Oil Spill Response

Emerging Best Practices

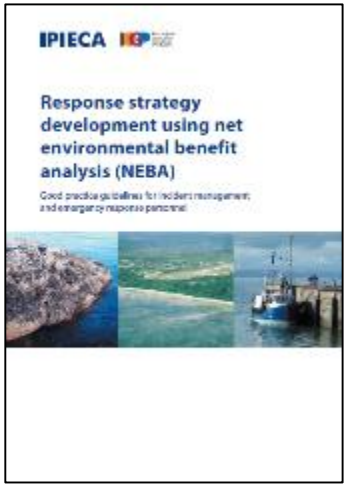
Ignatius Harta, Industry Outreach Manager - APAC

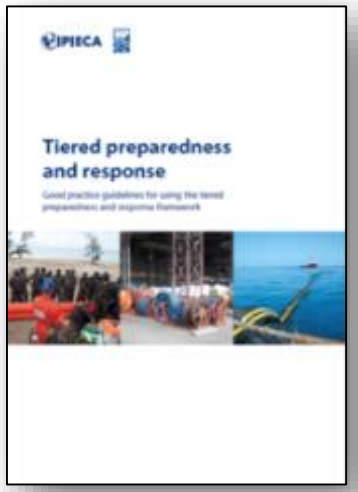
Content overview

Response Strategy & Options

NEBA/SIMA Concept and Applications

Tiered Preparedness and Response

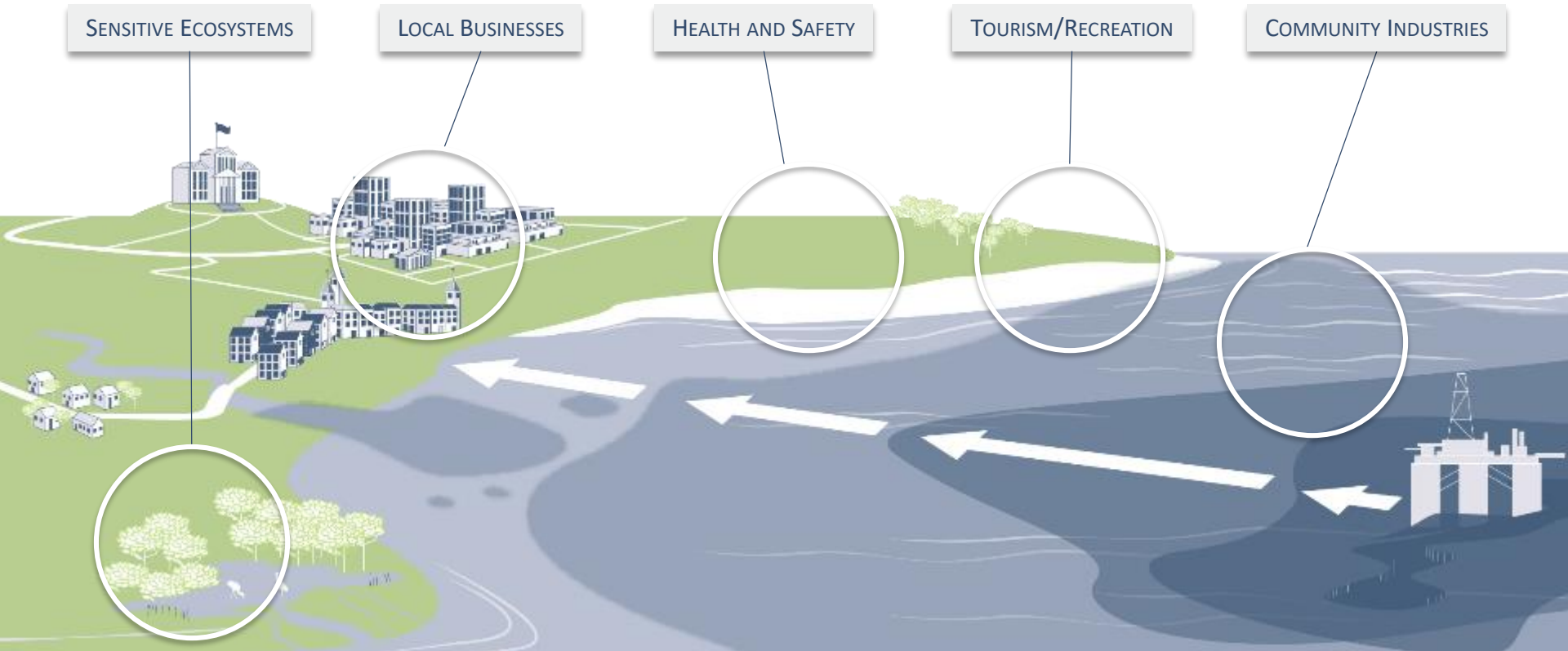




Combating the Spread of Spilled Oil

Our common enemy is the spread of spilled oil and its impact on our shared values

Protecting them is a race against time.



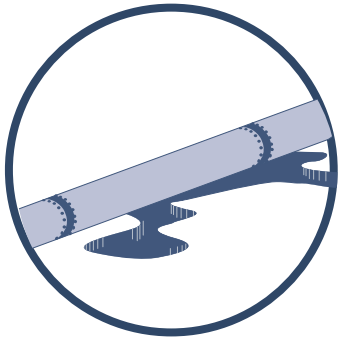
Response Options

Being prepared for the unlikely event of a spill, with strategies and tools to respond to different scenarios

