or social benefits versus reinstating the damaged attribute to a stable and useful state. Accordingly, use of the alternate terms 'reclaim' or 'rehabilitate' (and variations thereof) may be advantageous. Use of the terms 'restore' and 'restoration' in this document does not imply or establish an expectation or requirement to put a damaged attribute back to the state that it existed in prior to the damage occurring.

# Mitigate and manage BES impacts and identify BES opportunities

## RATIONALE

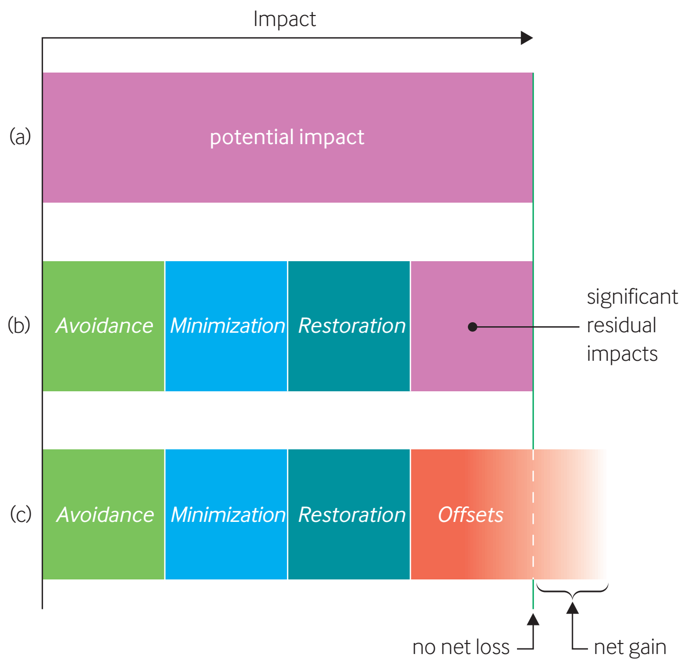
Based on the information gathered from stakeholder engagement (Practice no. 2), understanding the BES baseline (Practice no. 3), and assessing BES dependencies, impacts and related risks (Practice no. 4), companies can develop strategies and plans to mitigate and manage potential and actual impacts and related risks associated with BES dependencies (see Boxes 2 and 3), as well as identify opportunities for BES enhancements. This set of activities should be guided by the mitigation hierarchy, which follows a progression of developing actions to avoid, reduce and mitigate potentially significant impacts and their related risks (Figure 5) (CSBI, 2015).[9]

The goal of the mitigation hierarchy is to protect important BES, while avoiding unnecessary costs relating to the mitigation and offsetting of potential project and operational impacts. There is increasing stakeholder expectation, which is beginning to be reflected in regulatory requirements, that compensation or offsetting should be considered as the final step in the mitigation hierarchy for BES; this recognises that residual biodiversity-related impacts in some locations warrant additional interventions. In some cases, external standards or corporate policies may demand specific no net loss or net gain[10] outcomes.

Figure 5 The mitigation hierarchy components

Source: CSBI, 2015

The figure shows how the potential impact (a) can be reduced by implementing avoidance, minimization and restoration actions (b), and how significant residual impacts can be eliminated (to achieve no net loss) or changed into a net gain through the implementation of offsets (c).




[9] An alternative representation of the 'mitigation hierarchy' is avoid/reduce/remedy.

[10] 'No net loss' represents the break-even point for losses and gains of biodiversity features as a result of development. It implies there should be no overall reduction in the diversity within or among species and ecosystems, deterioration in their conservation status and ability to persist, or in their ability to deliver valued ecosystem services in a certain defined area or landscape. 'Net gain' (also sometimes termed 'net positive impact') means going beyond 'no net loss' to leave an overall positive legacy. How these targets should be defined, measured and monitored is the subject of ongoing debate by IPIECA and its members (Bull and Brownlie, 2015).

The mitigation hierarchy is a central approach to managing BES issues because:

- it can reduce ecological, economic, regulatory and reputational risks and costs (including from project delays);
- it facilitates the early identification of BES risk management options, including opportunities or additional conservation actions (including but not limited to biodiversity offsets), and the early forecasting of potential mitigation requirements, timetables and costs;
- it is widely used in development planning and a key conceptual framework in the ESHIA process (see Table 2 on page 32, which shows how the mitigation hierarchy should be used before, during and after the ESHIA process);
- major financial standards and safeguards (including IFC Performance Standard 6, EBRD Performance Regulation (PR6), World Bank Environmental and Social Standard 6 (ESS6), the Equator Principles) require the application of the mitigation hierarchy for the management of potential and actual biodiversity impacts and their related risks;
- as an organizing framework, it can provide a simple central planning reference, a platform to engage BES stakeholders, and a stimulus for performance measurement; and
- when used in conjunction with a mandated or targeted biodiversity outcome, such as no net loss or net gain, it can provide a useful framework to aid the quantification of outcomes.

## ELEMENTS OF GOOD PRACTICE

The CSBI document, *A Cross-Sector Guide for Implementing the Mitigation Hierarchy*, provides guidance on implementation of the mitigation hierarchy throughout a project's life cycle (Figure 6).

### Avoidance

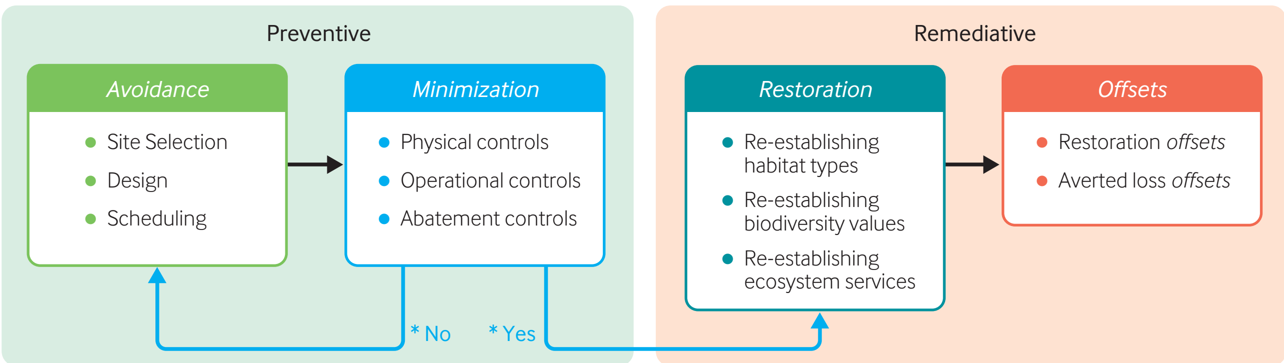
Avoidance anticipates and prevents potential and anticipated impacts on BES and their related risks during the entire life cycle of a project. Avoidance with regard to BES may involve:

- where a project site is located (**avoidance through site selection**);
- how a project is engineered (**avoidance through project design**); and
- how project activities are timetabled (**avoidance through scheduling**).

If feasible, avoidance has a number of key advantages over other components of the mitigation hierarchy. It has a higher chance of success, is immediate, can be cost-effective and avoid unpredictable and ongoing costs[11], can engender greater confidence and trust amongst stakeholders, it may also be the only way to meet certain regulatory or reputational requirements.

Figure 6 Schematic diagram showing implementation of the mitigation hierarchy

Source: CSBI, 2015




* Can potential impacts be managed adequately through remediative measures?

[11] For example moving a well pad to avoid a patch of old growth forest may be a more cost-effective way of reducing impacts than carrying out expensive, unpredictable restoration or offsetting which may not result in commensurate improvements in the status of priority biodiversity.

Table 2 Applying the mitigation hierarchy before, during and after ESHIA process

| PROJECT STAGE | USE OF MITIGATION HIERARCHY | QUESTIONS/ISSUES ADDRESSED | MITIGATION HIERARCHY COMPONENTS |
|---|---|---|---|
| Bid | Risk assessment | • Are there any significant BES risks in the area of interest? | Avoidance by selecting less risky areas |
| Pre-ESHIA (project feasibility and pre-design) | Risk assessment | • How large is the zone of influence?<br>• Where is the priority biodiversity and how does it interact in the landscape?<br>• What is the approximate magnitude of BES risks from direct, indirect, cumulative impacts?<br>• What are likely stakeholder concerns and ecosystem service dependencies?<br>• Is there a risk of irreversible significant residual ecological impacts/risks or ones that cannot be offset?<br>• Are there any BES 'showstopper' issues?<br>• What options exist regarding project alternatives and design?<br>• Are there less damaging alternatives/options which are feasible?<br>• Is it likely that impacts and related risks can feasibly be mitigated?<br>• Is it likely that site(s) can be restored?<br>• Can no net loss (if required) be achieved in principle?<br>• Are project dependencies on ES manageable? | Avoidance by site location |
| ESHIA (project design and planning) | Mitigation design<br>Feedback optimization approach to mitigation investment<br>Residual ecological impact assessment<br>Restoration—options assessment and design<br>Offsets—options assessment and design | • What are the major impacts, related risks and mitigation options?<br>• What are the expected project impacts and their related risks? How far can these be reduced by avoidance and minimization?<br>• What are the theoretical options for restoration and offsets?<br>• What are the technically and politically feasible options for restoration and offsets? Will these completely compensate for residual impacts?<br>• How will restoration and offsets be implemented and monitored?<br>• Can significant residual ecological impacts/risks be reduced further through an iterative process (iterative application of the mitigation hierarchy, examining feasibility and cost of implementing restoration and offsets)? | Avoidance by project design<br>Avoidance by scheduling<br>Minimization through physical, operational, abatement controls<br>(Restoration)<br>(Offsets) |
| Post-ESHIA (construction and operations) | Performance tracking<br>Adaptive management | • Are BES gains from minimisation, restoration and offsets meeting expectations?<br>• Are further impact reductions possible by deploying new approaches and technologies?<br>• How should management change if performance is not proving as effective as expected? | (Avoidance)<br>(Minimization)<br>Restoration<br>Offsets |

## Minimization[12]

Minimization comprises measures taken to reduce—to the extent practically feasible—the duration, intensity and/or extent of impacts that cannot be completely avoided. It is usually most cost-effective to consider these options during the design phase of a project, while alternative design options can still be considered. Minimization may involve:

- Adapting the physical design of project infrastructure (**physical controls**).
- Managing and regulating the activities (aspects) associated with a project (**operational controls**).
- Taking steps to reduce the levels of air emissions discharges and wastes (**abatement controls**).

