Structured decision making in the Great Barrier Reef

30 October 2017

Peter Hemphill – Open Lines Consulting

OPENLINES
Environmental consulting

Making good environmental decisions requires more than good science and a faithful application of the rules

OPENLINES
Environmental consulting

Port of Hay Point

- Established as a coal Port in 1971
- 7 berths, up to 3.8km offshore

- 9 Mm^3 capital campaign in 2006
- Channel approximately 9km long
- Apron approximately 4km long

Hay Point

Structured Decision Making: A Practical Guide to Environmental Management Choices

Robin Gregory

Lee Failing

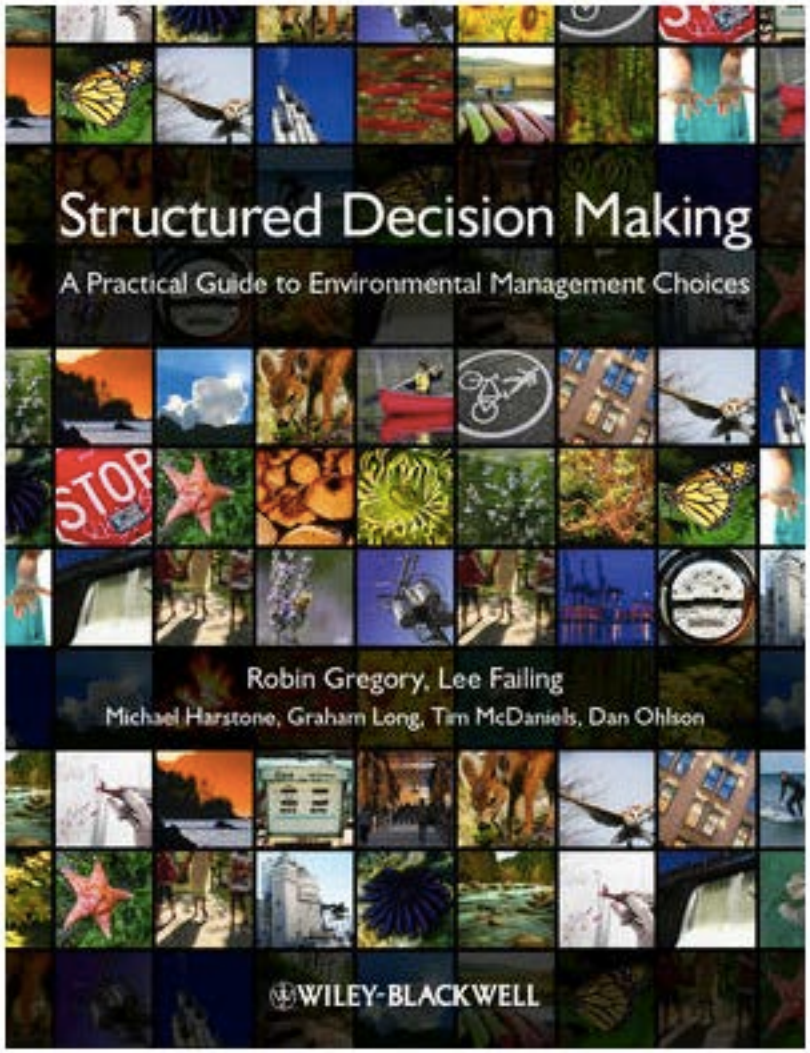
Michael Harstone

Graham Long

Tim McDaniels

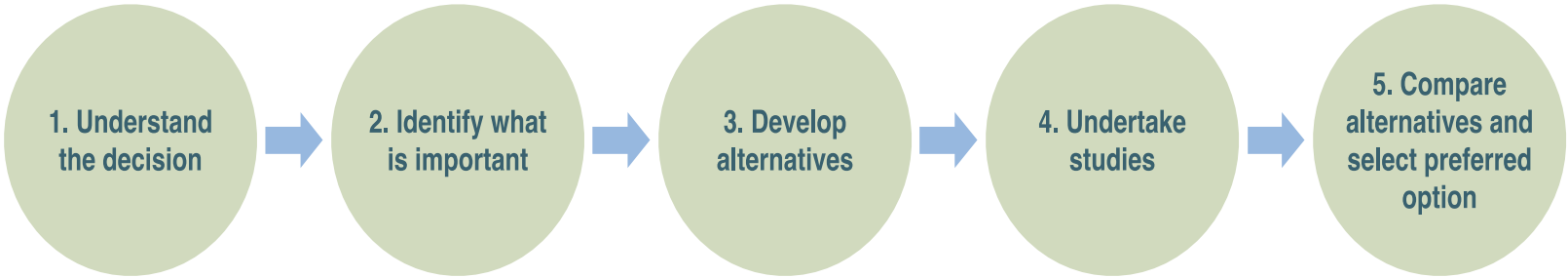
Dan Ohlson

(2012)