Spill Scenarios

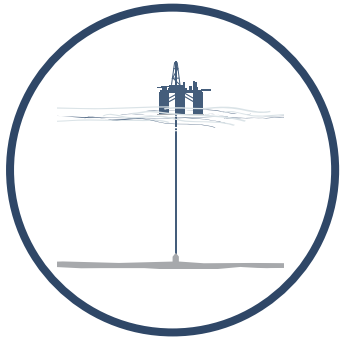
Offshore

Inland



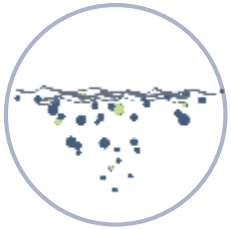
Onshore

Near Shore



Subsea

Response Tools



Dispersants

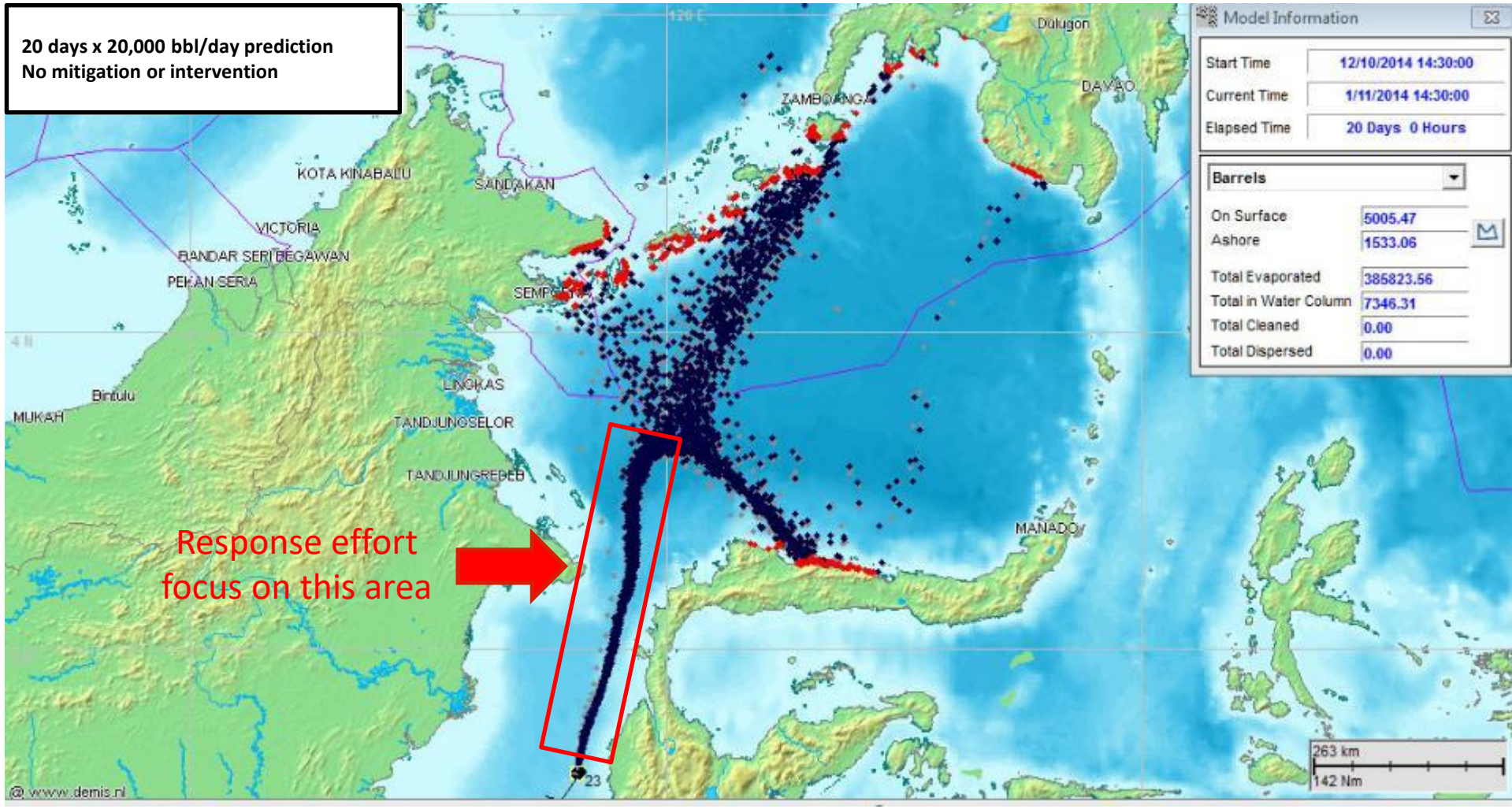
In-situ Burning

Mechanical Recovery

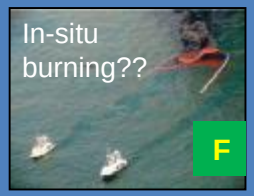
Physical Removal

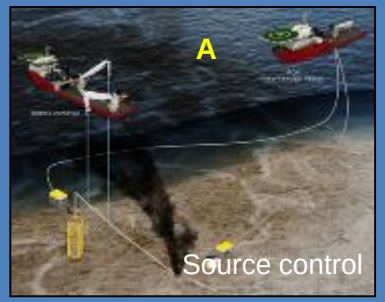
Natural Processes

Trajectory Modelling



Response Strategy





D E
Bongao Island
D E
Sitankai Island
Shoreline Resp. Div. 4
Shoreline Resp. Div. 2
Shoreline Resp. Div. 3
C
C
Pulau Tarakan
Malaysia Boundary
Philippines Boundary
Celebes Sea
C
East Kalimantan
Shoreline Resp. Div.. 1
D E
Gorontalo
B
F
A
BPN Airport
Balikpapan
Mutiara Airport
Gulf of Tomini
Central Sulawesi
Makassar Strait
Exclusion zone
Data SIO, NOAA, U.S. Navy, N
Sulawesi (Celebes)
Image Landsat

Spill Impact Mitigation Assessment (SIMA)

New IPIECA-IOGP Good Practice Guidance

Net Environmental Benefit Analysis **(NEBA)**

transitioning to

Spill Impact Mitigation Assessment **(SIMA)**

- Better reflects objectives, decision framework and shared environmental values
  i.e. ecological, socio-economic and cultural
- Removes perceptions of spin associated with the word ‘benefit’

SIMA is also a <u>methodology</u> for NEBA that is:

- *Transparent*
- *Holistic*
- *Qualitative*
- *Even-handed*
- *Flexible*

Principles unchanged

4 Stages of SIMA

Stage 1: Evaluate data

- A selection of credible potential release scenarios is chosen.
  - Oil fate and trajectory modelling is undertaken, and data on ecological, socio-economic and cultural resources evaluated.
    - Resources at risk are determined, and the feasible response options identified.

