Introducing Spill Impact Mitigation Assessment (SIMA) for Oil Spill Strategy Development

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Introduction

A key objective for any oil spill response is to minimize the impacts to ecological, socio-economic and cultural resources at risk. To that end, the contingency planners and incident managers have traditionally utilized a formal or informal Spill Impact Mitigation Assessment or SIMA (previously known as Net Environmental Benefit Analysis or NEBA) for selecting the most appropriate response option(s) to minimize spill impacts and promote recovery. Although the response strategy development outcomes have been similar, the SIMA processes have varied considerably between operators leading to challenges with communicating the underlying basis of response strategies to stakeholders.

To address those challenges, the international oil industry associations (IPIECA, API and IOGP) have jointly developed an optional methodology for conducting a SIMA for oil spill response strategy development that is transparent, facilitates stakeholder involvement and clearly communicates the response strategy development process. A guidance document, "Guidelines on implementing spill impact mitigation assessment (SIMA)" (IPIECA-API-IOGP, 2017), describing this methodology was published by the three organizations in 2017.

The SIMA methodology developed by the joint project is intended to be qualitative and primarily applicable to larger or higher consequence oil spill scenarios where multiple response options are being considered and a formal SIMA is warranted. The ultimate objective is to identify the response option(s) that will best mitigate the overall ecological, socio-economic and cultural impacts of an oil spill.

SIMA Methodology Overview

The SIMA methodology incorporates the conceptual approach described in the "Response strategy development using net environmental benefit analysis" (IPIECA-IOGP 2015) and involves four stages:

1. **Compile and evaluate data** for relevant oil spill scenarios including fate and trajectory modelling, identification of resources at risk and determination of safe and feasible response options.
2. **Predict outcomes/impacts** for the "No Intervention" (or "natural attenuation") option as well as the effectiveness (i.e. relative mitigation potential) of the feasible response options for each scenario.
3. **Balance trade-offs** by weighing and comparing the range of benefits and drawbacks associated with each feasible response option, compared to No Intervention, for each scenario.
4. **Select the best response option(s)** to form the strategy for each scenario, based on which combination of techniques will minimize the overall spill impacts and promote rapid recovery.

The version of SIMA described herein does not quantify the potential impacts of an oil spill or to what extent response operations may reduce those impacts. Rather, it assesses the relative impact mitigation potential of candidate response options to inform the selection and prioritization of those that will most effectively minimize the overall consequences of a spill. It also provides a transparent framework to consider and balance the consequential trade-offs of using the feasible response options - recognizing their potential benefits, limitations and drawbacks - compared to the No Intervention option.

SIMA is intended primarily for use during the contingency planning process as it provides an unhurried, consensus-based approach that facilitates the incorporation of dialogue with relevant stakeholders. However, it can also be used during a spill response to:

- Validate or modify the contingency planning SIMA results, if conducted; or
- Perform an abbreviated SIMA that relies heavily on expert opinion or professional judgement

Stage 2: Predict Outcomes

The heart of the SIMA methodology lies in this stage where an assessment is made of the outcomes (i.e. relative impacts to resources at risk) for a planning or actual oil spill scenario, using No Intervention as a baseline. The feasible response options are then evaluated using a comparative matrix to assess their relative potential to either mitigate, exacerbate or not alter the No Intervention outcome for various resource compartments. The results are then used to qualitatively determine which options have the greatest potential to mitigate baseline impacts. Figure 1 provides an illustrative, step-by-step overview of how the comparative matrix is used to predict outcomes (i.e. relative response option impact mitigation potentials) for a moderately sized hypothetical surface crude oil spill.

Stage 3: Balance Trade-offs

Stakeholder involvement is particularly important in this stage where the impact trade-offs as well as the resource compartments, relative impact levels and modification factors for each option are discussed and adjusted in the matrix, if necessary, to adequately address their concerns. Additionally, prior to publication of the SIMA guidance document, the methodology was tested at, or presented to, stakeholders and industry representatives in workshops held in the U.S., Europe, Australia and Singapore wherein it was well received with only very minor modifications made as a result of their feedback.

Conclusion

This optional SIMA methodology developed by IPIECA, API and IOGP is qualitative and considers potential ecological, socio-economic and cultural impacts in support of oil spill response option selection and strategy development. The method assesses the potential impacts of a selected oil spill scenario to key resources at risk and the ability of feasible response options to mitigate the overall impact of the spill. It is a transparent and easily understood process and facilitates the engagement of, and inputs from, relevant stakeholders as well as their comprehension of the variables and trade-offs associated with various response options and the development of response strategies. The methodology has been tested by stakeholders in various countries around the world with very positive feedback. Consequently, it should be seriously considered for oil spill response option selection and strategy development for both contingency planning and actual spill incidents.

