Prioritization of projects, understanding monitoring and environmental offsets

Dr. Scott Whiting

Department of Biodiversity, Conservation and Attractions,

Western Australian Government, Australia

Scope

Take Home

1. Introduction

2. Prioritisation of projects

- Conservation is complex and there are more tasks than there is money or time

3. **Monitoring**

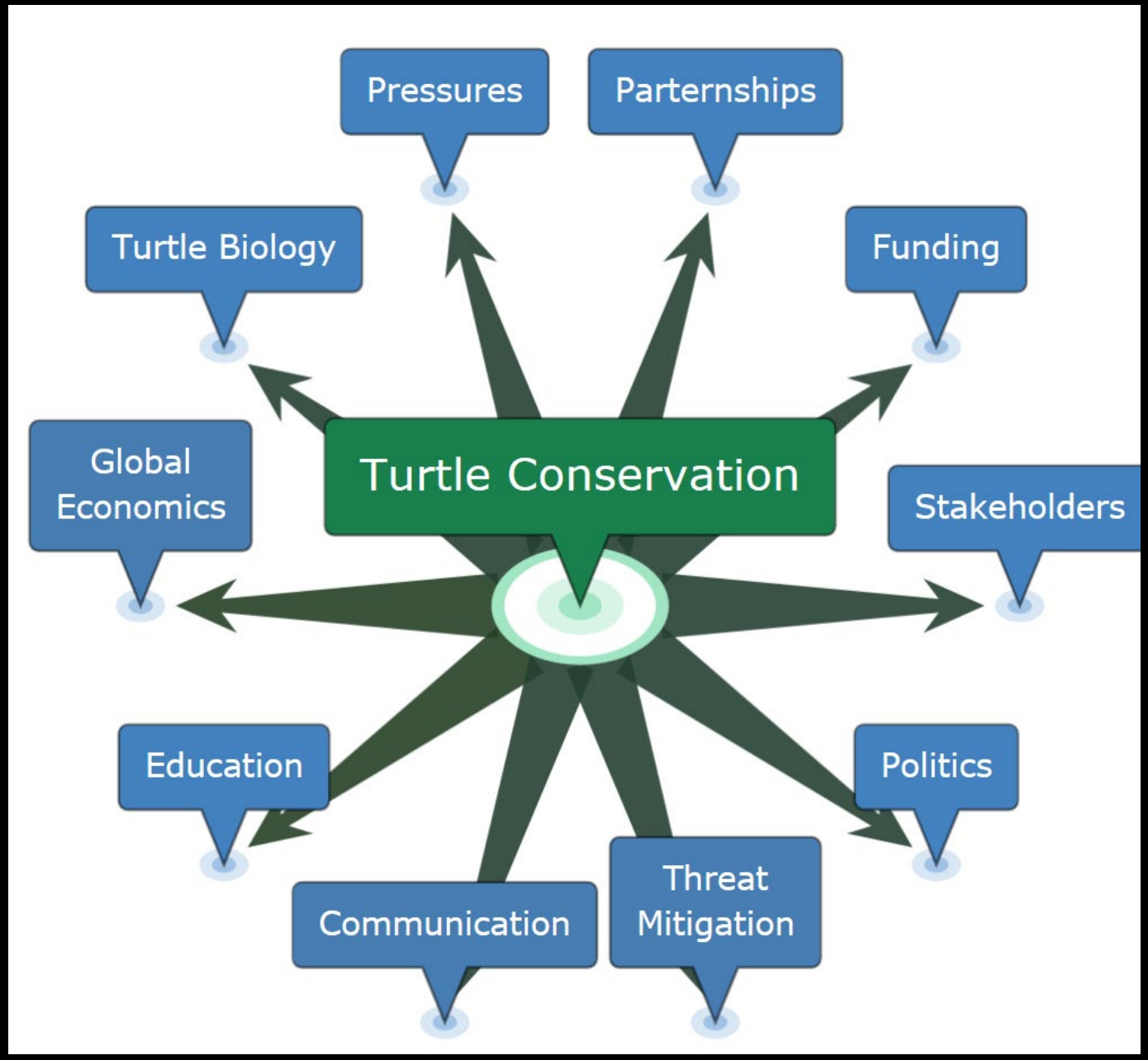
What is monitoring?, effectiveness and efficiency

4. Offsets – long term funding

- Understand biodiversity offsets and how they could be a mechanism for conservation.