Stage 2: Predict outcomes

- The potential relative impact of the spill on each resource at risk is assessed for the 'no-intervention' option.
- A preliminary prediction is made of how each feasible response option will modify the impact when compared with no intervention.

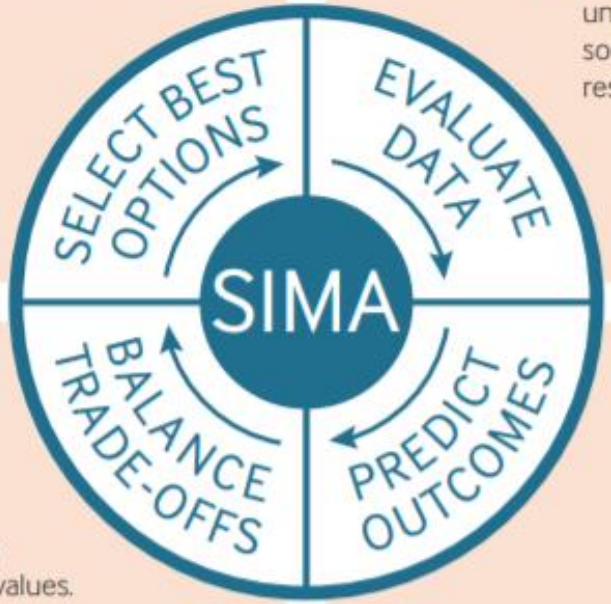
Stage 3: Balance trade-offs

- Dialogue with key stakeholders provides the opportunity to explain potential trade-offs or to obtain new inputs on resource sensitivities and values.
- The total impact mitigation score and ranking for each response option is agreed.

Stage 4: Select best options

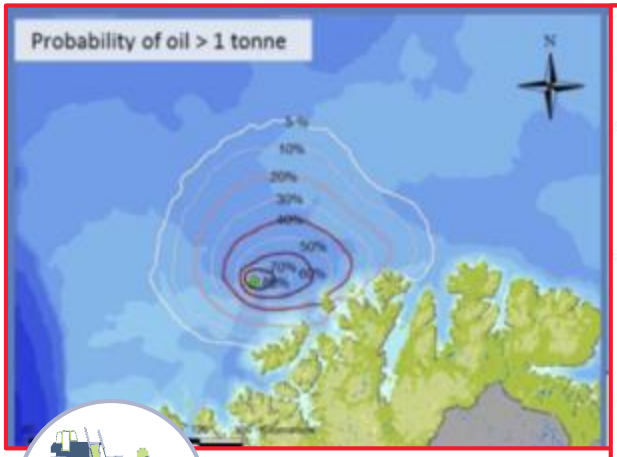
The best combination of response options is selected to create an appropriate reponse strategy. It is recommended that SIMA utilizes the complete response toolkit, including:

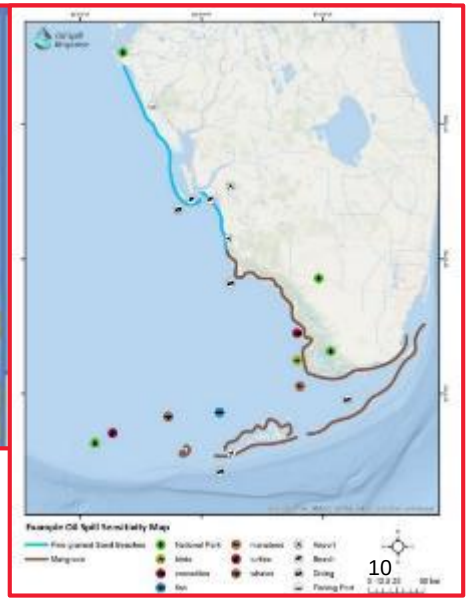
- No intervention
- At-sea containment and recovery
- Surface dispersant
- Subsea dispersant
- Controlled in-situ burning
- Shoreline booming