Minimization can be applied when avoidance options were missed or are not technically or economically feasible. Implementation of minimization measures may be more visible, for some BES stakeholders, than avoidance. An adaptive approach to minimization is possible, in response to performance monitoring and new technical developments.

The BP case study on page 38 from Colorado, USA shows how working with a conservation NGO to understand the distribution of habitats of high conservation value allowed revision of designs to minimize impacts.

### Box 2 Key elements for success in implementing avoidance and minimization

Adapted from CSBI, 2015

#### Methods

1. Start as early as possible in the project planning cycle.
2. Access and use the most relevant datasets and expertise.
3. Use maps and spatial information and build a permanent GIS platform.

#### Process

1. Engage project planners and engineers with environmental and socioeconomic subject matter experts.
2. Ensure communication between the environmental and social elements of the project.
3. Make mitigation requirements explicit in contractor agreements.
4. Integrate avoidance and minimisation into Environmental Management Plans.
5. Undertake appropriate stakeholder consultation and use feedback in the planning process.
6. Apply an iterative approach and strengthen planned avoidance and minimisation measures if necessary.
7. Where the success of minimization is uncertain, implement an adaptive management approach of monitoring and adjustment.

#### Monitoring and evaluation

1. Monitor basic performance of staff and contractors.
2. Monitor the implementation of Environmental Management Plans.
3. Monitor priority BES features.
4. Manage adaptively and allow for contingencies in the event of unforeseen outcomes.

[12] In some host-countries/jurisdictions, the term 'minimize' legally means 'reduce to zero'. Accordingly, use of the alternate terms 'reduce' or 'limit' (and variations thereof) may be advantageous. Use of the terms 'minimize' and 'minimization' in this document does not imply or establish an expectation or requirement to reduce to zero.

## Restoration[13] and offsets

Restoration and (biodiversity) offsets involve remediating rather than preventing impacts. This can carry higher risks and uncertainties than avoidance and minimization, as the actions required are often more complex and costly to implement. Restoration and offsets sometimes also have significant long-term sustainability challenges.

Opportunities and options for restoration and offsets are most effective if they are identified early in the project planning process (e.g., pre-FEED), when it is easier to identify, analyse and act on avoidance and minimization opportunities. Moving from prevention to remediation measures can be a significant planning step (see Figure 7). Before taking this step, it is important to assess the level and scale of potential and actual impacts and risks remaining, whether they are significant based on available guidance and good practices (see Practice no. 4), and if so, whether they can realistically and credibly be managed via restoration or an offset approach. Although offsets are the 'step of last resort' in the mitigation hierarchy, it is sometimes more practical to consider the feasibility of restoration and offsets in parallel, since these represent two components of managing significant residual ecological impacts and risks.

## Restoration

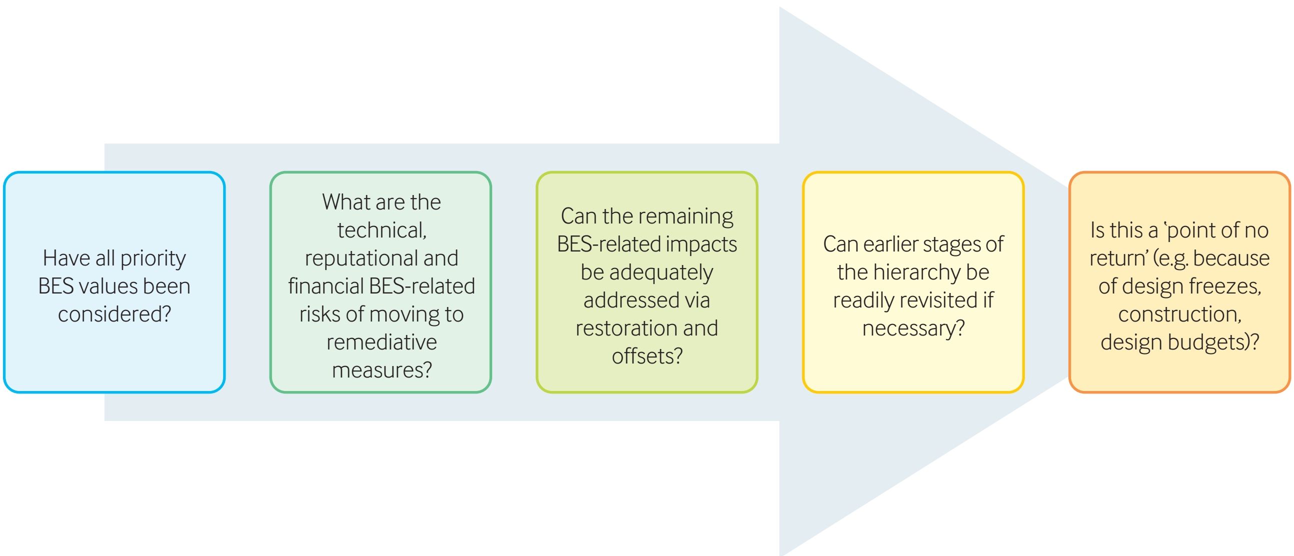
Restoration is the process of assisting the recovery of damaged or destroyed biodiversity. It typically involves on-site rehabilitation that aims to reinstate specific aspects of ecosystem structure, function and/or species composition. The feasibility of restoration and its contribution to the successful application of the mitigation hierarchy will vary greatly among projects. Generally, restoration is likely to be more feasible (and faster and less costly) for:

- areas that are relatively lightly degraded, or
- when the aim is to restore relatively simple habitat structure or specific ecosystem functions.

Recreating complex habitat and species assemblages may be difficult and even if possible may require very long time-scales. However, restoration ecology is a fast-evolving field and technical advances are in progress. Appropriate data and expert consultation are essential for assessing the probability of successful and sustainable, in the longer term, outcomes and setting realistic goals.

The likelihood of success and the risk-management potential of restoration may differ for biodiversity and for ES. Restoration of some ES may be more feasible than

Figure 7 Points to check when moving from avoidance/minimization (impact prevention) to restoration/offsets (impact remediation)
Source: adapted from CSBI, 2015




[13] See footnote 8.

biodiversity features, as they may require the restoration of a functional service, rather than a specific element of biodiversity. For example, a plantation of fast growing non-native trees could restore the hydrological function of a water catchment, but may have low biodiversity value. The alternative of restoring indigenous forest could provide the same ES values, whilst also restoring some biodiversity values; however, such an approach is likely to be significantly more complex, costly and challenging with regard to long-term viability and sustainability. It is important, therefore, to clearly define restoration goals and whether they are designed to restore ES, biodiversity, or both.

## Offsets

Offsets compensate for significant residual impacts (typically biodiversity-related) predicted to remain after all feasible measures for avoidance, minimization and restoration have been applied[14].

'Offsets can carry many uncertainties and risks. Good practice is therefore to reduce residual BES-related impacts to 'a level as low as reasonably possible' (ALARP) before offsets are considered. Carefully implemented, offsets can provide a real opportunity to improve both biodiversity and ES outcomes. Offsets can, for example, be undertaken in the context of a biodiversity no net loss or net gain goal, and though this is not technically essential, it represents an emerging expectation from some host-country governments, multilateral and private financing institutions, conservation NGOs and other stakeholders. Offsets can also be undertaken in conjunction with protected areas management.

Compensating for impacts on some priority ES can be achieved at a biodiversity offset site, depending on its access to impacted beneficiaries. Many sociocultural and regulation services are compatible with strong biodiversity conservation, and may even provide incentives for the preservation of a natural ecosystem. However, there is potential for conflict with some provisioning ES when advancing offsets. For example, a biodiversity offset measure might require reduction in the harvesting of wildlife, firewood or fruit that are priority ES for local communities. Where provisioning ES are completely incompatible with biodiversity offset targets, it may be possible to compensate those ES in other ways. For example, a semi-natural ecosystem could be created for firewood collection or fruit harvesting, or there could be scope for substitution (e.g., domestic animal breeding to offset meat from hunting) or financial compensation. Developing offset management strategies that are socio-culturally appropriate and legally permitted is essential for successful and sustained (in the long-term) offset implementation.

Although many offsets may be theoretically feasible, fewer options generally remain once technical and socio-political filters are applied, underlining the importance of consultation with relevant BES stakeholders.

In addition to offsets designed for remediation of particular impacts, there may also be opportunities to implement additional conservation actions (ACAs). These are voluntary measures undertaken by a company that lie outside of regulatory and other legal obligations and are intended to manage ecological risks and/or enhance BES outcomes; ACAs are often precipitated by interactions with local communities and other stakeholders. Examples include but are not limited to contributions by a company to support the work of conservation/wildlife NGOs, safeguarding the traditional subsistence hunting activities of indigenous peoples, mapping sensitive species over and beyond the project's area of influence to assist local knowledge and conservation actions, educating local communities about the benefits of conserving iconic wildlife in their locale and providing training to local biodiversity experts on international BES management strategies. The case study from Alaska, USA below shows that working with local communities can help identify opportunities which not only provide socio-economic benefits to communities, but may also help manage the use of natural resources. In this case improved meat storage to reduce wastage is developed and tested.