5. Conclusion

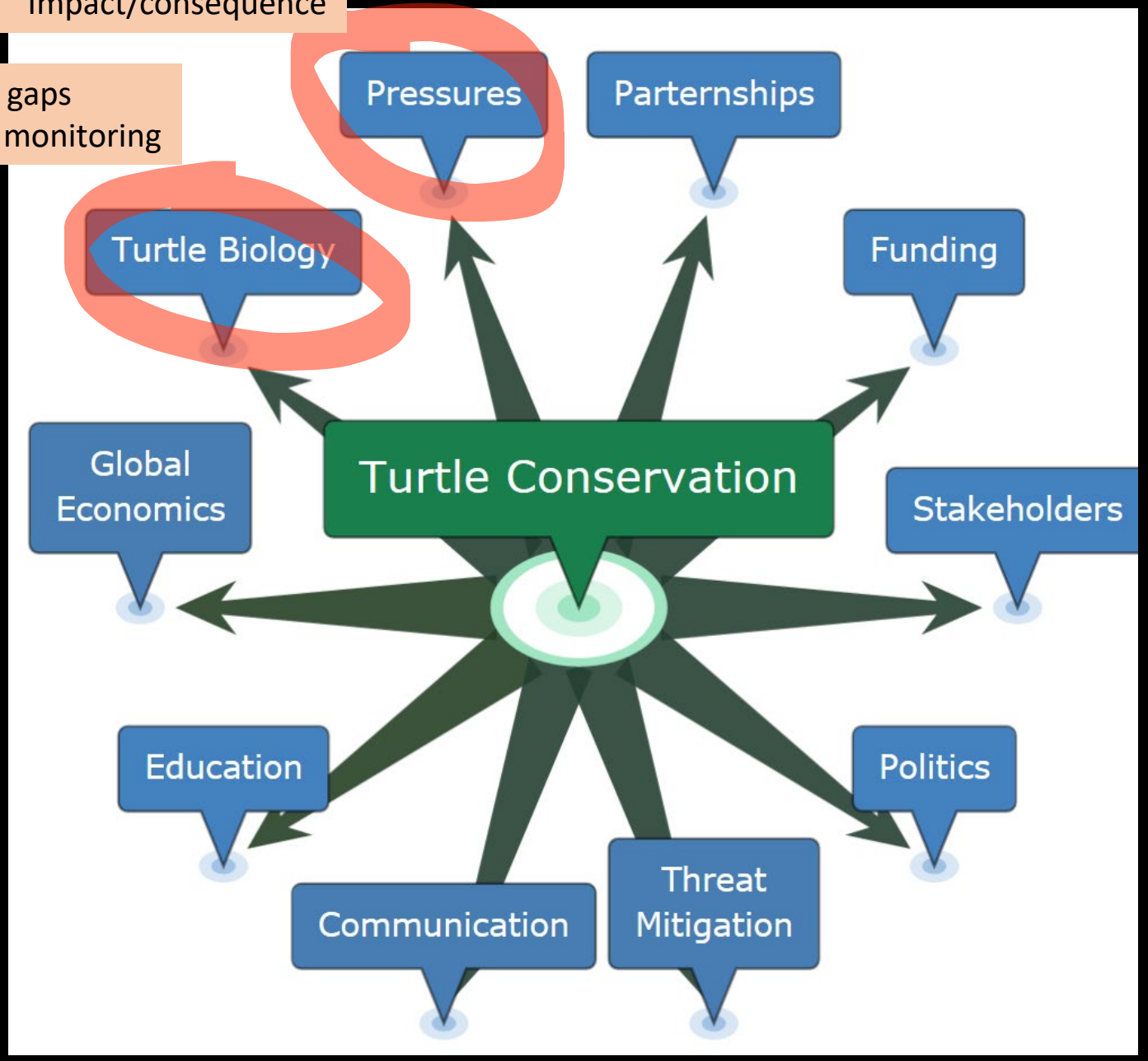
Introduction - Project Management



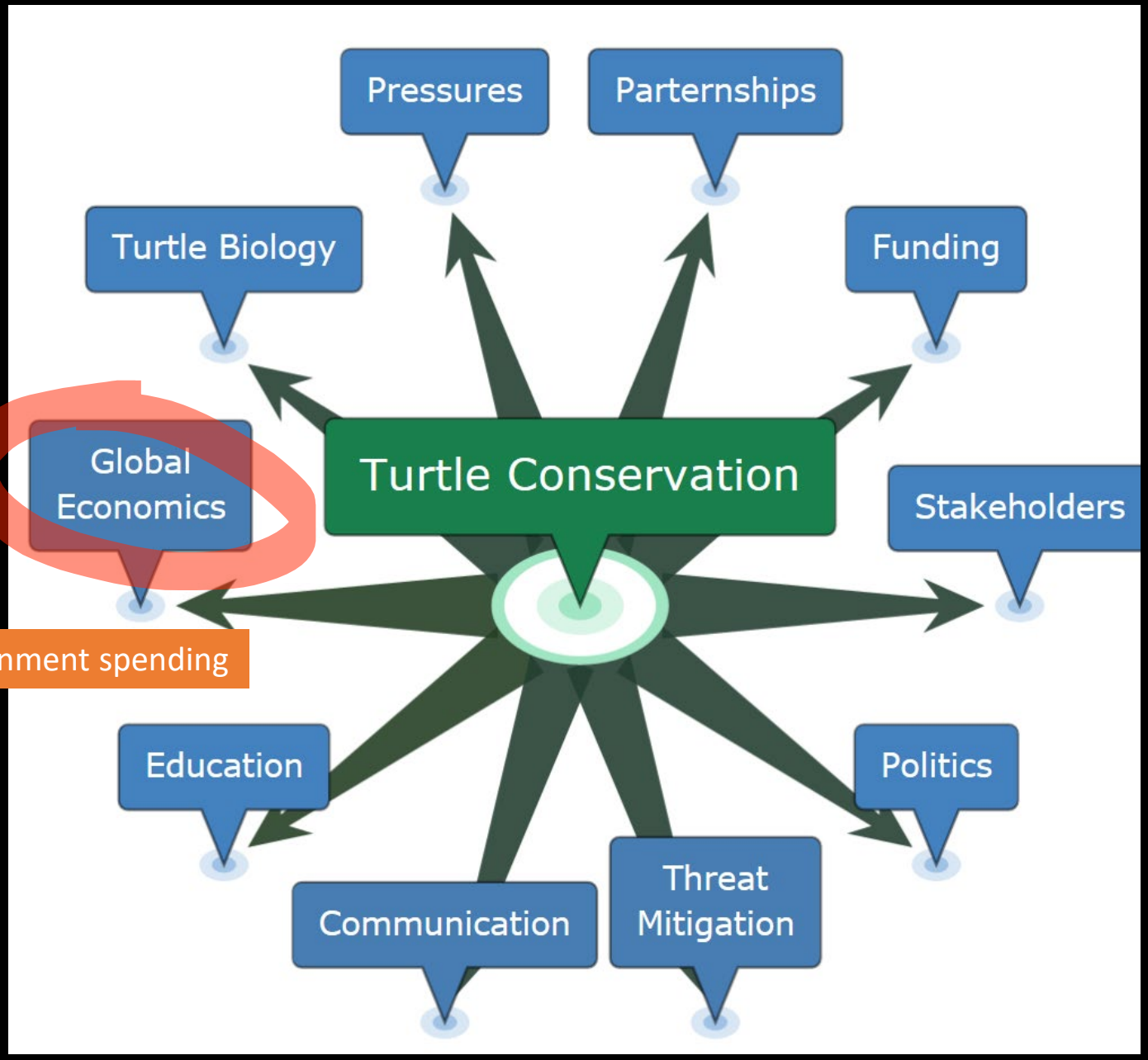
Project Management

- Type
- Frequency
- Impact/consequence

- Knowledge gaps
- Population monitoring



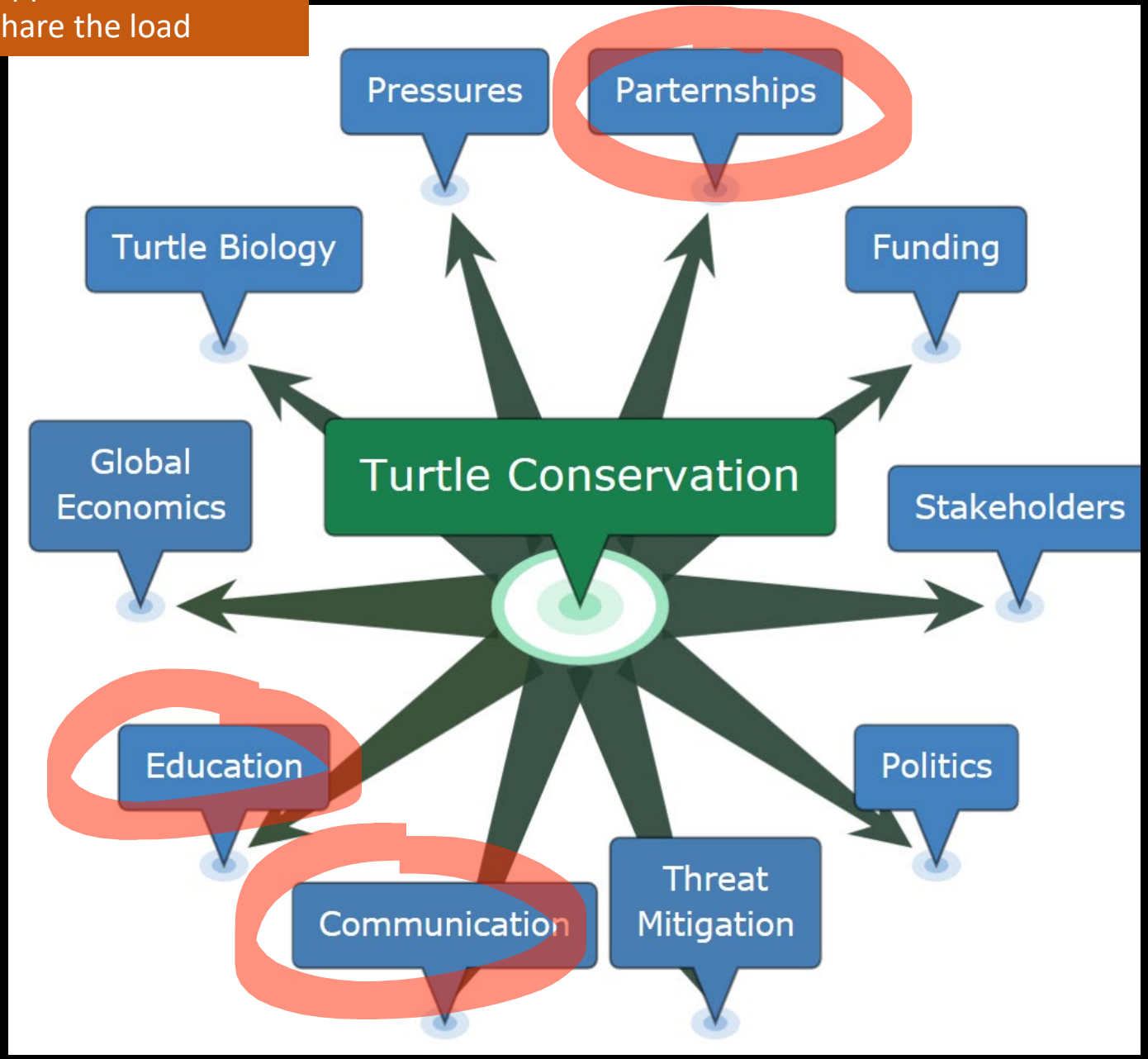
Project Management



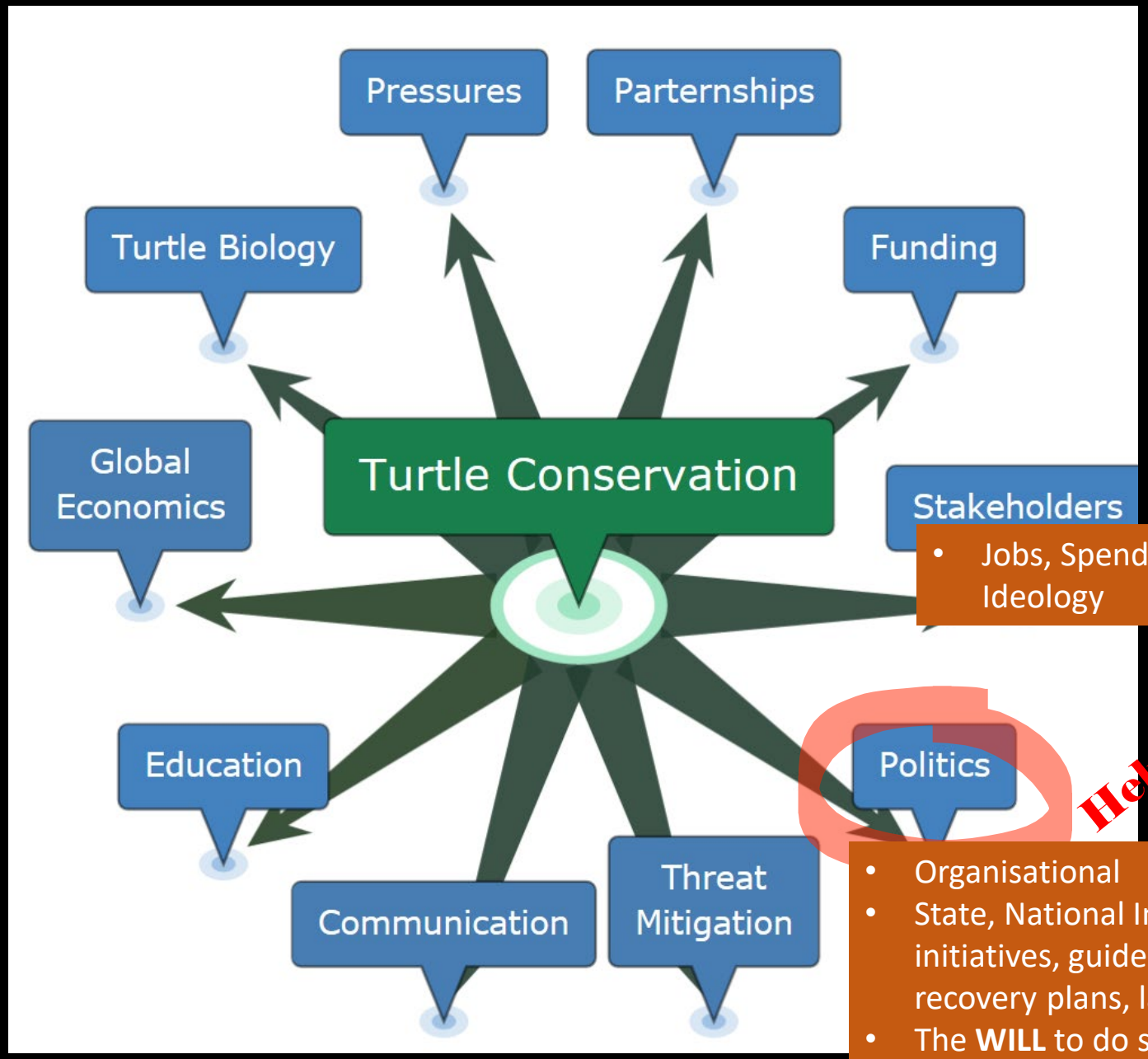
- Jobs, government spending

Project Management

- Fundamental public & political support
- Partners share the load



Project Management



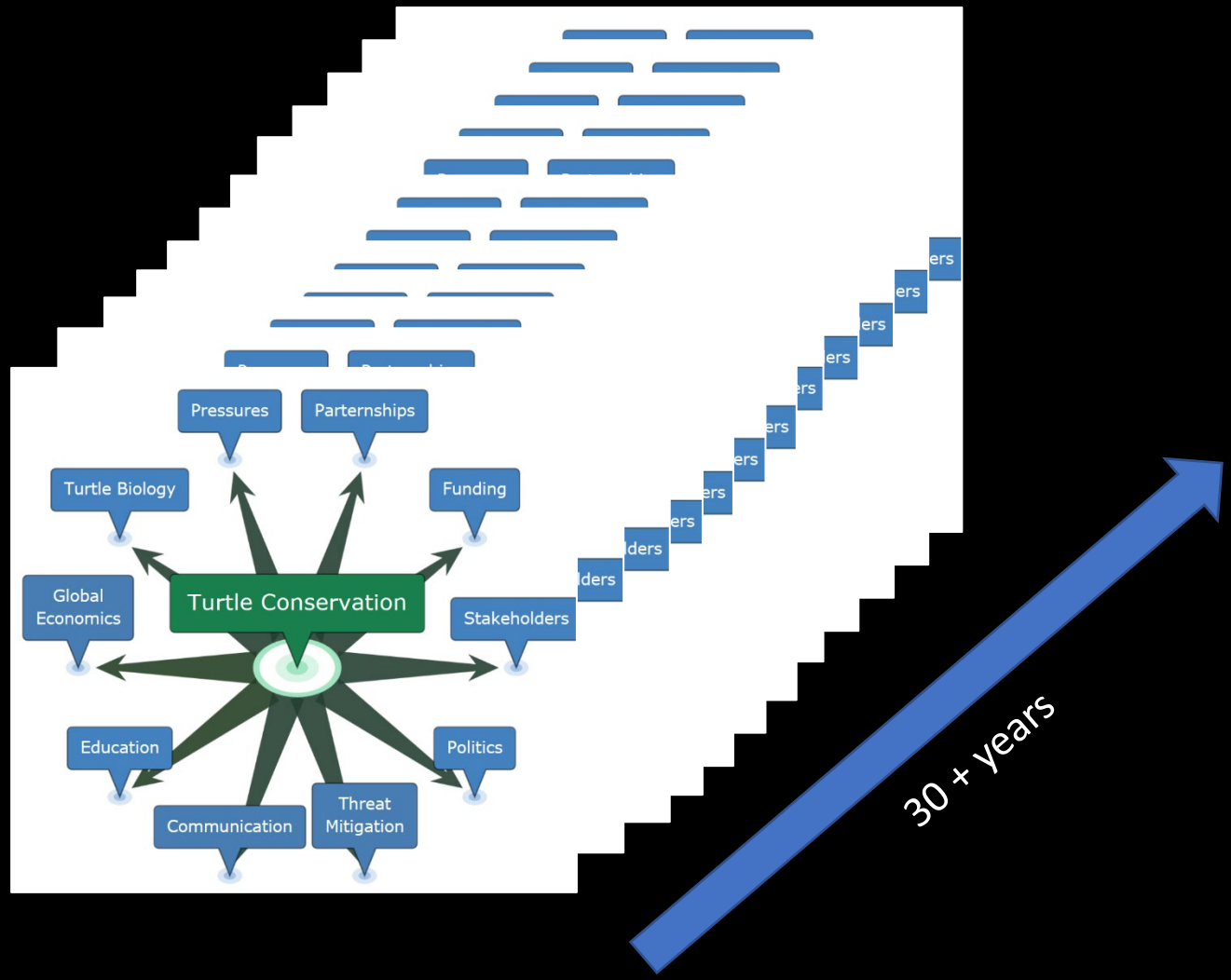
- Jobs, Spending, Ideology

Help or hinder

- Organisational
- State, National International initiatives, guidelines, recovery plans, laws.
- The **WILL** to do something….

Project Management

- Components are dynamic through time.
- Managers need to continually adjust and refocus efforts



Prioritization

Why should we do prioritization?

- We have many jobs (corals, turtles, fish, etc). How do we pick?
- Not enough time or money to do everything
- Accountability for funds, time and outcomes
- Stakeholder are involved
  - Grassroots community, researchers, managers, businesses, government, international
  - **Transparency**
- Good plans allow bosses or funders to feel comfortable.