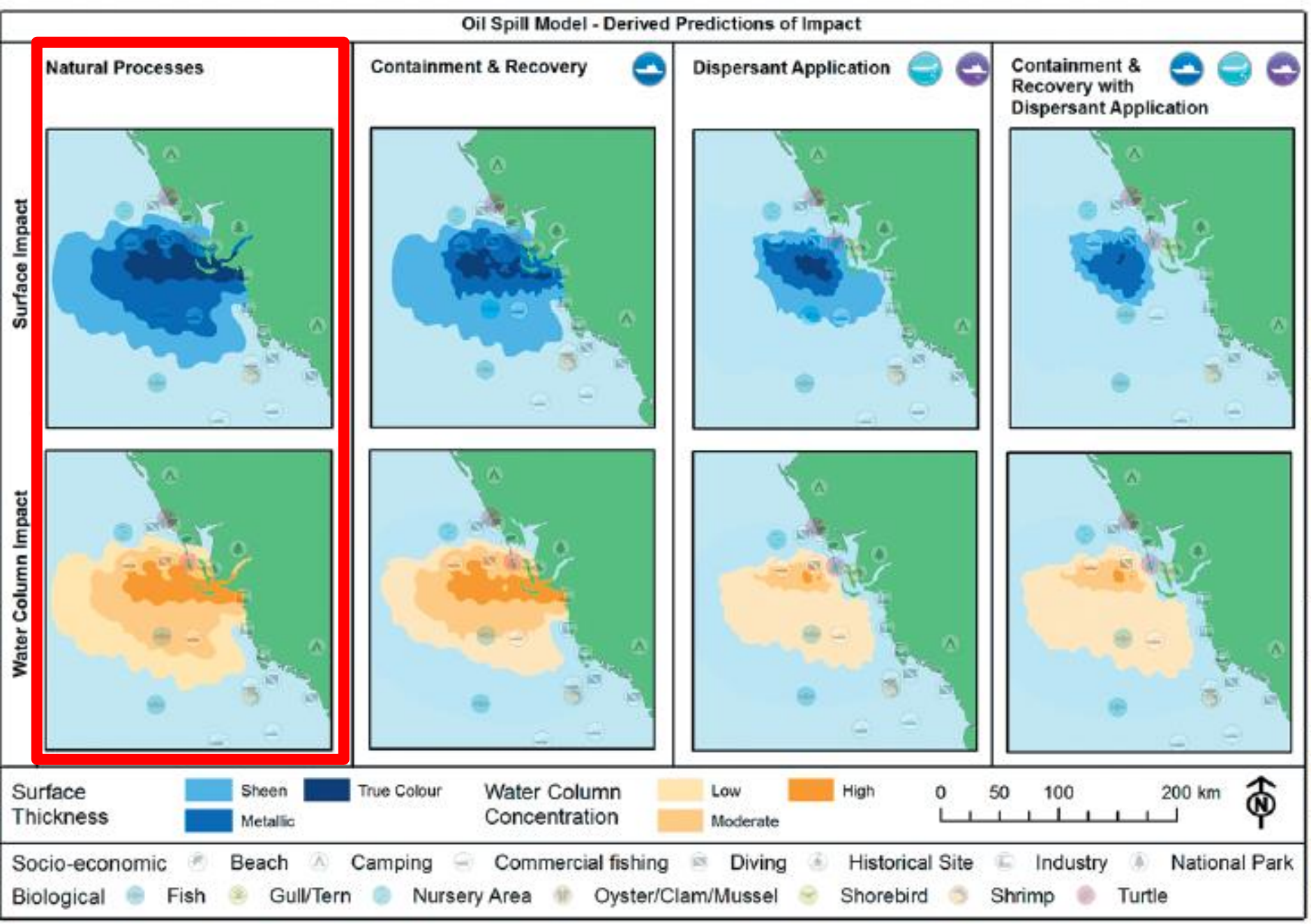
Compile and evaluate data ▶ Predict outcomes ▶ Balance trade-offs ▶ Select best option(s)

- Know your oil
- Model fate and trajectory
- Sensitivity data/map
- Identify potential response options:
  - Effectiveness
  - Feasibility
  - Regulations