[14] The 'offset' approach represents the intervention of last resort with regard to the mitigation hierarchy since the application of other measures in most instances fully addresses a project's biodiversity/habitat-related impacts and related risks, i.e. no material residual impacts/risks remain that could potentially warrant an offset. Furthermore, an offset is most often only warranted in those instances where a project's material residual biodiversity-related impacts occur in locations featuring 'critical habitats' and/or 'priority biodiversity features' (as defined by the World Bank).

Guidance is available on how to undertake effective offsets (see sources below) and this is signposted in the CSBI guidance on implementing the Mitigation Hierarchy (CSBI, 2015).

### Box 3 Mitigating and managing impacts on ES

Potential impacts on ES may pose risks to a project in two ways:

1. The impacted services are important to affected stakeholders (e.g. they support the well-being of local communities).
2. Success of a project depends on the impacted services.

Many different ES could be impacted by a project. A management response should be proportionate, focusing on those services that are of key significance (to stakeholders or to a project) and are also significantly impacted. Most often, the ES considered are either provisioning or cultural services. However, potential impacts on other kinds of services (i.e. regulating or supporting) should not be overlooked, especially for those on which a project is dependent. In some cases, impacts might not be immediately apparent but could cause problems at some point in the future, for example if flood prevention capacity was compromised.

Although ecosystem services are underpinned by biodiversity, their supply is maintained from ecosystem functions. Assessing and addressing impacts and the related risks on ES necessitates stakeholder consultation and expertise in both the social and environmental facets. Addressing ecosystem service issues thus requires bringing together both the social and environmental strands of the ESHIA process, and both the social and environmental teams of a company.

Biodiversity and ES maintenance goals can be in conflict, especially regarding provisioning services. Managing these situations can be challenging, potentially requiring negotiation between different stakeholders.

## CASE STUDY

### Over mountain and desert—the PERU LNG approach to simplifying BES management across complex geographies

*Situation*
This case study provides an example of how 'starting yesterday', locating and assessing sensitive areas, and thinking about the whole landscape, can allow for the successful management of sensitive BES values in challenging and topographically very diverse regions.

*Action*
PERU LNG faced the challenge of managing a wide range of sensitive BES values across a complex geography, for a natural gas pipeline project that began in the upper montane forests of the Amazonian headwaters, traversed valleys and ranges of the Andes, crossed the Peruvian

Regional diversity along PERU LNG pipeline: (top) the Eastern Valleys; (centre) the Andes; and (bottom) the Pacific coast.

desert and ended at a liquid natural gas (LNG) plant and terminal on the Pacific ocean. Building upon the knowledge of practitioners with experience in other major pipelines, as well as lessons learned from a previous pipeline project and guidance from multilateral bank policies, PERU LNG chose to develop a BAP and Ecological Management Plan that would meet and exceed the requirements of lenders and expectations of stakeholders. Once it had launched this initiative, PERU LNG quickly realized that 'one size doesn't fit all' and sought to develop a BES management approach that reflected this diversity.

Using GIS and ecological approaches, the pipeline area of influence was divided into 14 Ecological Landscape Units or 'ELUs'. For each ELU, a specific Ecological Action Plan was developed and these were managed and implemented through three regional Ecological Management Plans for the Eastern Valleys, the High Andes, and the Pacific Slope. This approached allowed PERU LNG to manage BES at meaningful scales and with actions tailored to the needs of the ecology and geography of the landscape units, all prior to the start of pipeline construction. Another critical aspect was the full integration of the BAP (Figure 8), Ecological Management Plans, and other plans and programmes into the PERU LNG Environmental, Social, Health and Safety (ESHS) management system at all levels. This included the development of Contractor Management Plans to ensure incorporation of BES management requirements for contractors and subcontractors. PERU LNG's environmental managers were fully involved in the development of the plans. This ensured a high level of ownership and support from senior management, while PERU LNG's internal subject-matter experts sharpened their skills through interaction with expert consultants and academic and institutional collaborators.


Figure 8 Peru LNG's Biodiversity Action Plan

*Outcome*
The PERU LNG experience illustrates the value of 'starting yesterday', locating and assessing sensitive areas, and thinking about the whole landscape. Putting an experienced team in place early on, and continuing to refine BES information after preparation of the ESIA, enabled PERU LNG to put in place the plans and programmes needed to protect BES values prior to the start of construction. This proactive management of risks helped prevent delays and keep the project on schedule. By locating and assessing sensitive areas, through an ongoing process that started with surveys during the alternative analysis process prior to the ESIA, PERU LNG was able to identify priority BES features, avoid and minimize impacts on these features to the extent practicable, and then develop appropriate bio-restoration and monitoring plans. Finally, by considering the whole landscape, PERU LNG was able to take into account the unique processes and properties of 14 distinct landscape units and manage the implementation of mitigations at appropriate levels of scale and with landscape-specific actions.

## CASE STUDY

### Oil and gas activities in and around protected areas: BP's approach to BES management in the San Juan basin, Colorado

*Situation*
In the San Juan basin of Colorado, BP's Lower 48 gas production operations are taking a landscape approach to managing impacts on biodiversity in and around the San Juan State National Forest reserve. The overall aim is no net loss of habitat effectiveness for elk and deer populations, the key features of the protected area.

*Action*
Working with The Nature Conservancy, BP integrated biodiversity issues into early planning of operations, and is applying the mitigation hierarchy to avoid, minimize and offset impacts. This has helped to identify the most important areas for biodiversity, manage where and when to operate, and design conservation easements to benefit local biodiversity.

Early in the planning stages of the San Juan Basin project, BP carried out an ESIA, following the requirements and recommendations defined in BP's environmental and social practices. This evaluated the project's potential impacts on the landscape and mapped out areas of high importance for deer and elk, identifying areas where well pad sites should be avoided and where mitigation efforts would bring greatest benefits.

In May 2009, The Nature Conservancy agreed to assist BP in the analysis of species and habitats in La Plata and Archuleta counties. With oversight from Colorado regulators, a team from The Nature Conservancy used a well-established, science-based methodology to evaluate the project's potential impacts on the landscape. The team performed analysis, including computer modelling, to establish which local areas contained habitats and other natural resources of especially high value. Based on this they were able to recommend areas where BP should minimize or avoid future development and where wildlife and habitat mitigation efforts would likely bring the most benefits.

The evaluation by The Nature Conservancy identified more than 20 native plant and animal species that are directly impacted by drilling activity and that would thus benefit most from mitigation. For example, modelling determined that the maintenance of existing sage brush communities would have positive impacts for deer and elk herds. The sage brush habitat provides critical forage during winter months when snow depths can limit foraging opportunities.

BP partnered with a private landowner and a conservation organization to place 250 acres (101 hectares) of land with healthy stands of sage brush into a conservation easement. The easement will ensure that the current habitat value to a range of species is maintained into the future.

*Outcome*
Over a period of 18 months, the information gathered, and analysis completed, by The Nature Conservancy, Colorado Parks and Wildlife and BP allowed the development of a rigorous Wildlife Mitigation Plan. This was the first of its kind in the San Juan Basin and earned BP an outstanding operator award from the Colorado Oil and Gas Conservation Commission in August 2011. The overarching goal of the plan is to preserve existing high-quality habitats where possible, while also offsetting any loss of habitat by taking steps to restore or enhance habitat conditions nearby. Using outputs from The Nature Conservancy's computer modelling, Colorado Parks and Wildlife has identified 11 priority areas where mitigation work will be concentrated.

As part of the Wildlife Mitigation Plan, BP will continue to apply good practice at its facilities to minimize wildlife impacts. Examples include:

- automating well operations so that vehicle traffic to well-pad sites is minimized;
- water-gathering systems that pipe waste water away from drilling sites;
- a closed-loop drilling system which stores drilling waste in a storage area instead of the traditional open pit in which wildlife can become trapped;
- drilling multiple wells from one well-pad site when possible; and
- use of wildlife-friendly reclamation seed mixes.

As part of a six-year research project BP has been studying the local populations of mule deer, elk, and bald and golden eagles to understand how these species are using the landscape and to monitor the effectiveness of the mitigation measures.

## CASE STUDY

### Additional conservation action—supporting local community ice cellar construction on Alaska's North Slope

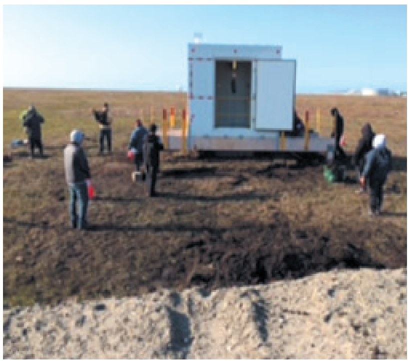
*Situation*
Following the fall bowhead whale subsistence hunt on Alaska's North Slope, indigenous community members receive their shares of the whale meat but often do not have adequate means of storing it. This meat has traditionally been stored in ice cellars that are dug beneath the permafrost to ensure that the meat does not spoil. Changing permafrost conditions and surface water hydrology have challenged the viability of this approach.

In recent years, there have been several instances of meat spoiling or arctic wildlife pillaging unsecured stockpiles after smelling the meat from miles away. An ice cellar serves both a safety and cultural purpose, and was identified as an area of priority in initial consultation meetings with local indigenous community members.