Prioritization

- Simpson et al 2015

Conservation Science W. Aust. 9 (3) : 227–237 (2015)

Prioritisation of conservation research and monitoring for Western Australian protected areas and threatened species

CJ SIMPSON [a], M BEGER [b], JG COLMAN [c], KJ FRIEDMAN [a,d], AK HILL [e], AJ KENDRICK [a], KA WAPLES [a], SD WHITING [a] AND SK WILSON [a,d*]

[a] Marine Science Program, Department of Parks and Wildlife, Kensington, WA 6151, Australia

IMPORTANT – many ways to do this. Complex/ simple

Identify Assets

Identify Pressures

Identify Knowledge Gaps

Score the Value (V)

Score the Pressures (P)

Score Knowledge Gaps (K)

Value (V)

Pressure (P)

Knowledge (K) (lack of)

High Value and High pressure

V x P = Conservation and Monitoring Priorities

V x P x K = Applied Research Priorities

V x K= Fundamental or Foundation Research Priorities


Conservation Science W. Aust. 9 (3) : 227–237 (2015)

Prioritisation of conservation research and monitoring for Western Australian protected areas and threatened species

CJ SIMPSON[a], M BEGER[b], JG COLMAN[c], KJ FRIEDMAN[a,d], AK HILL[a], AJ KENDRICK[a], KA WAPLES[a], SD WHITING[a] AND SK WILSON[a,e]

[a]Marine Science Program, Department of Parks and Wildlife, Kensington, WA 6151, Australia

Simpson, C. J., M. Beger, J. G. Colman, K. J. Friedman, A. K. Hill, A. J. Kendrick, K. A. Waples, S. D. Whiting, and S. K. Wilson. "Prioritisation of conservation research and monitoring for Western Australian protected areas and threatened species." Conservation Science Western Australia 9, no. 3 (2015): 227-237.

Develop questions for each of these

Ecological asset (KPI focus)

- Mangroves
- Saltmarshes
- Macroalgae & seagrass
- Coral reef
- Water quality
- Shorebirds
- Invertebrates
- Dolphins
- Whales
- Finfish
- Turtles
- Crocodiles

Values (characteristics)

1. Habitat forming
2. Ecosystem support
3. Uniqueness
4. Cultural
5. Recreational
6. Economic
7. Scientific
8. Historical
9. Vulnerability
10. Recovery potential

Knowledge

1. Inventory
2. Baseline
3. Influencing processes
4. Management targets

Pressures

1. Spatial scale
2. Temporal scale
3. Biological severity
4. Socio-political
5. Likelihood

Each value scored 1-3 (low/med/high)

Simpson et al 2015

Values (characteristics) will include:

ECOLOGICAL ROLE (3 Q's)

Habitat Forming Biota

Ecosystem Processes

SOCIAL & CULTURAL (4 Q's)

Recreational

Economic

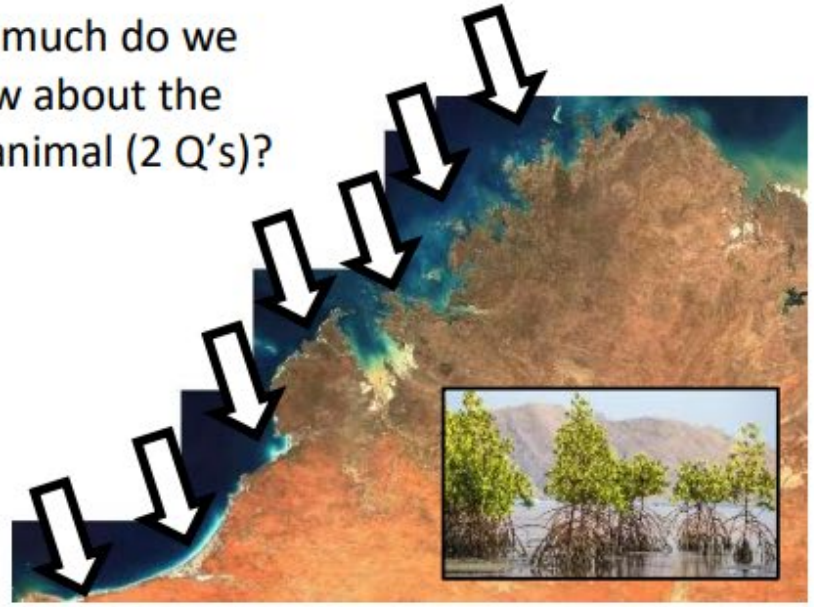
HEALTH, VULNERABILITY & RECOVERY (3 Q's)

Vulnerability

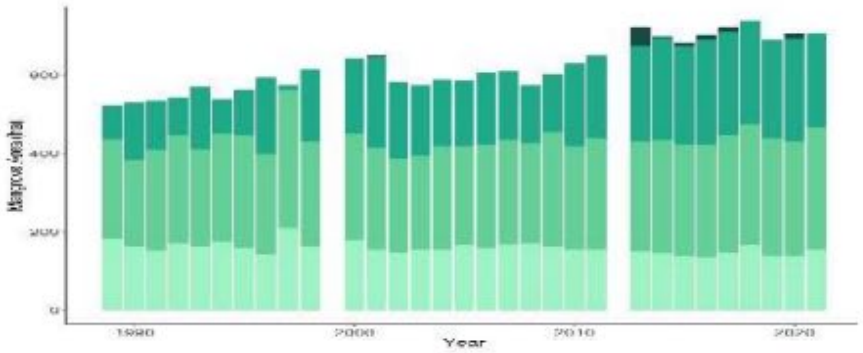
Recovery Potential

Knowledge

How much do we know about the plant/animal (2 Q's)?

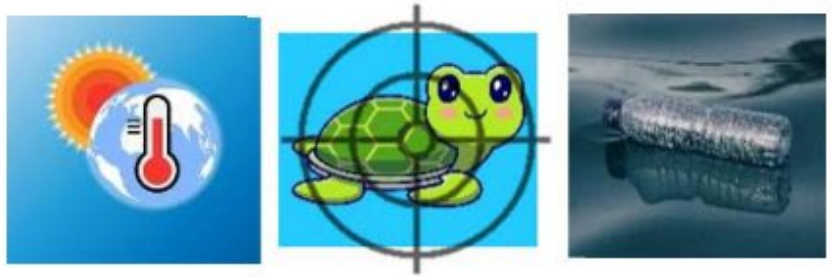


Data available over a broad area?

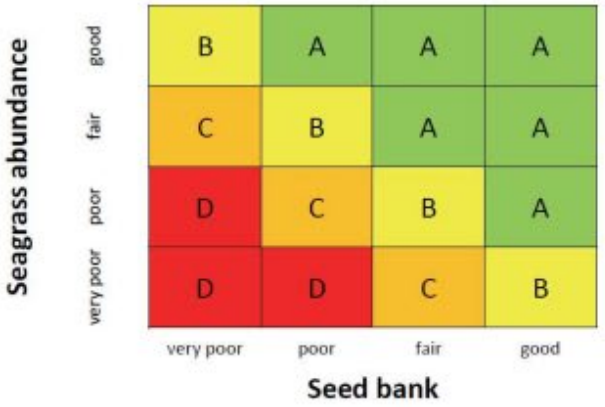


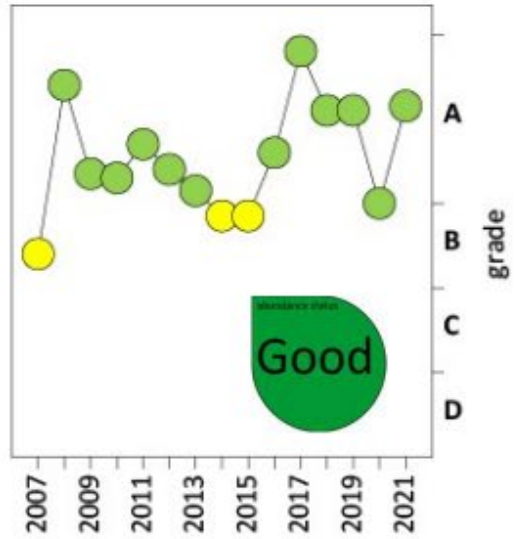
Long-term data?

Do we know what pressures/processes affect the plant/animal (1 Q)?



Do we know enough to set sustainable management targets (1 Q)?