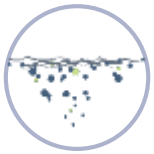




Compile and evaluate data ▶ **Predict outcomes** ▶ Balance trade-offs ▶ Select best option(s)



Compile and evaluate data ▶ Predict outcomes ▶ **Balance trade-offs** ▶ Select best option(s)

	Benefits	Drawbacks
Dispersants 	• Removes surface oil that could harm wildlife and keeps oil from spreading to shoreline; enhances natural biodegradation of oil and reduces vapors on water surface	• Dispersed oil has the potential to initially affect local water column-dwelling wildlife and vegetation
Mechanical Recovery 	• Removes oil with minimal environmental impact	• Mechanical recovery can be inefficient, resource-intensive, and restricted by water conditions, with typically no more than 10-20 percent oil recovery
In-Situ Burning 	• Removes large amounts of oil rapidly via controlled burning	• Burning presents a potential safety risk and localized reduction of air quality; burn residue can be difficult to recover
Physical Removal 	• Selectively restores environmental and social value to specific locations using a variety of tools	• Aggressive or inappropriate removal methods may impact ecosystems and individual organisms
Natural Processes 	• Takes advantage of natural processes for oil removal, including biodegradation, and avoids intrusive cleanup techniques that may further damage the environment	• Natural removal can take more time to achieve pre-spill use than other response techniques

Compile and evaluate data ▶ Predict outcomes ▶ Balance trade-offs ▶ **Select best option(s)**