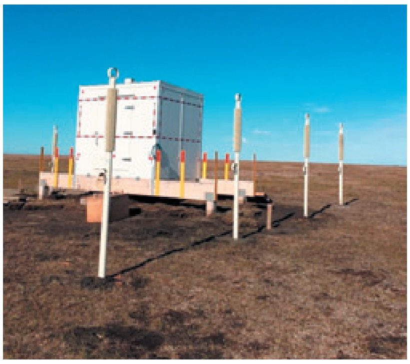
*Action*
ExxonMobil's Point Thomson Project worked with a local indigenous community and the University of Alaska Fairbanks to fund temperature modelling studies for the development of a community-wide engineered ice cellar. This resulted in a design concept which integrated traditional aspects and modern technology. The Project also contributed 'seed money' to support the subsequent ice-cellar design and construction.

*Outcome*
Motivated by the promising results of the modelling studies, the seed money provided by the Point Thomson Project and the establishment of a local Community Foundation with the help of the Project, local community members were able to raise contributions from other donors and progress the design, material acquisition and construction of the ice cellar. In the summer of 2014, the construction phase featured a truly community-wide effort as dozens of residents (as well as the Point Thomson Project Community Relations Lead) contributed their 'sweat equity' for tundra sod foundation work and thermosyphons installation.

The next phase will include additional subsurface excavations to make room for greater storage capacity and long-term soil temperature monitoring. With a design life of 50 years, this is a long-term solution for a core health and cultural issue.


Community construction


A downhole view of the ice cellar


Completed installation of thermosyphons

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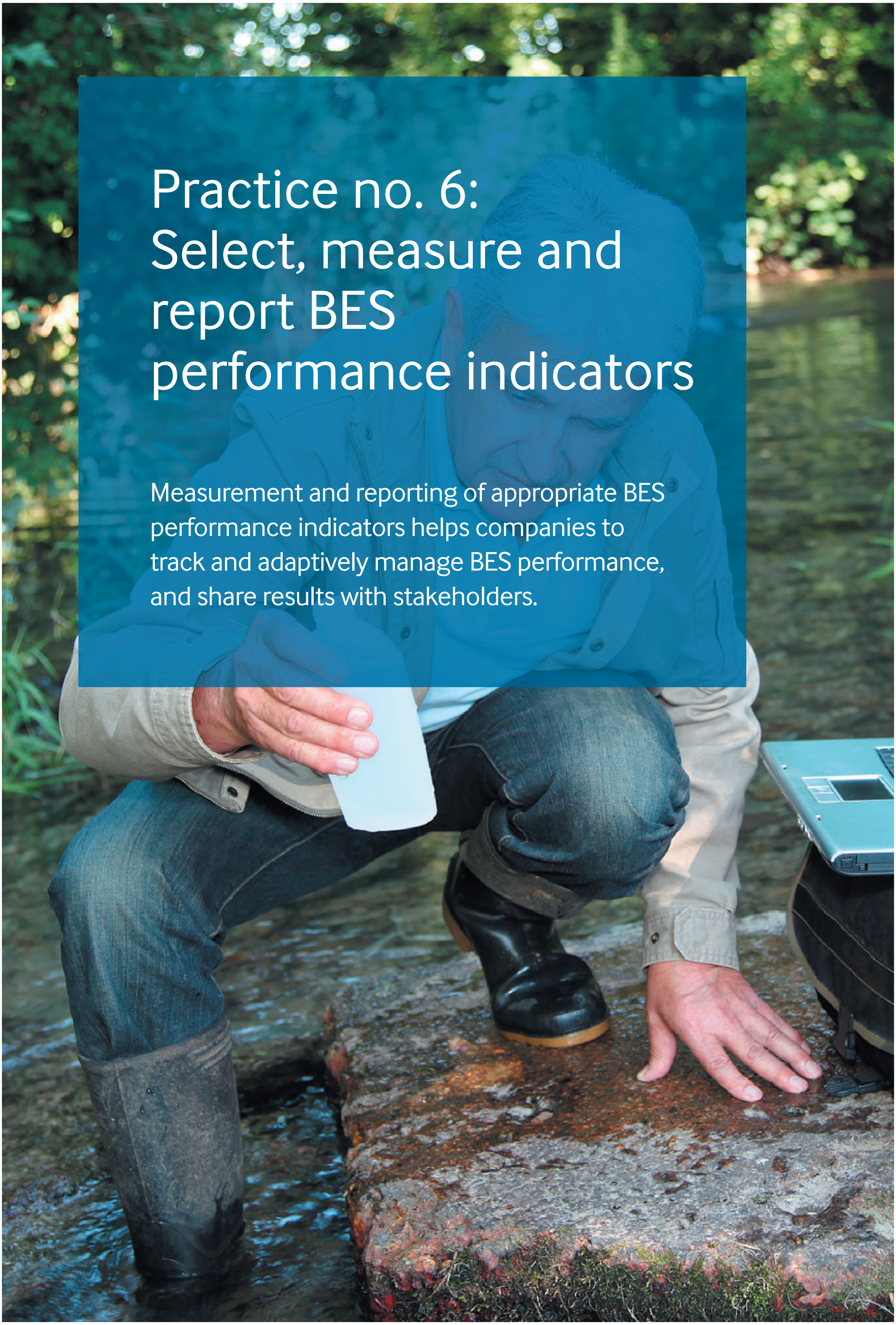


# Practice no. 6: Select, measure and report BES performance indicators

Measurement and reporting of appropriate BES performance indicators helps companies to track and adaptively manage BES performance, and share results with stakeholders.

# Select, measure and report BES performance indicators

## RATIONALE

The selection and use of appropriate indicators for BES enable companies to measure and report on the strategies and plans put in place to mitigate dependencies and potential and actual impacts on BES, as well as to capture opportunities for BES enhancements. This can happen at an asset or company-wide level, and be reported both internally and externally. Measuring and reporting on BES performance is central to a process of continual improvement. Tracking and reporting BES performance allows the effectiveness of management and mitigation to be demonstrated, and adaptive management to be implemented where necessary. IPIECA's guidance on voluntary sustainability reporting (IPIECA-API-IOGP, 2015) notes that it can enhance company reputation, business value, company operations and improve stakeholder and industry relationships.

## ELEMENTS OF GOOD PRACTICE

Good practice in BES monitoring and reporting includes:

1. Ensuring complete coverage of the area of impact, at a landscape level where/when appropriate.
2. Focusing on BES priorities (monitoring is expensive, so being focused is an opportunity for cost savings).
3. Ensuring adequacy of BES indicators and a clear link to mitigation measures.
4. Allowing for an adaptive management response based on monitoring results by refining/altering indicators and/or actions as needed.
5. Developing an integrated system of third-party verified, company-level and site-level indicators and monitoring system.

### Monitoring

According to the Organisation for Economic Co-operation and Development (OECD), monitoring is the *'continuous or frequent standardized measurement and observation of the environment (air, water, land/soil, biota), often used for warning and control'*.

Therefore, monitoring involves the repeated, targeted collection of data over time, to detect changes in one or more parameters of interest.

*Monitoring frameworks*
Four sequential questions that should be answered when designing a monitoring scheme are shown in Figure 9.

An integrated system involving two-level (site and company) BES indicator monitoring would enable the measurement and monitoring of activities and risk management outcomes at the site level as well as of a company's performance at the global level. This information can be used to help set improvement targets at both levels.

*Site-level monitoring*
At the site-level, the fundamentals of BES monitoring are typically concerned with determining the effectiveness of management and mitigation measures and, when possible, demonstrating positive conservation outcomes.

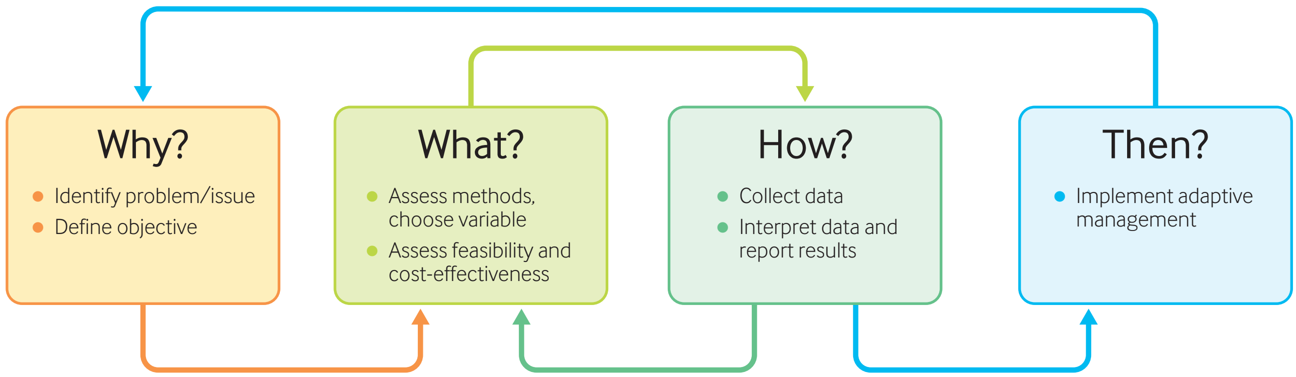
An effective monitoring programme should:

1. allow for the ready detection of BES impacts/risks and enable them to be distinguished from natural ecological changes or third-party impacts;
2. enable the assessment of BES-related performance, and the efficacy of implemented risk management and mitigation measures;
3. promote improvements through adaptive management;
4. provide opportunities to remove ineffective indicators and identify new ones; and
5. meet internal and external reporting requirements.

It is essential to be clear about why BES monitoring is being done. For example, monitoring could aim to track the effectiveness of management and mitigation measures, to determine whether regulatory requirements at a site are being met, to demonstrate progress towards corporate BES targets, or to show whether specific BES stakeholder expectations are being fulfilled.