Pressures:

- Human activities and natural processes that impact or have potential to impact plant/animal health

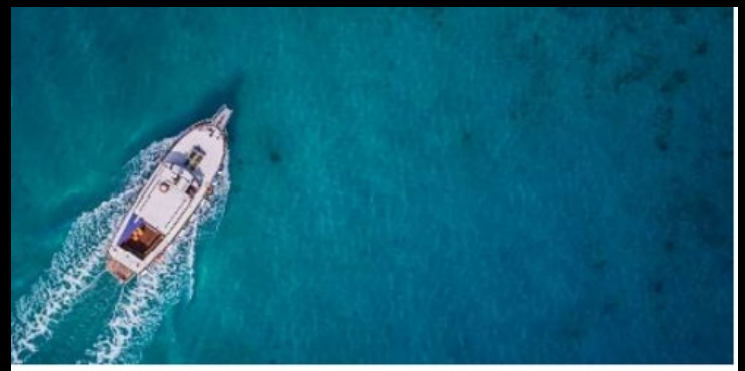
- Determined from 5 criteria/questions based on:
  - How far and how long the pressure will last (2)
  - The likelihood of the pressure occurring (1)
  - The consequences of the pressure (2)

- These 5 questions are answered for each potential pressure that could impact the plant/animal
  - e.g. 4 pressures = 20 questions (5 questions x 4 pressures)

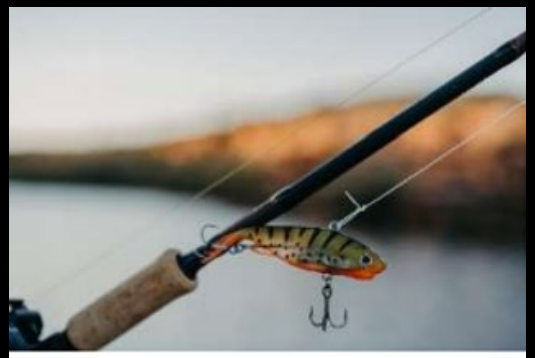
Development – i.e. mining

Climate change

Pollution



Boating and ship strikes



Fishing

Cyclonic events

Flooding & droughts

Scoring:

Value (all cells)	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	K1	K2	K3	K4
Coral reef communities	3	3	2	2	3	2	3	1	3	1	2	3	3	3
Crocodiles	1	1	2	1	1	1	2	2	2	1	2	2	2	1
Dolphins	1	1	2	1	2	3	2	1	3	2	2	2	2	1
Dugong	2	2	2	3	1	1	2	2	2	2	1	2	2	1
Finfish	1	2	1	3	3	3	3	3	3	1	1	1	3	1
Geomorphology	3	2	2	1	1	2	2	1	1	3	1	1	2	1
Intertidal sand and mudflat communities (bioturbated sedimentary habitats)	3	3	2	2	1	2	2	1	2	2	2	2	2	2
Mangrove communities	3	3	2	3	2	2	2	1	3	1	3	3	3	2
Marine turtles	2	2	2	3	2	2	3	2	3	2	3	3	3	3
Rocky shore communities	3	2	2	2	1	2	1	1	2	1	1	1	2	1
Seagrass and algae communities	3	3	2	2	2	2	2	1	2	1	1	1	3	1
Sharks and rays	2	2	2	3	1	2	3	3	2	2	1	1	3	1
Shorebird communities	1	2	3	1	1	1	2	2	3	2	3	3	2	3
Water and sediment quality	3	3	1	1	1	2	2	3	3	3	3	2	2	2
Whales	1	1	2	3	1	3	2	2	3	2	2	1	2	3

Values (characteristics)

1. Habitat forming
2. Ecosystem support
3. Uniqueness
4. Cultural
5. Recreational
6. Economic
7. Scientific
8. Historical
9. Vulnerability
10. Recovery potential

Knowledge

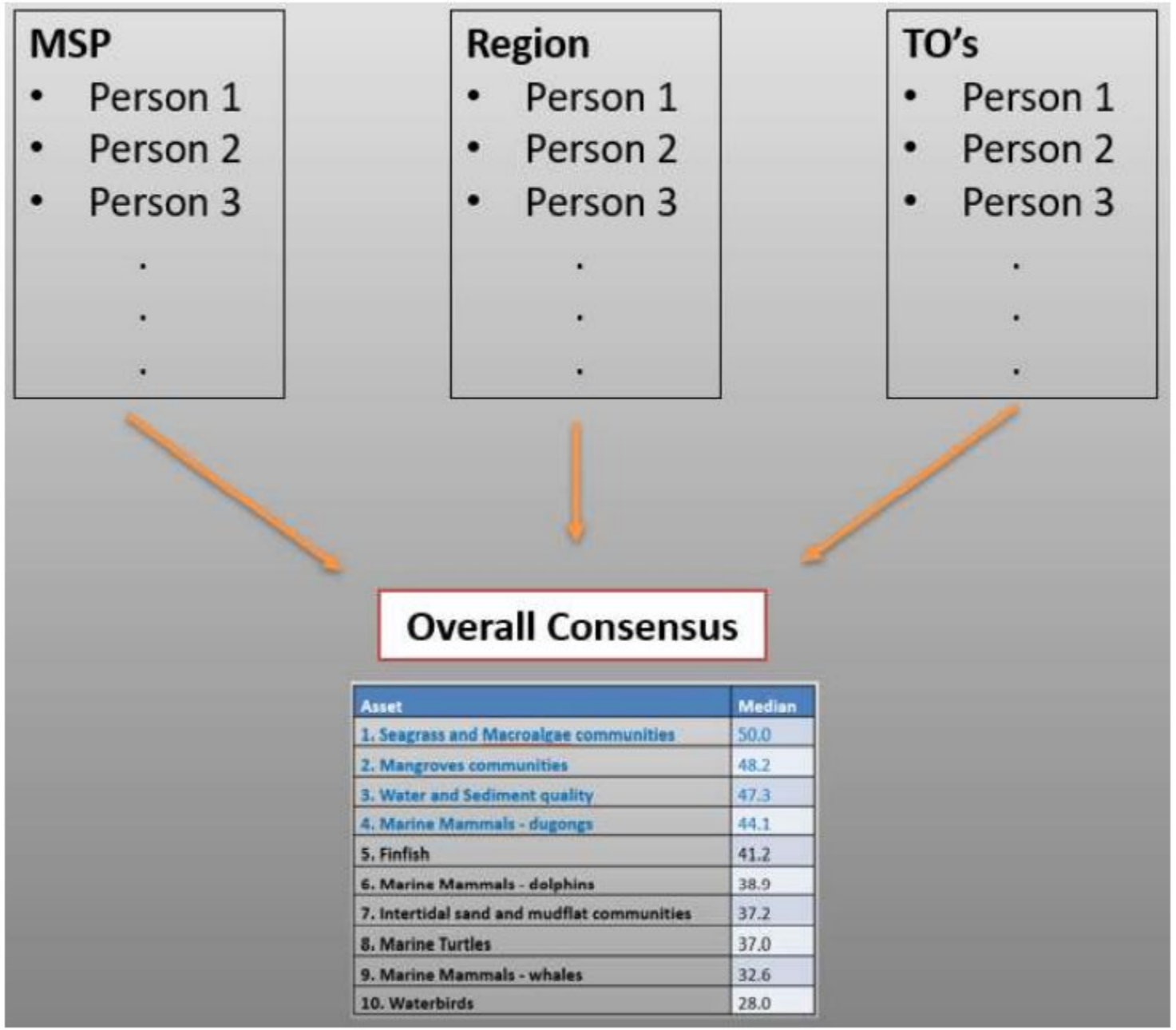
1. Inventory
2. Baseline
3. Influencing processes
4. Management targets

Pressures

1. Spatial scale
2. Temporal scale
3. Biological severity
4. Socio-political
5. Likelihood

pressure category	P1	P2	P3	P4	P5
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Climate change	3	3	3	2	3
Fishing/aquaculture/taking	2	2	2	2	3
Fishing/aquaculture/taking	2	2	3	2	3
Fishing/aquaculture/taking	1	1	2	1	3
Disturbance	1	3	2	1	2
Disturbance	1	2	2	1	2
Disturbance	1	1	1	1	1
Disturbance	2	2	2	1	3
Pollution	1	1	3	3	1
Pollution	1	1	1	1	2
Disease/invasive species	1	1	2	2	2
Climate change	3	3	3	2	3
Climate change	3	3	3	2	2
Fishing/aquaculture/taking	2	2	3	2	3
Fishing/aquaculture/taking	1	1	3	1	2
Disturbance	2	2	1	2	3
Pollution	1	1	3	3	1
Disease/invasive species	1	1	1	1	3
Climate change	3	3	3	2	2
Fishing/aquaculture/taking	2	2	2	2	3
Fishing/aquaculture/taking	2	2	3	2	3
Fishing/aquaculture/taking	2	3	2	2	3
Disturbance	1	3	3	2	1
Disturbance	1	3	2	1	2
Disturbance	1	2	2	1	2
Disturbance	2	2	2	2	3
Disturbance	1	1	1	2	1
Pollution	1	1	3	3	1
Pollution	1	1	1	1	2