Primary Goal of Oil Spill Response

Maximize Encounter Rates and Effectiveness…

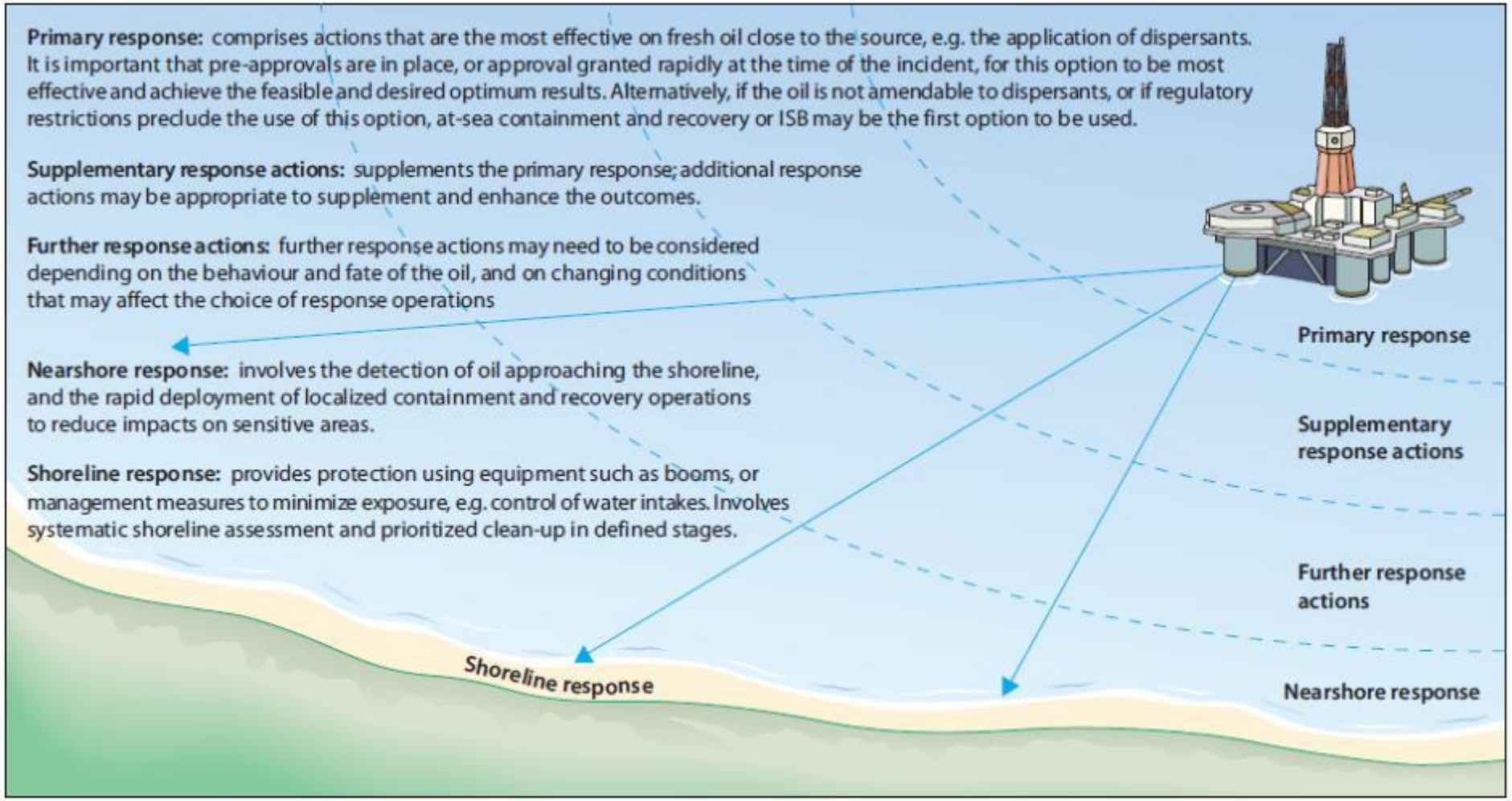
…to Minimize Impact

Which strategy will remove the most oil?? + Regulatory Compliance

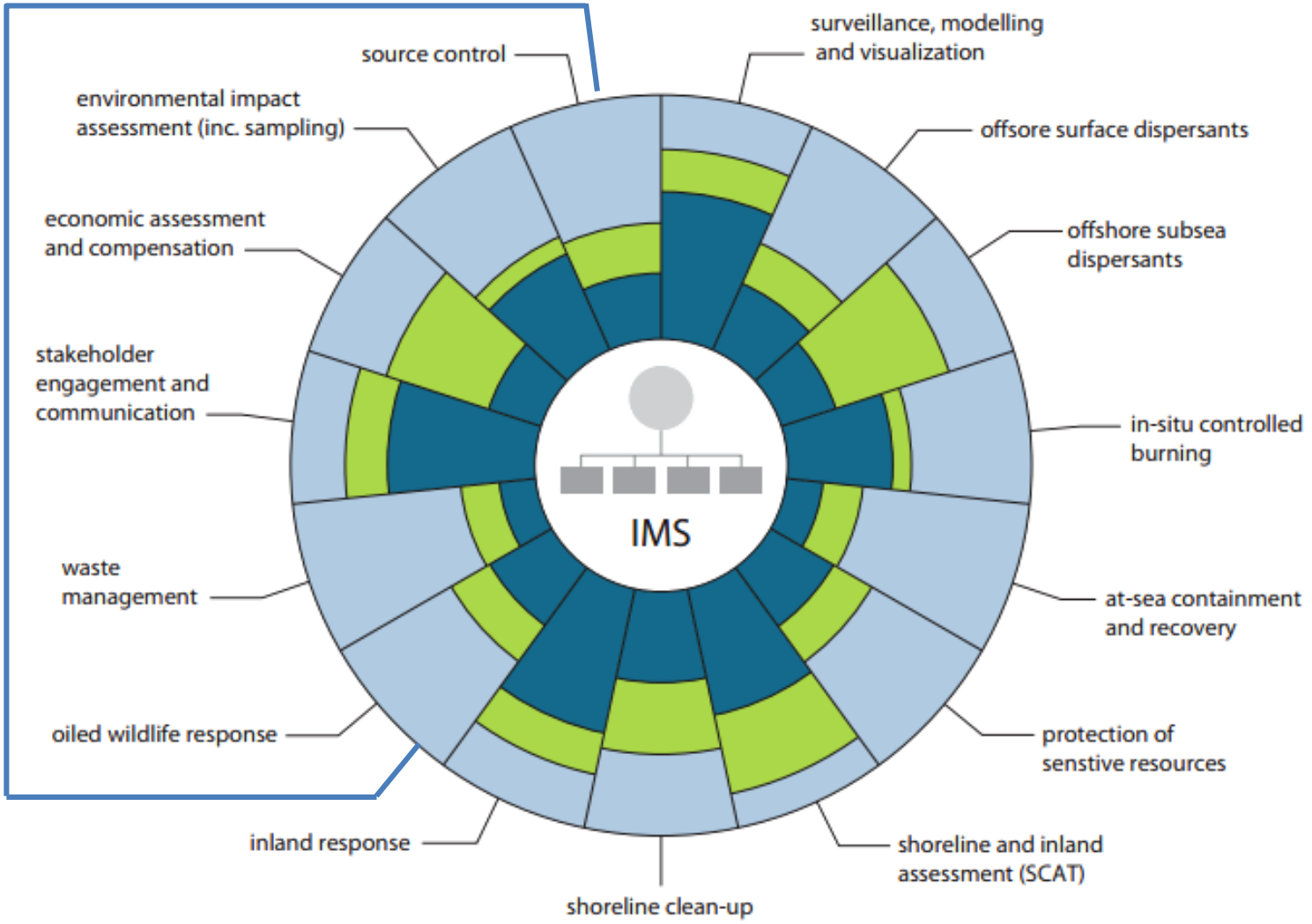
Agreed outcomes on a matrix

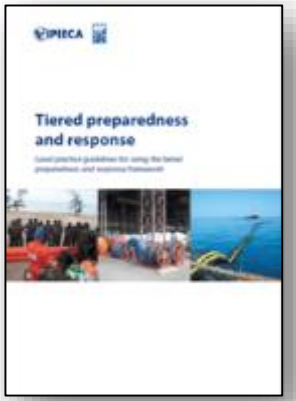
RESOURCE COMPARTMENTS		NO INTERVENTION	CONTAINMENT AND RECOVERY		SURFACE DISPERSANT		SUBSEA DISPERSANT		CONTROLLED IN-SITU BURNING		SHORELINE BOOMING	
		Potential relative impact	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score
		A	B1	A x B1	B2	A x B2	B3	A x B3	B4	A x B4	B5	A x B5
Seabed	Low	2	0	0	0	0	-1	-2	0	0	0	0
Lower water column	Low	2	0	0	0	0	-2	-4	0	0	0	0
Upper water column	Low	2	0	0	-2	-4	3	6	0	0	0	0
Water surface	Medium	3	1	3	2	6	3	9	2	6	0	0
Air	Low	2	1	2	2	4	3	6	1	2	0	0
Shorelines		3	1	3	2	6	3	9	1	3	0	0
Wetland	*High*	*4*	*1*		*2*		*3*		*1*		*0*	
Rocky shores	*High*	*4*	*1*		*2*		*3*		*1*		*0*	
Sandy beaches	*Low*	*2*	*1*		*2*		*3*		*1*		*1*	
Socio-economic		4	1	4	2	8	2	8	1	4	2	8
Coastal tourism	*High*	*4*	*1*		*2*		*3*		*1*		*2*	
Inshore aquaculture	*High*	*4*	*1*		*2*		*3*		*1*		*3*	
Mid-water fisheries	*Low*	*2*	*0*		*0*		*-2*		*0*		*0*	
Desalination intake	*High*	*4*	*1*		*2*		*3*		*1*		*3*	
Maritime recreation	*High*	*4*	*1*		*2*		*3*		*1*		*0*	
Cultural	Medium	3	1	3	2	6	3	9	1	3	1	3
Total impact mitigation score:				15		26		37		18		11
Ranking:				**4th**		**2nd**		**1st**		**3rd**		**5th**

Optimized Response Options



Response Resources





Summary

- Qualitative process - relies heavily on expert / professional judgement
- Understanding of the potential effects of a spill on environment and other resources
- Help to evaluate various response options
- Address potential trade-offs for different response strategies

- Overcome barriers during a response
- Government and industry working together cooperatively

Thank You

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