Figure 9 Generalized steps in designing a monitoring scheme

Source: Adapted from Bennun, L. A. (2001). *Hydrobiologia*, Vol. 458, Issue 1, pp. 9-19.




The following general considerations should be borne in mind when planning BES monitoring:

- Timing: when to undertake habitat/species surveys is important—for example to account for seasonal variability.
- Who: individuals/groups undertaking monitoring tasks, for example internal vs external experts (consultants/universities/NGOs) and the kinds of experts needed to cover key faunal or floral groups or ES types.
- Balance: monitoring needs to be fit for purpose. The sampling design should have sufficient statistical power to allow useful conclusions to be drawn from the data collected. Monitoring is also often costly, so collection of superfluous data will be wasteful.
- Relevance: indicators/results should have a clear and specific purpose (e.g. to track the effectiveness of particular mitigation measures) to keep use of resources focused and effective.
- Efficiency: information derived from remote sensing (such as the analysis of satellite imagery) can often be informative and cost-effective. However, such information needs to be checked and aligned against on-ground measurements to ensure that conclusions are not misleading.
- Context: monitoring of data needs to be assessed in the context of long-term natural processes and socio-ecological change.
- Adaptive management: if monitoring shows management and mitigation measures are not working then interventions need to be adapted accordingly (see Tip 10 'Monitor, adapt and Improve', IPIECA-IOGP, 2014).

When developing approaches to BES monitoring, companies may have limited internal capacity at either site or company level. Developing a more comprehensive and sophisticated approach to monitoring should ideally go hand-in-hand with developing internal capacity for planning, implementing and reporting on monitoring. External consultants can play a valuable role at all stages. However, their role should preferably evolve from leading the process (especially at site level) to training and advising on specific technical issues. Eventually their role should evolve to providing third-party review and verification of the results that have been produced through a process led and implemented by the company itself.

Environment and social teams should be in close communication with each other regarding monitoring of ES that are important to local communities or other stakeholders, including the selection of indicators and the planning and implementation of field survey work.

An emerging practice is monitoring of BES impacts for specific supply-chain components, where there are seen to be potential risks that need addressing[15].

*Company-level monitoring*

At company-level, monitoring is largely linked to strategic decision making and credibility with stakeholders. It can help address:

1. company risk evaluation (image, global exposure);
2. effectiveness of the BES model/programme in place (e.g. assessing BES Management capacity);
3. continuous improvement and setting new targets; and
4. reporting requirements and providing company credibility.

[15] This approach has been furthest developed through Kering's Environmental Profit and Loss account, www.kering.com/en/sustainability/epl, focused primarily on ecosystem services and translated into monetary values.

Across a company's operations, BES monitoring may be needed for several different purposes and at different scales. Company-level indicators can, in turn, provide a measure of global BES performance, inform strategic BES-related decisions and relate to targets that help drive continuous corporate improvement.

A strategic approach to monitoring design would consider and develop, as far as possible, a scalable system involving a nested set of performance indicators, where site-level indicators would directly feed into and support company-level indicators. This would enhance the efficiency of BES performance assessments at a site and company level and ultimately serve to reduce cost.

Company-level indicators tend to be based on company BES objectives and targets. In addition, IPIECA and the GRI both provide frameworks of indicators that could be monitored for company-level reporting. These are potential starting points from which companies can select and adapt indicators that relate to their own material BES concerns, supplementing these with additional indicators (including at site level) to fill key gaps.

## Indicators

The IPIECA/API/IOGP guidance on voluntary sustainability reporting (2015) defines indicators as '*information or data which provides evidence of a company's performance in addressing sustainability issues which are material for reporting.*' More specifically, BES indicators are '*a way of presenting and managing complex information relating to BES features in a simple, clear manner that can form the basis for future action and can be readily communicated to internal or external stakeholders as appropriate*' (adapted from EBI, 2003). Therefore, a BES indicator is information derived from monitoring data (e.g. by calculation of a statistic or field surveys) that is intended to demonstrate the status or change of BES features.

Theoretically, an ideal approach would be to develop and implement an integrated system of third-party verified company-level and site-level indicators. Company-level indicators would be used to measure the company's global performance, set company targets for continuous improvement in BES management, inform strategic decisions and report externally to stakeholders or against financial benchmarking criteria. Site-level indicators would be used to quantitatively measure and monitor activity effects and BAP outcomes at site level, systematically improve operational practices, set targets for continuous improvement in BES management, and inform the system of company-level indicators.

In practice, however, selecting appropriate and widely accepted company- and site-level BES indicators is still a significant challenge. To this end, it is important to bear in mind what purposes indicators should serve and which criteria indicators should meet.

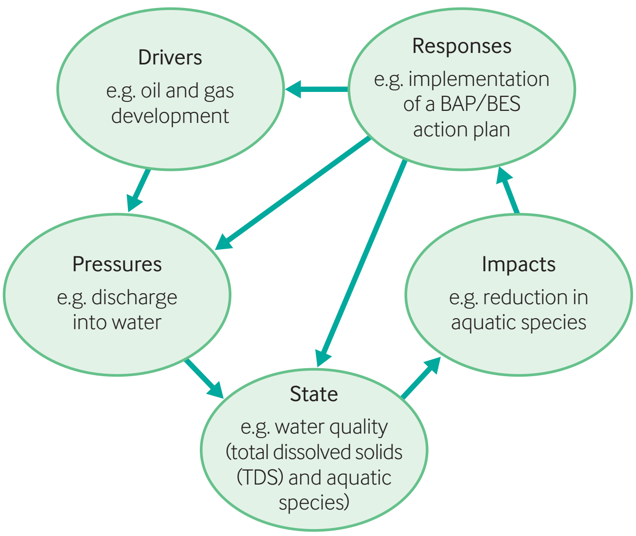
### *Indicator selection framework*

Monitoring frameworks facilitate the selection of appropriate indicators which look at different aspects of BES.

In the past two decades, several attempts have been made to develop systematic approaches for selecting indicators for environmental monitoring. In 1993, the OECD presented the 'Pressure-State-Response' (PSR) framework for the selection of environmental indicators to foster uniformity in monitoring and informing environmental policy in various countries.

In 1998, the EU evolved the PSR framework into the DPSIR framework (Figure 10) by introducing two additional indicator categories: driver and impact. Driver indicators provide information on activities leading to

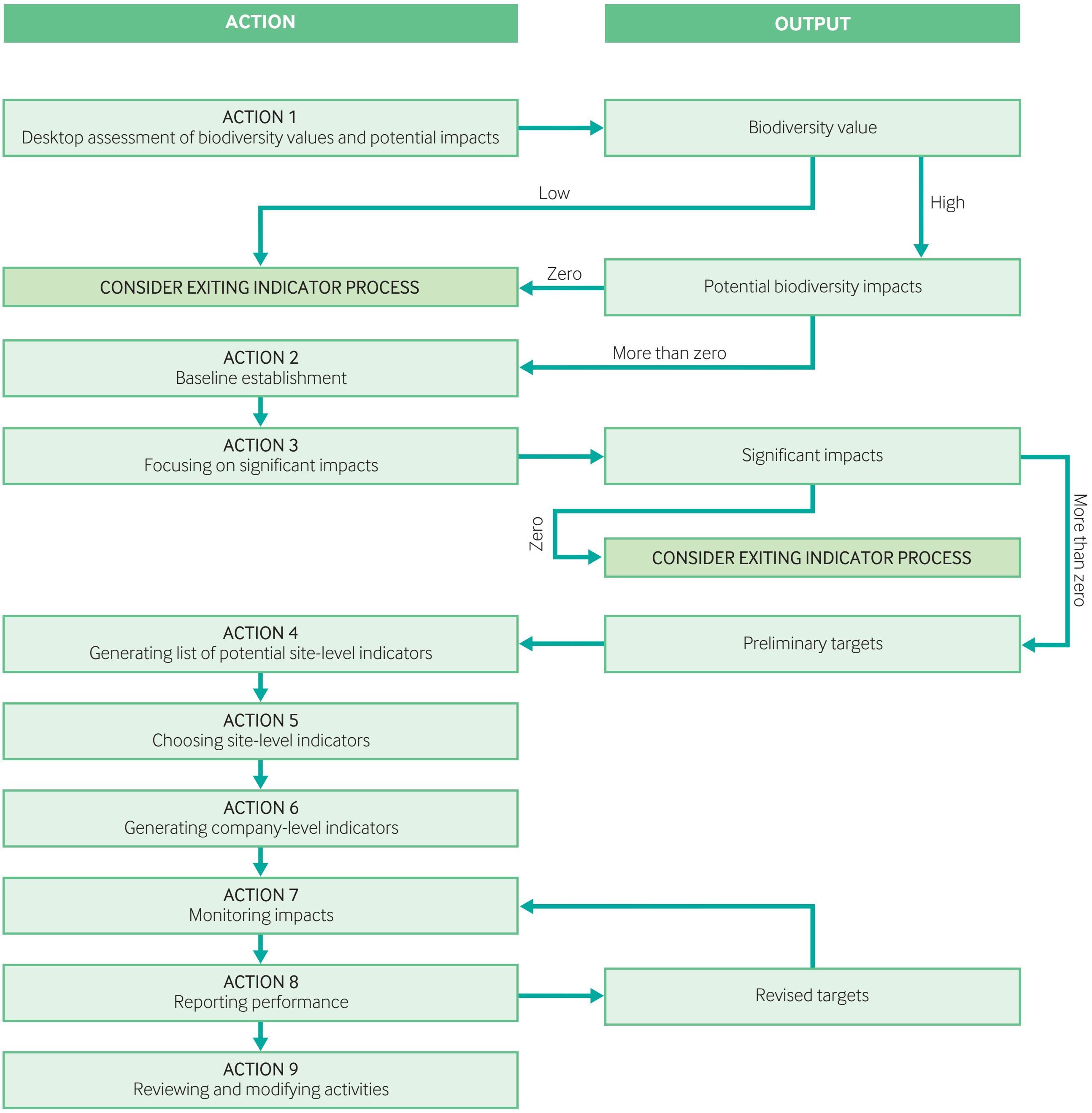
Figure 10 The DPSIR conceptual framework and relationship between driver, pressures, state, impact and response indicators.
Adapted from EU (1998)[16]




[16] Sparks T. H. *et al.* (2011). In *Oryx* Vol. 45, Issue 3, pp. 411-419.

pressure on BES (e.g. oil and gas development), whereas impact indicators would provide information on potential risks due to a change in the state of relevant BES aspects (e.g. reduction in species abundance) as a result of changes in water quality. The DPSIR framework can provide a useful approach for the purpose of developing BES indicators and can be applied to the EBI's process for generating an integrated system of site and company-level indicators (Figures 10 and 11).