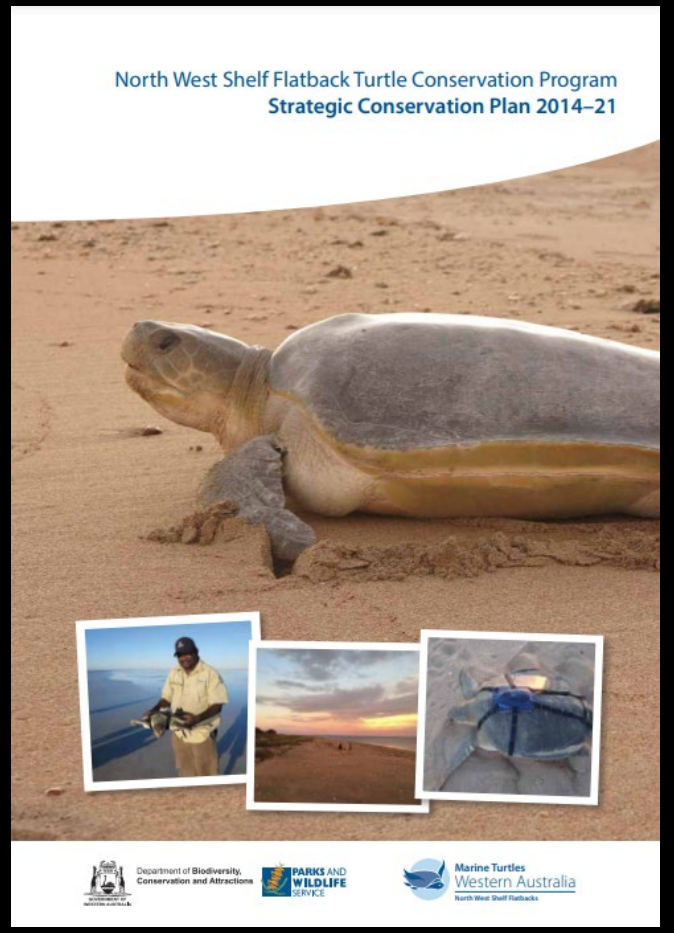
Scoring:

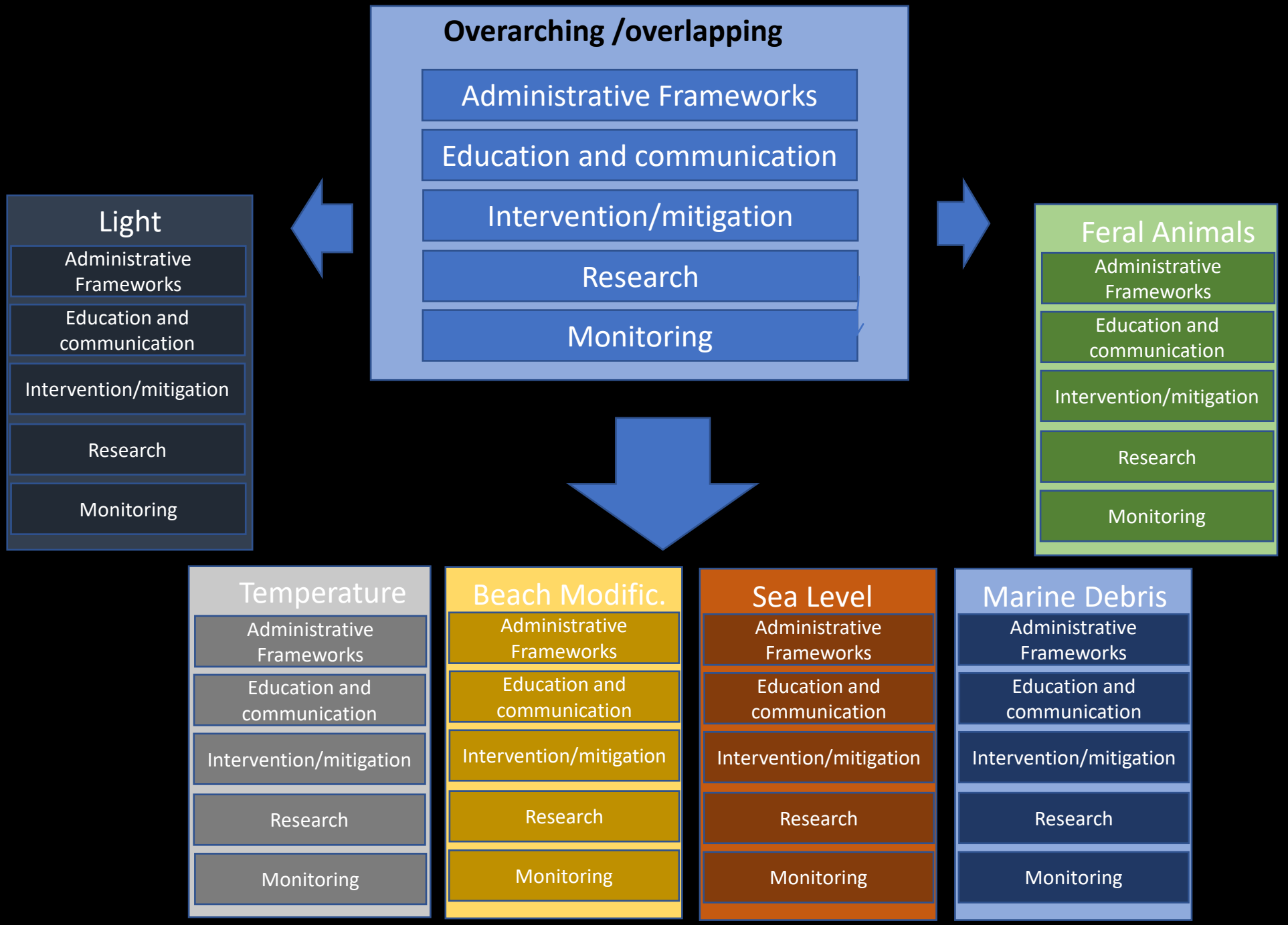


Asset	Median
1. Seagrass and Macroalgae communities	50.0
2. Mangroves communities	48.2
3. Water and Sediment quality	47.3
4. Marine Mammals - dugongs	44.1
5. Finfish	41.2
6. Marine Mammals - dolphins	38.9
7. Intertidal sand and mudflat communities	37.2
8. Marine Turtles	37.0
9. Marine Mammals - whales	32.6
10. Waterbirds	28.0

- Fundamental Research
- Applied Research
- Monitoring priorities

	Value													Pressure Metrics							
Pressure	E1	E2	E3	E4	B1	B2	B3	B4	C1	C2	C3	C4		P1	P2	P3	P4	P5			
	Func.Import	Areal extent	Population	Recovery	Local	Regional	National	Global	Cultural	Economic	Scientific	Recreational	Sub Total	Life stage	Spatial scale	Temporal	Consequence	Probability	Sub Total	V*P	
Light - onshore and offshore sources	2	3	1	2	3	3	3	3	1	1	3	1	26	1	3	3	3	3	30	780	H
Introduced pests/feral animals	Same scores as first row												26	1	2	3	2	3	24	624	H
Sea Level Rise - climate change													26	3	3	3	2	2	22	572	M
Global temperature increase - climate change													26	3	3	3	2	2	22	572	M
Modification of beaches - coastal development													26	1	1	3	2	3	21	546	M
Marine debris													26	2	2	3	3	2	20	520	M
Water pollution (chronic)													26	3	1	3	2	2	18	416	L
Direct death - dredging- port development													26	3	1	1	3	2	16	416	L
Disturbance of turtles on beaches - tourism/people													26	1	2	3	2	2	16	416	L
Vessel strike and disturbance													26	3	1	2	2	2	16	416	L
Marine habitat destruction - dredging - port development													26	3	1	2	1	2	14	364	L
Noise seismic													26	2	2	1	3	3	14	364	L?
Noise - dredging/piling - port development													26	3	2	1	1	2	14	364	L
Water pollution (acute)													26	2	1	1	3	2	14	364	L
Fishing bycatch													26	3	1	2	2	1	8	208	L
Illegal or unregulated take outside Australia													26	1	1	3	2	1	7	182	L
Indigenous harvest													26	1	1	3	1	1	6	156	L