OPENLINES
Environmental consulting

"Founded on the idea that good decisions are based on an in-depth understanding of both values (what's important) and consequences (what's likely to happen if an alternative is implemented)"

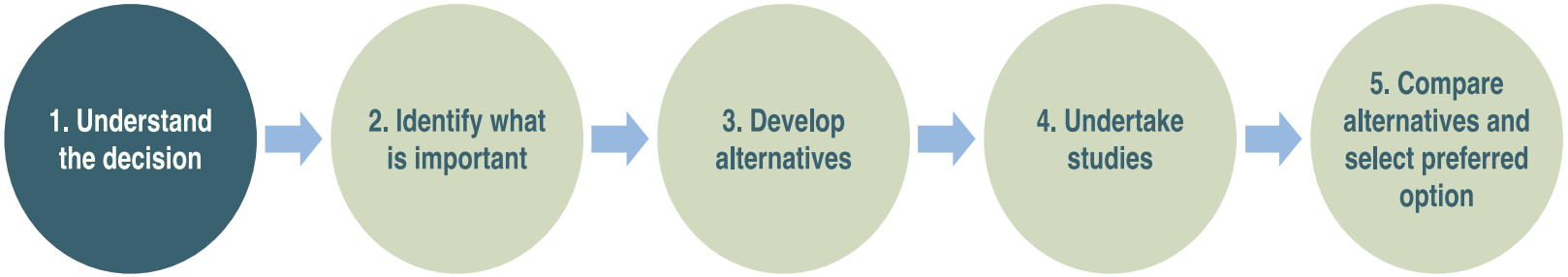


OPENLINES
Environmental consulting

Step 1: Understand the decision

If dredging is required, what are the feasible options for use or disposal of the material?

What is the best package of measures to provide for long term sustainable management of marine sediments at the Port of Hay Point?



OPENLINES
Environmental consulting

Step 2: Identify what is important

OBJECTIVES

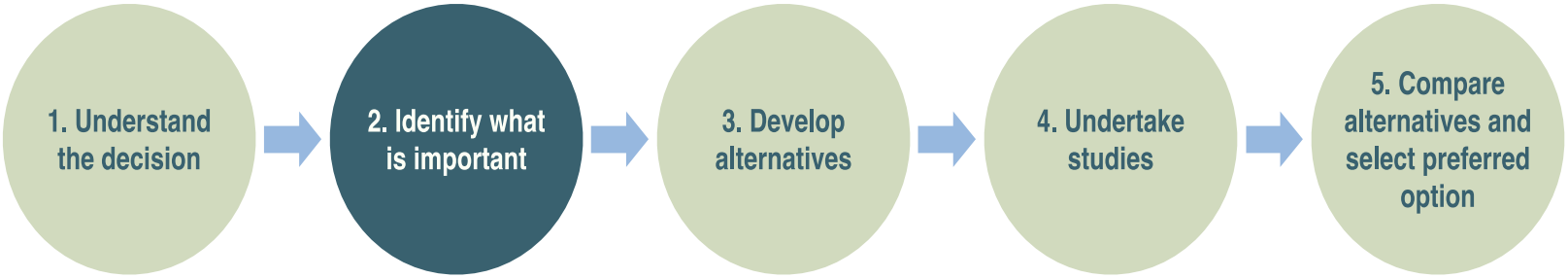
The things that matter to stakeholders

Stated even if hard to measure or contradictory

PERFORMANCE MEASURES

Enable comparison of alternatives against objectives

Defining the right measures is critical, but can be a difficult



Themes	Decision making objectives
ENVIRONMENT	**1. Avoid and minimise impacts to coastal ecosystems**
	2. Minimise carbon emissions
CULTURAL HERITAGE	**3. Minimise impact on cultural heritage within the area**
PORT ECONOMICS & OPERATION	**4. Maintain effective and efficient port operations**
	5. Ensure solution is cost effective
	6. Avoid significant loss of future port expansion opportunities
HEALTH & SAFETY	**7. Avoid or mitigate health and safety risks**
SOCIAL	**8. Minimise interference to social activities within the region**
	9. Provide increased economic and social opportunities
INNOVATION	**10. Promote innovation in port management**
WORLD HERITAGE	**11. Avoid and minimise impacts to the Great Barrier Reef World Heritage Area**