Figure 11 EBI flow chart for generating site and company-level indicators
Source: EBI, 2003



*Indicator types*
Indicators may be:

- qualitative (e.g, the implantation of a BAP at a site); or
- semi-qualitative or quantitative (e.g. area of natural habitat brought under effective protection); there is the potential to consider monetary quantitative indicators.

Indicators can relate to specific targets (e.g. to have a BAP in place for those operations overlapping with listed biodiversity sites), or they may be open-ended, where no target has been set.

When selecting indicators of pressure (threats) and responses (actions), the standard classifications produced by IUCN and the Conservation Measures Partnership[17] are a useful guide.

Data for calculating quantitative indicators are generally acquired by sampling, e.g. through field surveys. Sample design must be robust enough, with large enough sample sizes, to draw useful conclusions. For any quantitative indicators, it is strongly recommended to seek expert ecological, social and statistical advice for selecting indicators and designing sampling regimes. Importantly, BES-related indicators often fluctuate and may be influenced by many factors, whether natural or caused by people, which have nothing to do with project impacts. Establishing controls is therefore an essential element of monitoring. Understanding background changes in BES indicators helps to show what changes (positive or negative) have been brought about by a company.

Indicators may relate to specific sites or operations, or they may be compiled at a global, company-wide level.

*Site-level indicators*
Prioritizing BES features may support the selection of the most appropriate and useful indicators for monitoring BES-related impacts and risks. The likelihood of features being significantly impacted by a project or operation is one important criterion. Other important factors can include stakeholder uses (or priorities) of the area, national conservation priorities, or features which qualify an area as being of importance to the project (such as Critical Habitat-qualifying features, among others).

Indicators should address the overall monitoring goal, whether it is ecological change or mitigation performance. The costs of collecting monitoring data should be proportionate to the cost of the activities or interventions whose outcomes are being monitored. Establishing the right number of indicators may be difficult, although sometimes one indicator may helpfully serve as a credible proxy for several others. Sometimes a proxy is the only option because it may not be feasible for more direct indicators to be assessed, for example if a species of interest is rare, unobtrusive or nocturnal the survey costs may be disproportionately high. Proxy indicators should be used with care, however. Assumptions made should be carefully explored and questioned (and made transparent when reporting). There can be risks, without good supporting evidence, in assuming that Response indicators can act as proxies for indicators of Pressure or State; an example may be the assumption that if the number of operations with BES Action Plans increases this shows that operational impacts on BES are decreasing.

Good practice is that site-level indicators help to drive a process of continuous improvement in BES performance (via target setting) at the operational level. Adaptive management is key as it allows companies to adjust mitigation/actions if the desired outcome is not being achieved.

Ideally, site-level indicators should be designed so that they could be aggregated to form a summary global indicator. Due to the complex nature of BES, however, a standardized system might be needed to compare disparate site-level indicators.

[17] See IUCN-CMP Unified Classification of Direct Threats v. 3.2 (2012):
www.iucnredlist.org/documents/Dec_2012_Guidance_Threats_Classification_Scheme.pdf
IUCN-CMP Unified Classification of Actions Needed v. 2.0 (2012):
www.iucnredlist.org/documents/Dec_2012_Guidance_Conservation_Actions_Needed_Classification_Scheme.pdf

Generally, site-level indicators will be most useful when they are SMART[18] (i.e. Specific, Measurable, Achievable, Relevant and Timely), but also when they are:

- sensitive: related to an identified BES sensitivity or risk;
- simple: understandable, interpretable and usable;
- focused: able to discern sources of impacts (e.g. natural vs company vs third party);
- spatial and temporal: should be able to detect BES changes over time and space;
- dynamic: responsive to ongoing ecological or operational changes;
- capable of addressing change: able to address positive and negative BES changes or risks; and
- relevant: able to answer a posed monitoring question that is part of a BAP, reporting requirement or financial benchmarking study.

The case study on page 48 demonstrates how the application of SMART indicators at a landscape and site-level is enabling continuous improvement in BES management practices in the Ecuadorian Amazon.

*Company-level indicators*
Company-level BES indicators tend to provide more aggregated information and typically:

- measure qualitatively and/or quantitatively company-wide performance on BES issue management);
- are based on company BES objectives and targets;
- are based on relevance and materiality;
- are responsive to BES targets for continuous improvement;
- are more about 'process' than impacts;
- involve an aggregation of site-level indicators; and
- follow the principles of relevance, transparency, consistency, completeness and accuracy.

Company-level indicators are frequently linked to 'response' indicators (e.g. the percentage of sites that have carried out BES screening or have a BAP in place). Company-level pressure indicators may also be useful, for example the number of sites operating in sensitive areas. State indicators are challenging as they are often site-specific, and aggregating indicators from a range of sites with diverse social and ecological environments is complex and perhaps uninformative. Benefit indicators are also sometimes found in corporate-level BES monitoring frameworks. However, these tend to be limited to water or other resource-consumption indicators.

*Evolving expectations for indicators*
In parallel with the growing maturity in corporate thinking about how to understand and manage BES risks, external expectations of BES monitoring and reporting are increasing. Best practice is evolving from targeted project specific measures and some corporate-level processes, to an approach where more quantitative site- and company-level indicators are regularly assessed and used to inform performance improvement. At the site level, the widespread implementation (and acceptance as best practice) of the IFC's Performance Standard 6[19] is a strong driver towards quantitative, target-focused indicators that address the most material BES impacts. The Yemen LNG project (see case study on page 50) has aligned with Performance Standard 6 and has thus developed a BAP and comprehensive marine monitoring programme to evaluate the effectiveness of mitigation measures for both biodiversity and ES (in this case fisheries).

## Reporting

Like all other environmental and social reporting, reporting on BES issues is based on information drawn from monitoring results. Guidance on reporting BES indicators is available, and includes the IPIECA-API-IOGP voluntary sustainability reporting guidance and the GRI guidelines. BES reporting is typically organized at both the site and company levels.

*Site-level reporting*
Site-level reporting is based on site-level BES monitoring. It provides periodic internal updates on BES site impacts and the effectiveness of management and mitigation measures. Such reporting can be used to reinforce/augment Environmental and Social

[18] Specific: there is a clear definition of what is being tracked. Measurable: the indicator is quantitative; however, there may still be a valuable role for qualitative indicators in some circumstances. For example, at a site with BES features of lower sensitivity or importance, quantitative monitoring may not be needed. Achievable: it is practical to collect the necessary data and calculate indicator values. Relevant: the indicator helps answer the question being posed. Timely: the indicator is available in time to inform decisions, adaptive management and reporting.

[19] Alongside the closely-related frameworks of other Multilateral Financial Institutions.

Management System tools and practices (e.g. risk register and audits). It should inform the dialogue with relevant regulators and stakeholders. Where stakeholders are involved in collecting monitoring data (e.g. through citizen-science approaches) experience shows that timely, transparent and regular feedback on findings is essential for maintaining their motivation and interest.

*Company-level reporting*
Company-level reporting serves internal and external stakeholder information purposes and is based on company-level BES indicators including aggregated site-level indicators as appropriate. The outputs help to demonstrate a company's BES management performance.

The IPIECA guidance on voluntary sustainability reporting (IPIECA-API-IOGP, 2015) helps oil and gas companies develop and enhance the quality and consistency of sustainability reports. This guidance follows a six step process:

1. Articulate vision and strategy.
2. Describe governance and management systems.
3. Determine material issues.
4. Select indicators and collect data.
5. Analyse and interpret data and incorporate into a narrative.
6. Provide assurance.

The IPIECA guidance covers a range of environment, social and health issues. The most relevant to BES is indicator E5 which sets out how a company addresses the management of BES risks and opportunities within its global portfolio; this includes a descriptive narrative in addition to qualitative and quantitative indicators for both biodiversity and ES.

The GRI oil and gas sector guidelines include a core indicator, EN14, on 'Strategies, actions and plans for managing impacts to biodiversity'. Other GRI indicators also include aspects that are relevant for BES reporting.

## Verification and assurance

Verification is a fundamental step to achieve credibility and transparency with stakeholders and shareholders regarding the BES management, monitoring and reporting process, both at the site and company level.

*Site level*

- Driver: internal and external assurance that BES monitoring design and implementation are fit-for-purpose and are based on sound science, and that measurements are being interpreted correctly.
- Process: analysis of BAP components and their effectiveness.
- Goal: assessment of site-level performance in light of established BES targets (e.g. management and mitigation of potential and actual impacts and their related risks, no net loss/net gain where applicable).
- By whom: internal BES experts and third-party commentary from reputable external expert(s) (e.g. stakeholder panels, science-based conservation NGOs, universities, and scientific institutions).