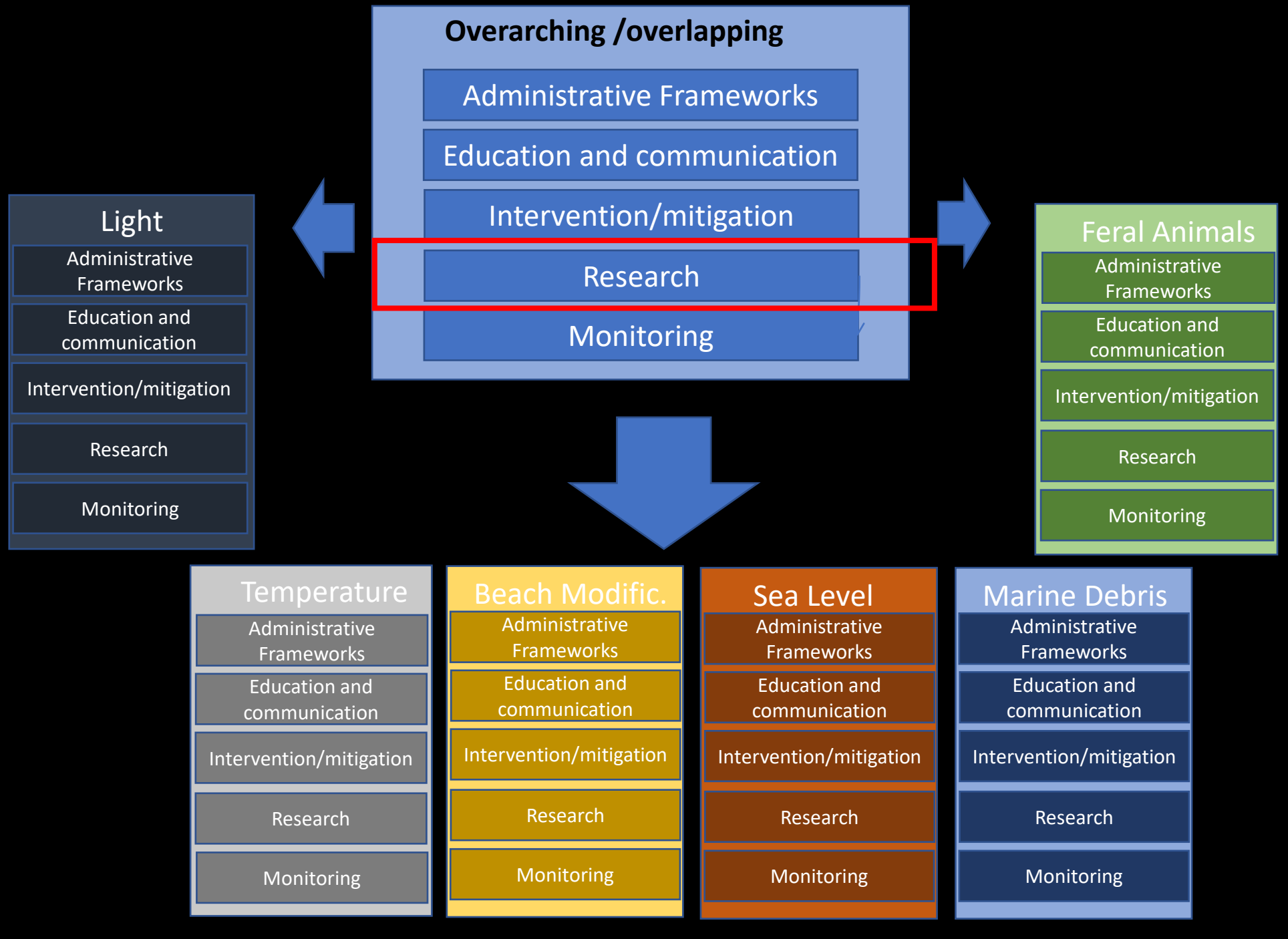



Overarching /overlapping
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Light
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Feral Animals
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Temperature
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Beach Modific.
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Sea Level
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Marine Debris
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring

EG Flatback Turtles and Feral Animal Predation

TARGET - The impact of feral animals on hatchling production is maintained at insignif. levels

Admin. Frameworks	• Develop and integrated approach to managing leased land, private land, and government land
Education	• Develop and maintain education programs across stakeholder groups
Public Participation	
Patrol and Enforcement	
Mitigation	• Control feral animals at key nesting sites
Research	• Ensure measure of success are used in all mitigation • Use economic models to plan mitigation events
Monitoring	• Monitor feral animal numbers and their impact on turtles at key beaches


Overarching /overlapping
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Light
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Feral Animals
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Temperature
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Beach Modific.
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Sea Level
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring
Marine Debris
Administrative Frameworks
Education and communication
Intervention/mitigation
Research
Monitoring

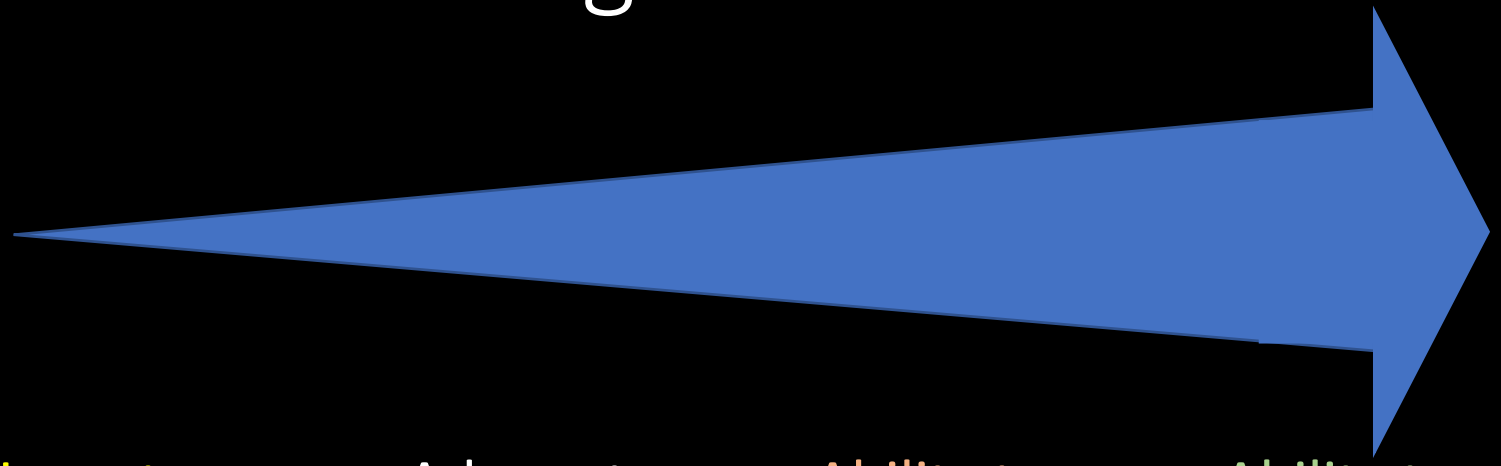
5.3.1.4 *Overarching actions - Research (OA R)*