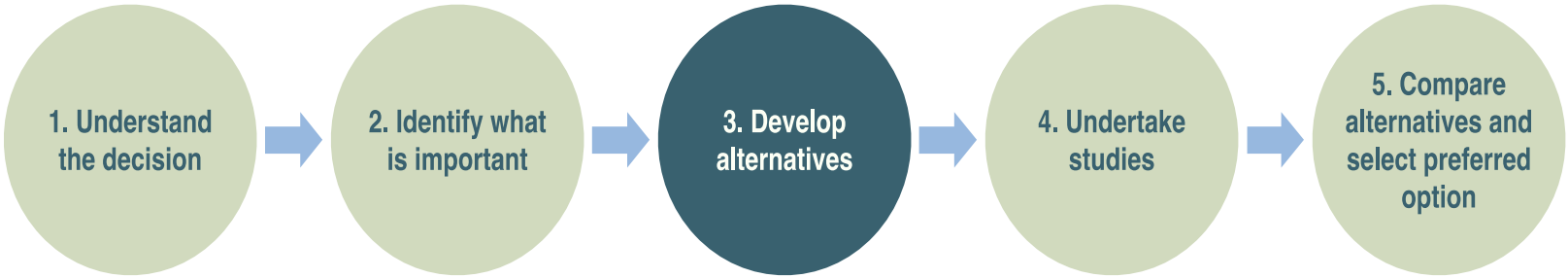
Step 3: Develop alternatives

It is useful to look at a range of different alternatives

Alternatives can be a mix of actions

Alternatives should not be limited by precedent or traditional thinking

New alternatives can be developed as the process moves along



OPENLINES
Environmental consulting

Step 3: Alternatives for dredge disposal

Alt 1 – Reclamation Hay Point

Alt 2 – Reclamation Port of Mackay

Alt 3 – Mangrove Rehab

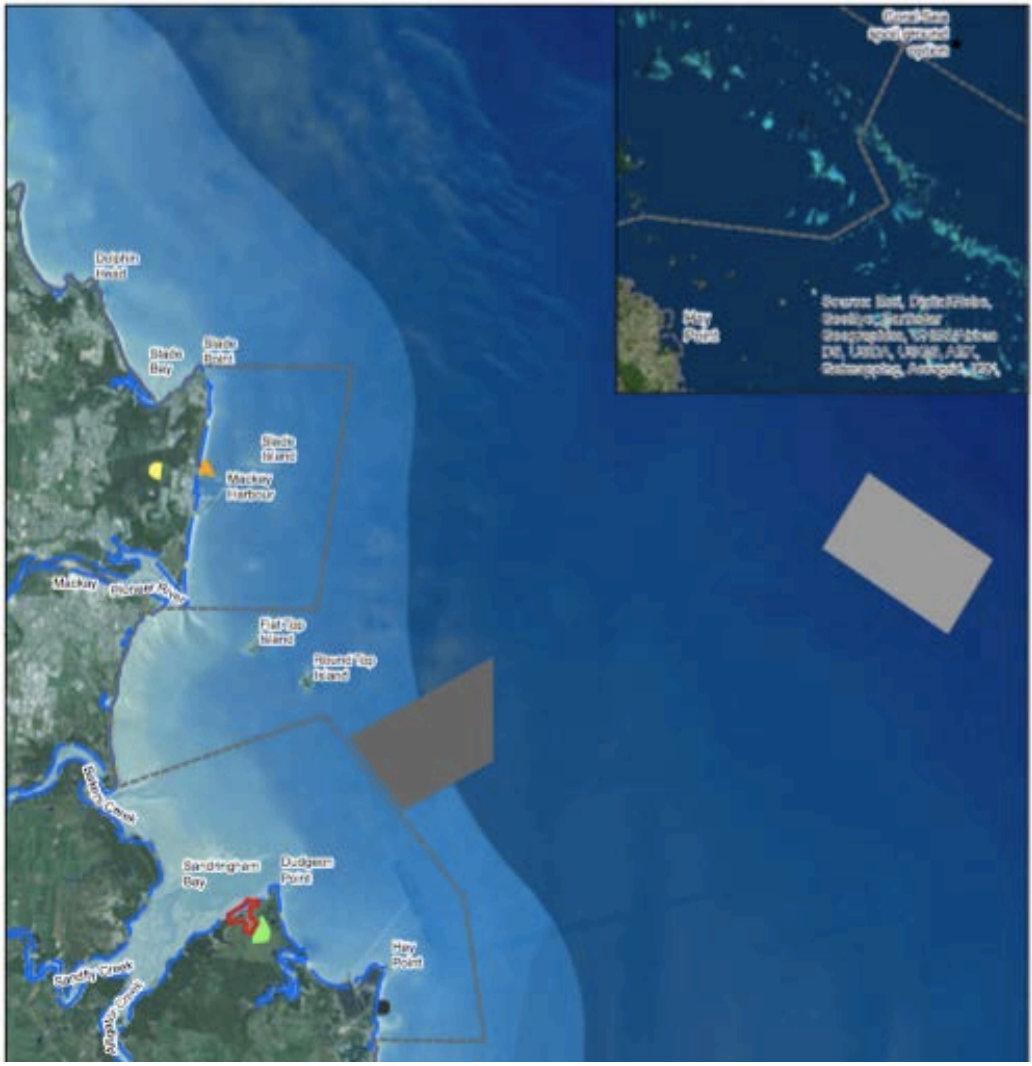
Alt 4 – Onshore Dudgeon Point

Alt 5 – Onshore Port of Mackay

Alt 6 – At-sea Existing

Alt 7 – At-sea Midshelf

Alt 8 – At-sea Coral Sea



OPENLINES
Environmental consulting

Step 4: Compare alternatives

Theme	Objectives	Performance measure	Units	Dir	1 Exist + 4 Rec HP	1 Exist + 1 Mangr + 3 Exist	1 Exist + 1 Mangr + 3 Rec HP	1 Exist + 1 Mangr + 3 DP	1 Exist + 4 DP	1 Exist + 1 Mangr + 3 Onshore Mack	1 Exist + 4 Onshore Mack	5 Exist	5 Mid-shelf	1 Exist + 4 Coral
ENV	1. Avoid and minimise impacts to coastal ecosystems	A) Coastal ecosystems performance	20-80	H	22	40	34	43	34	40	30	30	40	38
		B) Water quality performance	0-105	L	6	24	6	6	6	6	6	30	5	6
	2. Minimise carbon emissions	C) GHG emissions	(tCO2-e)	L	27,777	4,146	28,656	11,303	10,424	9,544	9,053	3,090	5,060	32,018
CULTUR	3. Minimise impact on cultural heritage within the area	D) Cultural heritage performance	15-45	L	19	15	18	21	23	21	23	15	15	15
ECON	4. Maintain effective and efficient port operations	E) Port disruption	Days	L	106	76	103	103	106	127	138	70	115	78
	5. Ensure solution is cost effective	H) Cost	$ millions (present value)	L	$25.73	$7.57	$20.76	$17.33	$20.72	$16.13	$14.49	$4.38	$7.11	$42.93
	6. Avoid significant loss of future port expansion opportunities	I) SPL area affected	ha	L	40	20	60	70	50	70	50	0	0	0
H&S	7. Avoid or mitigate health and safety risks	J) Relative risk	8-24	L	16	10	16	15	15	16	16	8	11	15
SOCIAL	8. Minimise interference to social activities within the region	K) Social performance	15-45	L	27	15	24	15	15	27	31	15	15	15