*Company-level*

- Driver: internal and external assurance that company level BES monitoring and reporting is accurate, complete, transparent and consistent.
- Process: analysis of corporate BES indicators.
- Goal: assessment of corporate BES performance in light of corporate BES performance goals.
- By whom: internal analysts and third-party commentary from reputable external organizations (e.g. industry associations, intergovernmental organizations, NGOs, investors etc.)

## CASE STUDY

### Agip Oil Ecuador—effectiveness of integrated monitoring as part of a BES action plan: implementing good BES management practices in the sensitive environment of the Ecuadorian Amazon

*Situation*
Since 2000, Eni's subsidiary Agip Oil Ecuador (AOE) has been operating the Villano field in Block 10 on the western edge of the Ecuadorian Amazon. The operations consist of oil extraction, processing and transportation through two well pads connected via a 40-km flowline to the Central Processing Facility (Figure 12 on page 49).

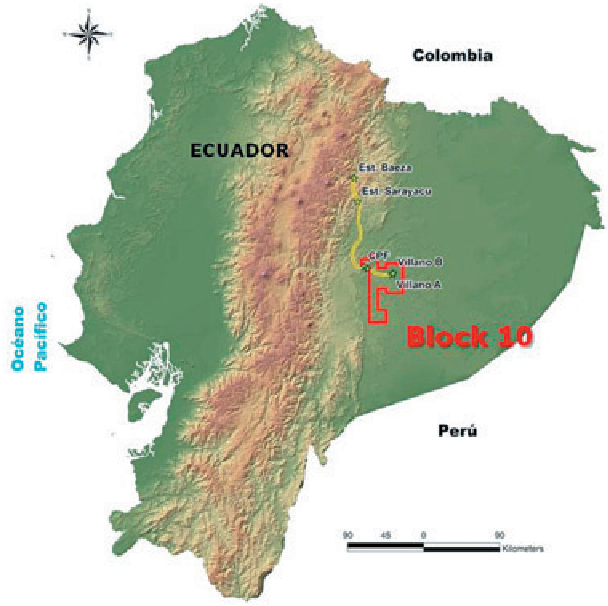
*Action*
Recognizing the high ecological and social value of the area, the company implemented environmentally-friendly technologies and good BES management practices to avoid and minimize impacts on the natural environment from the very beginning of the exploration phase. During the subsequent operational phase a specific BES survey and impact assessment was carried out in partnership with the international NGO Fauna & Flora International and the Pontificia Universidad Catolica del Ecuador, and in consultation with relevant national and local stakeholders. This survey responded in part to changes in the natural environment induced by rapid human colonization and uncontrolled exploitation of forest resources. It involved a scientific assessment of BES status and trends, identifying key drivers of environmental change and differentiating operational impacts from those caused by other human pressures.

Based on the survey results, a targeted BES Action Plan (BESAP) was implemented. Its specific objectives were to:

- effectively restore the identified, limited and localized primary impacts associated with the company's activities;
- monitor restoration outcomes and the impacts of other human pressures;
- provide a scientific basis for dialogue with relevant stakeholders on how to effectively address these impacts;
- evaluate the feasibility of implementing REDD+ schemes (reducing emissions from deforestation and forest degradation and assessing the role of conservation, sustainable management of forests and enhancement of forest carbon stocks) as an opportunity for BES conservation and enhancement; and
- inform AOE on timely identification of BES sensitivities and effective application of the mitigation hierarchy.

Site-level monitoring

Figure 12 Location of the Villano Field in Block 10, Ecuador




Monitoring, using SMART indicators, was a key component of both the BES survey, impact assessment and BESAP. An integrated monitoring approach enabled detection and measurement of BES changes over time and space, as well as identification and differentiation of impact sources. In particular:

- landscape level monitoring: performed by GIS analysis of satellite imagery spanning over 20 years, the landscape level monitoring identified the key components of the local ecosystems and the long-term drivers of change in forest pattern, forest cover and land use. It provided context and informed the site-level monitoring; and
- site-level monitoring: measured the edge effect, the disturbance gradient and the quality of water streams using a suite of floral (e.g. trees and ferns) and faunal (mammals, birds, insects and amphibians) species to evaluate the direct effects of company's facilities (e.g. presence of well pads and flowline) and activities compared to those associated with other human pressures (presence of settlements and public road, activities of local communities such as cattle

ranching, agriculture, hunting and logging). Site-level monitoring was also used to verify the effectiveness of restoration practices aimed at accelerating the recovery towards native forest.

*Outcome*
The combination of landscape and site-level monitoring proved to be effective in providing an accurate and dynamic picture of the natural environment where the company's operations are located, and in distinguishing and classifying impact sources and entities. Based on the outcomes of the monitoring and the evolution of the operational context, the BESAP is being periodically updated to ensure continuous improvement in BES management practices.

## CASE STUDY

### Yemen LNG (TOTAL Opco): the Balhalf Marine Biodiversity Monitoring Programme, Yemen, Indian Ocean

*Situation*
The Yemen LNG project comprises a new gas processing and liquefaction facility in Balhalf, on the south-central Yemen coastline. Baseline studies of the area concluded that the fish and coral communities were rich and diverse, with 79 different coral species and some colonies more than 400 years old. The main potential impacts were during construction from increase in seawater turbidity due to land preparation and shore activities.

*Action*
Aligned with its commitment to comply with IFC Performance Standards, the company undertook actions to maintain marine biodiversity and ensure protection of the corals and marine fish. A marine BAP was designed with mitigation measures and a monitoring programme. Key monitoring and indicators include daily site monitoring by marine contractors (water quality, qualitative coral conditions, etc.) and in-depth bi-monthly missions by international experts (coral health and diversity, relative to internationally-accepted statistical criteria). Regular verification missions are conducted by the Yemeni Authorities Monitoring Team. Together with an annual verification by an independent biodiversity committee, including IUCN experts, this allows validation of monitoring/reporting results and confirmation of any adaptive management needed.

The BAP began with project design optimization and then addressed construction and operations to preserve the marine environment and biodiversity in and around the site. Key actions included avoidance of impacts to coral communities through redesign of the Material Offloading

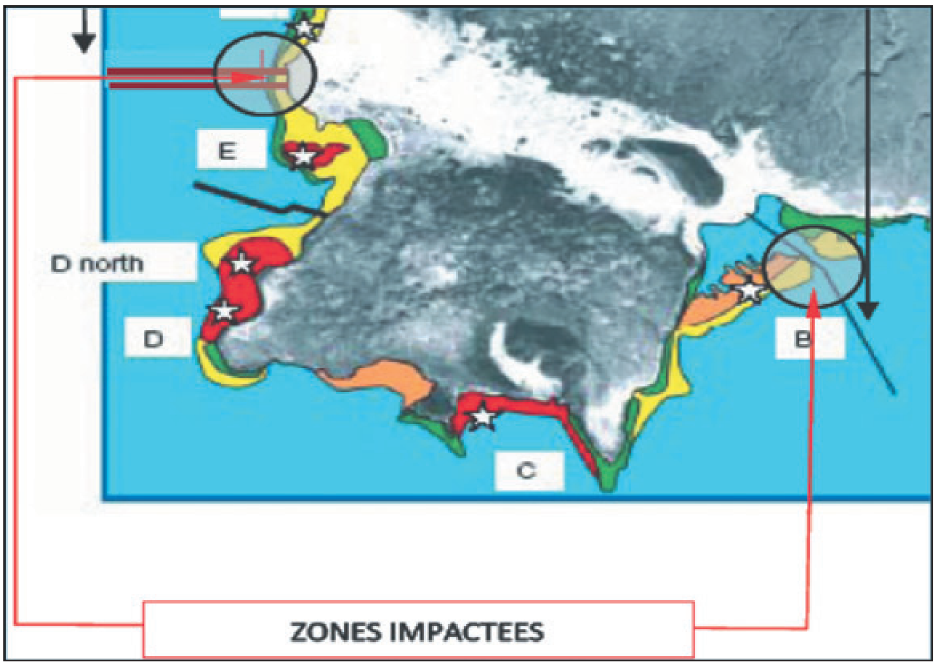



Figure 14 Coral values and impact areas

Coral monitoring

Facility, intake/outfall pipes and jetty and their relocation in areas with minimal possible damage to corals. Avoidance opportunities were informed by the detailed baseline monitoring data, with coral biodiversity values accurately mapped before construction. Mitigation of unavoidable impacts was managed through a coral transplantation programme with individual coral colonies removed from their habitat and relocated. Monitoring of coral survival rates demonstrated a survival rate of 80%, which was considered successful by experts.

*Outcome*

The BAP includes ES monitoring with fish abundance assessments in and around the project area: fish are a key source of protein for local communities. Monitoring results showed an actual increase in abundance of fish biomass in the project area due to certain fishing restrictions (for safety) in the immediate project area. This has served as a fish refuge, increasing surrounding stocks and benefiting fishing communities in the medium to long terms. Coral monitoring has a regional dimension, extending 30+ km eastward of Balhalf and linked in to the north Indian Ocean coral monitoring programmes. This broader seascape approach allowed a bleaching event that affected the site corals to be linked to a cyclical seawater heating event (possibly exacerbated by climate change).

Key lessons learned include the importance of a regional seascape approach to demonstrate non project-related impacts on coral biodiversity values and the opportunity to combine biodiversity and ES monitoring in one programme.