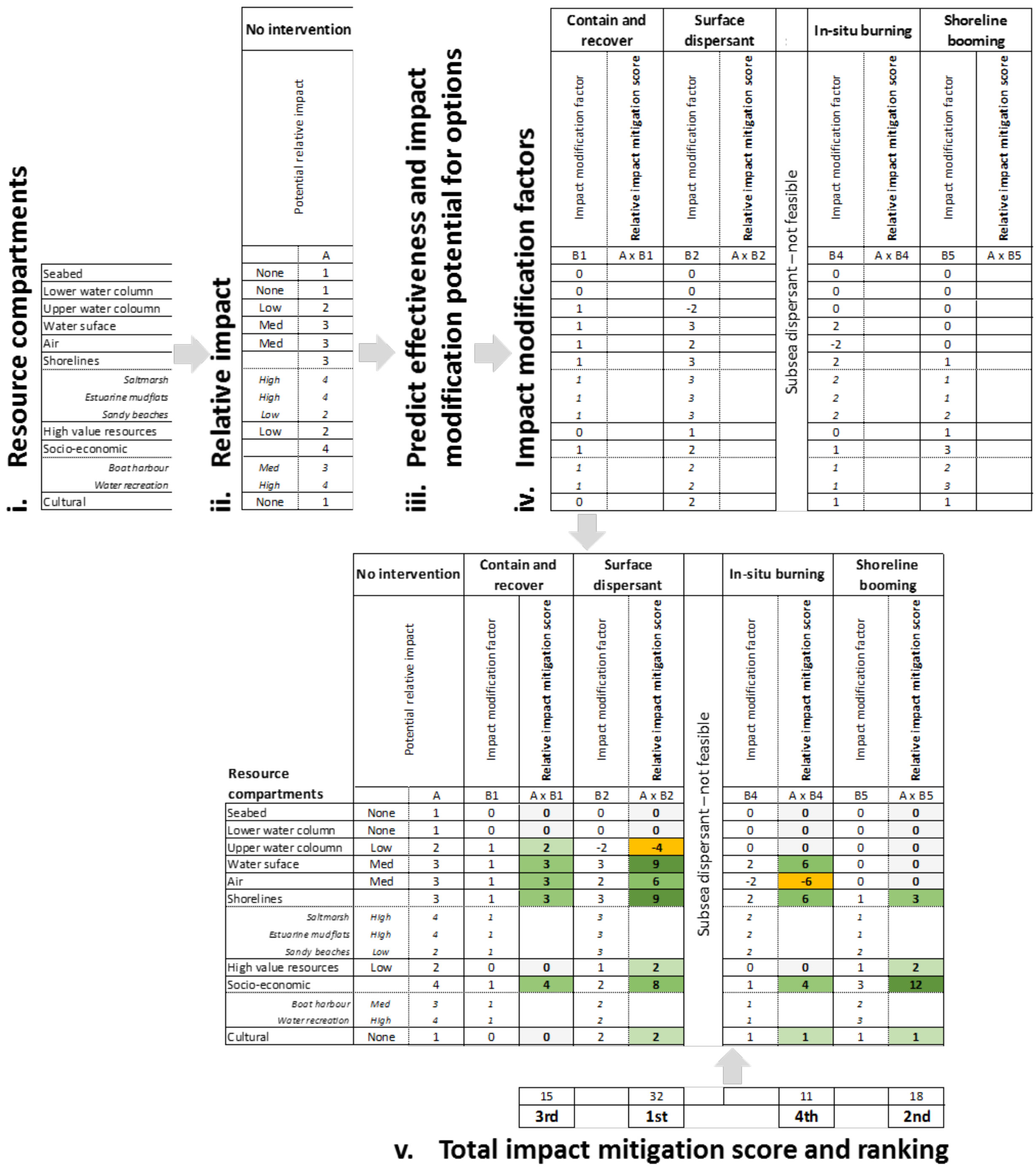

Figure 1 Overview of the Predict Outcomes (i to iii) and Balance Trade-offs (iv to v) stages

References

IPIECA-IOGP (2015). *Response strategy development using net environmental benefit analysis (NEBA).* IPIECA-IOGP Good Practice Guide Series, Oil Spill Response Joint Industry Project (OSR-JIP). IOGP Report Number 527.

IPIECA-IOGP-API (2017). *Guidelines on implementing Spill Impact Mitigation Assessment (SIMA)*