	9. Provide increased economic and social opportunities	L) Employment	FTE jobs created	H	0.3748	0.1032	0.428	0.344	0.3008	0.2224	0.1792	0.05	0.1	0.038
INNO	10. Promote innovation in port management	M) Innovation	15-45	H	15	20	20	20	15	20	15	15	25	23
WH	11. Avoid and minimise impacts to the Great Barrier Reef World Heritage Area	N) World Heritage performance	15-45	H	22	32	26	38	38	35	34	30	25	34

Step 5: Compare alternatives & select option

	Rec - HP	Rec - M	Rehab	Onshore - DP	Onshore - M	Existing	Mid-shelf	Coral sea
Equal weights	42	40	70	53	43	75	73	65
Environment focus	36	40	89	62	59	67	75	68
Social focus	65	46	62	75	35	58	58	54
Economic focus	39	39	58	46	38	89	80	66
Cultural focus	72	72	92	63	60	93	93	91
WHA	39	29	83	60	57	66	56	72

Best score for an option under a particular weighting scenario

Second best score for an option under a particular weighting scenario

Worst score for an option under a particular weighting scenario

OPENLINES
Environmental consulting

Western Sydney Strategic Assessment

Next 30 years of development in Sydney

Biodiversity is already highly cleared and fragmented

Land is astronomically expensive

Housing in Western Sydney is one of Australia's big political issues

State and Commonwealth environmental laws

What is the optimal biodiversity outcome for Western Sydney that will enable planned development to proceed in an affordable and sustainable way?

OPENLINES
Environmental consulting

Wrap up

Framework for dealing with complex problems

Deals with competing objectives

Trade-offs at the end

Collaborative and creative

Incorporates science and values

Can be applied at different scales

OPENLINES
Environmental consulting

Acknowledgements

Tom Kaveney

Adaptive Strategies

Kevin Kane

North Queensland Bulk Ports

OPENLINES
Environmental consulting

Questions?

Peter Hemphill

Director

Open Lines Consulting

Website: openlines.com.au

Ph: 0414 709 744

Email: peter@openlines.com.au

OPENLINES
Environmental consulting