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# Glossary and list of acronyms

# Glossary

The definitions below are intended to clarify terminology commonly used during the management of BES. These are adapted from those used by CSBI, which draw primarily but not exclusively from the IFC Performance Standards and documents produced by the CSBI member associations. Useful additional directories and glossaries of terms are provided by UNEP-WCMC's 'Biodiversity A–Z' at www.biodiversitya-z.org.

| | |
|---|---|
| Additionality | A property of an impact or mitigation measure, where the outcomes are demonstrably new and additional and would not have resulted in other circumstances. |
| Avoidance | Measures taken to anticipate and prevent adverse impacts and related risks on biodiversity before actions or decisions are taken that could lead to such impacts/risks. |
| Baseline | A compilation and assessment of information on the biodiversity values occurring at a site, their current condition, and trends before a project commences. The state against which potential changes due to a project are assessed, and during and after project execution change is measured. |
| Biodiversity | Defined by the Convention on Biological Diversity (CBD) as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems'[20] |
| Biodiversity Action Plan (BAP) | A document or framework that outlines the set of actions to mitigate impacts on biodiversity, including if relevant biodiversity offsets or additional conservation actions. Leading practice BAP would include identification of resources needed to implement the actions, targets and timelines, and links to monitoring activities. |
| Cumulative impacts | Impacts resulting from the accumulation of demands or stresses on habitat, biodiversity, resources, or ES from multiple causes or activities. The impacts will exceed those that would result from any of the individual causes or activities.<br>Examples include:<br>• reduction of water flows in a watershed due to multiple withdrawals; and<br>• forest habitat damage due to the combination of logging, road building, resulting traffic and induced access. |

[20] www.cbd.int/convention/articles/default.shtml?a=cbd-02

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| Direct impacts | Impacts/risks that are a direct result of project activities or decisions; they are predictable, usually occur near to project activities, occur during the project lifetime, and are easily identified during planning and the ESHIA process. |
| Ecosystem services | Benefits people obtain from ecosystems:[21]<br>*Provisioning services:* the products people obtain from ecosystems; may include food, fresh water, timber, fibres, medicinal plants.<br>*Regulating services:* the benefits obtained from the regulation of ecosystem processes, including, for example, the regulation of climate, water and some human diseases.<br>*Cultural:* the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experience, including, for example, knowledge systems, social relations and aesthetic values.<br>*Supporting services:* services that are necessary for the maintenance of all other ES. These are fundamental natural process that underpin biodiversity and ecosystem function.<br>*Type 1 services:* those services on which projects and operations are most likely to have an impact and, therefore, could result in adverse impacts on affected communities[22].<br>*Type 2 services:* those services on which the project is directly dependent for its viability. |
| Indirect impacts | Those which result from interactions of a project/operation with social, economic, political and environmental factors and also with actors such as local communities, migrants, government and project personnel. Also known as induced impacts. |
| Minimization | Measures taken to reduce the duration, intensity, significance and/or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible. |
| Mitigation hierarchy | The sequence of actions to anticipate and avoid, and where avoidance is not possible, minimize, and, when impacts occur, restore, and where significant residual (biodiversity/ecological) impacts/risks remain, offset to affected communities and/or the environment. An alternative representation of the mitigation hierarchy is 'avoid/reduce/remedy'. |
| No net loss (NNL) | The point at which project-related impacts on biodiversity are balanced by measures taken according to the mitigation hierarchy on an appropriate geographic scale (e.g. local, ecosystem-level, national, regional). NNL may be assessed relative to underlying rates of loss. |
| Net gains (NG) | Additional conservation outcomes that can be achieved for the biodiversity values of an area. Net gains may be achieved through the implementation of on-the-ground programmes to enhance habitat, and protect and conserve biodiversity, or through the development of a biodiversity offset, when offsets are mandated by applicable host-country regulatory requirements, lender requirements (externally financed ventures) or emerge through the application of the mitigation hierarchy. NG may also be referred to as net positive impact. |

[21] www.millenniumassessment.org/documents/document.767.aspx.pdf

[22] From IFC Performance Standard 6.

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| Offset (BES offset) | Measurable conservation outcomes, resulting from actions applied to areas not impacted by the project, that compensate for significant, adverse project impacts that cannot be avoided, minimized and/or rehabilitated/restored. Some frameworks provide their own specific definitions, including in IFC PS6, the BBOP Standard on Biodiversity Offsets (p. 13) and Australia Government (Environment Protection and Biodiversity Conservation Act 1999: Environmental Offsets Policy 2012). |
| Perceived impacts | Impacts on biodiversity or ES that either do not actually occur or are unrelated to project activities but are thought by stakeholders to be caused by a project. |
| Protected area | A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ES and cultural values. |
| Rehabilitation | Measures taken to improve degraded ecosystems or re-establish cleared ecosystems following exposure to impacts that cannot be completely avoided and/or minimized. Rehabilitation emphasizes the reparation of ecosystem processes, productivity and services, whereas the goals of restoration also include the partial or complete re-establishment of the pre-existing biotic integrity in terms of species composition and community structure. |
| Residual impacts | Project-related impacts that remain after a variety of risk mitigation and management measures (i.e. avoidance, set-asides, management controls, abatement, rehabilitation etc.) have been implemented. The determination of residual impacts on biodiversity needs to take into account the uncertainty of outcomes due to implemented management and mitigation measures. |
| Restoration | In the context of this guidance, measures taken to establish a desired habitat type, biodiversity values and/or ES by restoring degraded or damaged ecosystems following project impacts that cannot be completely avoided and/or minimized. It does not imply or establish an expectation to reinstate a degraded ecosystem to the same state and functioning as before it was degraded (which is the meaning in some specific jurisdictions, and may be an impossibly challenging or costly task). Restoration may instead involve land reclamation or ecosystem rehabilitation to repair project impacts and return some specific functions and biodiversity features to the ecosystems concerned. |
| Stakeholders: | Individuals or groups that are directly or indirectly impacted by a project either by interest or by their capacity to influence the result of it in either a positive or negative way. Stakeholders can be both internal to a project or company, or an external body.[23] |

[23] ARPEL (2011). *Stakeholder Engagement Manual*. Corporate Social Responsibility Management System. Other similar definitions can be found in the American Petroleum Institute's *Community Engagement Guidelines*, and the IFC's *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets*.

# List of acronyms

| | |
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| ACA | Additional conservation actions. |
| AIS | Automatic Identification System. |
| ALARP | As Low As Reasonably Possible/Practical. |
| BAP | Biodiversity Action Plan. A Plan to manage potential risks to changes in biodiversity or ES arising from environmental aspects of assets and activities; it lists the actions to take to conserve or enhance biodiversity. |
| BES | Biodiversity and ecosystem services. |
| BESAP | BES Action Plan. |
| BOMP | Biodiversity Offset Management Plan. A plan to attain specific and additional off-site BES gains to compensate for residual impacts after on-site avoidance, minimization and restoration measures are taken into account. Needs to be informed by the BAP but is separate from it as it focuses on specific off-site site(s). |
| CAA | Conflict Avoidance Agreement. |
| CBD | Convention on Biological Diversity. |
| CIEEM | Chartered Institute of Ecology and Environmental Management. |
| CSBI | Cross-Sector Biodiversity Initiative: a partnership between ICMM, IPIECA and the Equator Principles Association. |
| EBI | Energy and Biodiversity Initiative. |
| EBRD PR6 | European Bank for Reconstruction and Development Performance Regulation 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources. |
| E&P | Exploration and production. |
| ES | Ecosystem services. |
| ELU | Ecological Landscape Units. |
| EMS | Environmental (and Social) Management System. |
| ESHIA | Environmental, Social and Health Impact Assessment. |
| ESHS | Environmental, Social, Health and Safety. |
| ESIA | Environmental and Social Impact Assessment. |
| EU | European Union. |
| FEED | Front-end engineering and design. |
| GIS | Geographic Information System. |
| GRI | Global Reporting Initiative. |
| IBAT | Integrated Biodiversity Assessment Tool. |
| IFC PS6 | International Finance Corporation *Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.* |

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| IPIECA | The global oil and gas industry association for environmental and social issues. |
| IOGP | International Association of Oil and Gas Producers. |
| ISO | International Organization for Standardization. |
| IUCN | International Union for Conservation of Nature |
| LNG | Liquid natural gas. |
| NBSAP | National Biodiversity Strategy and Action Plan. |
| NGO | Non-governmental organization. |
| NNL | No Net Loss. |
| NPI | Net Positive Impact. |
| OECD | Organisation for Economic Co-operation and Development. |
| SEP | Stakeholder Engagement Plan. |
| SMART | Specific, Measurable, Achievable, Relevant and Timely. |
| SPE | Society of Petroleum Engineers. |
| TBC | The Biodiversity Consultancy. |
| ToR | Terms of Reference (contractual/scope of work specification). |
| UN | United Nations. |
| UNEP | United Nations Environment Programme. |
| WBSCD | World Business Council for Sustainable Development. |
| WCMC | World Conservation Monitoring Centre. |
| WDPA | World Database on Protected Areas. |
| World Bank ESS6 | World Bank *Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.* |
| WRI | World Resources Institute. |
| VHF | Very-high frequency. |

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# IPIECA

IPIECA is the global oil and gas industry association for environmental and social issues. It develops, shares and promotes good practices and knowledge to help the industry improve its environmental and social performance, and is the industry's principal channel of communication with the United Nations.

Through its member-led working groups and executive leadership, IPIECA brings together the collective expertise of oil and gas companies and associations. Its unique position within the industry enables its members to respond effectively to key environmental and social issues.

IOGP International Association of Oil & Gas Producers

IOGP represents the upstream oil and gas industry before international organizations including the International Maritime Organization, the United Nations Environment Programme (UNEP) Regional Seas Conventions and other groups under the UN umbrella. At the regional level, IOGP is the industry representative to the European Commission and Parliament and the OSPAR Commission for the North East Atlantic. Equally important is IOGP's role in promulgating best practices, particularly in the areas of health, safety, the environment and social responsibility.

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