Overarching - Research				
Management Objective - To implement collaborative and cost effective research programs to improve ecological and social knowledge directly related to the conservation of NWS flatback turtles and other species where there is direct benefit to the NWS flatback turtles or where other species can act as research surrogates.				
Management Target – Research produces knowledge for inventory, baseline, monitoring methodology and design, and predictive models to meet management and monitoring needs				
Code	**Action**	**Priority**	**Complete Time**	**Output/ Milestone**
Inventory (where, when, what)				
NdS OA R1	1. NWS flatbacks - Produce an inventory of nesting locations and seasonality (spatial and temporal distribution)	H	2017/18	Collation of existing information and surveys conducted to ensure that all major rookeries are mapped in the Pilbara
NdS OA R2	2. Neighbouring flatback MUs- Produce an inventory of nesting locations and seasonality (spatial and temporal distribution)	H	2016/17	Collation of existing information and surveys conducted to ensure that all major rookeries are mapped in the Kimberley
NdS OA R3	3. Define and map from existing data key spatial areas and habitats in the life cycle, including foraging areas, migration routes and mating areas	H	2017/18	Key foraging areas are identified and at least some mating areas are identified
NdS OA R4	4. Increase understanding of connectivity (both spatial and temporal) - a. Continue genetic analysis to define MUs b. Investigate innovative genetics methodology to establish local connectivity links between rookeries c. Collate or conduct relevant tracking studies of individuals between nesting and foraging grounds (Determining the level of connectivity between rookeries within MU and between rookeries and foraging habitat) d. Use techniques such as stable isotopes to link nesting beaches to foraging grounds	H	2016/17 to 2020/21	Connectivity between nesting and foraging grounds defined. Investigation of methodologies to investigate between rookery connectivity

Strategies of Management

Administrative frameworks
Education
Public Participation
Patrol and Enforcement
Mitigation
Research
Monitoring

Levels of knowledge



Inventory

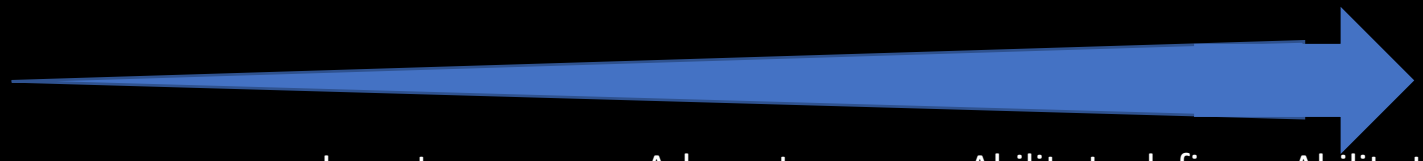
Where, when, how many

Adequate Baseline Information

Ability to define monitoring parameters

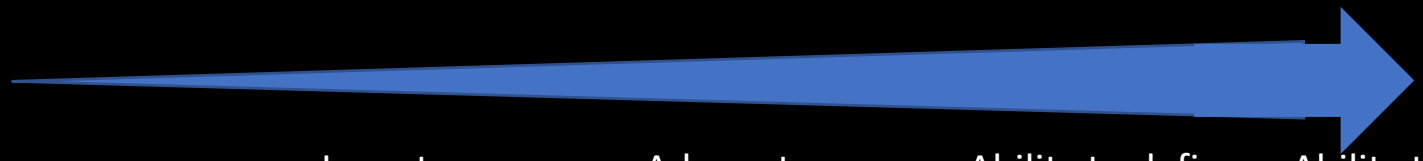
(know processes) (Indicators)

Ability to set targets and limits of acceptable change



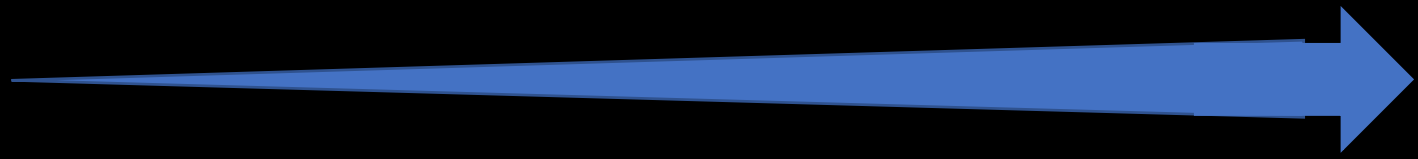
	Inventory	Adequate Baseline Information	Ability to define monitoring parameters (Indicators) and appropriate methodology	Ability to set targets and limits of acceptable change
Eggs (hatching)				
Hatchlings (nest to water)				
Post-hatchlings				
Neonates				
Juveniles				
Adult females				
Adult males				
Migration routes				

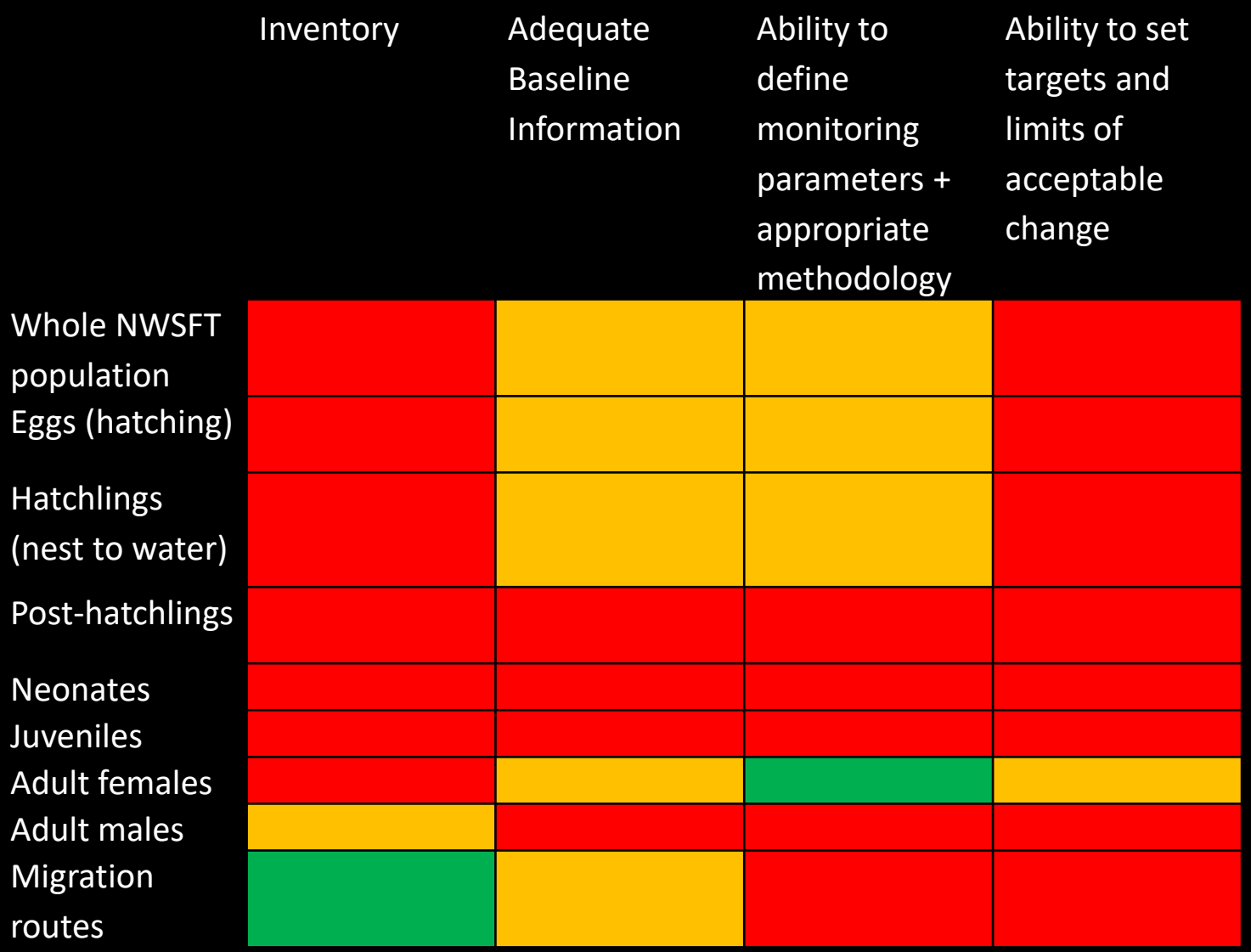
Loggerheads Qld



	Inventory	Adequate Baseline Information	Ability to define monitoring parameters (Indicators) and appropriate methodology	Ability to set targets and limits of acceptable change
Loggerheads Qld population				
Eggs (hatching)				
Hatchlings (nest to water)				
Post-hatchlings				
Neonates				
Juveniles				
Adult females				
Adult males				
Migration routes				

Flatbacks - WA

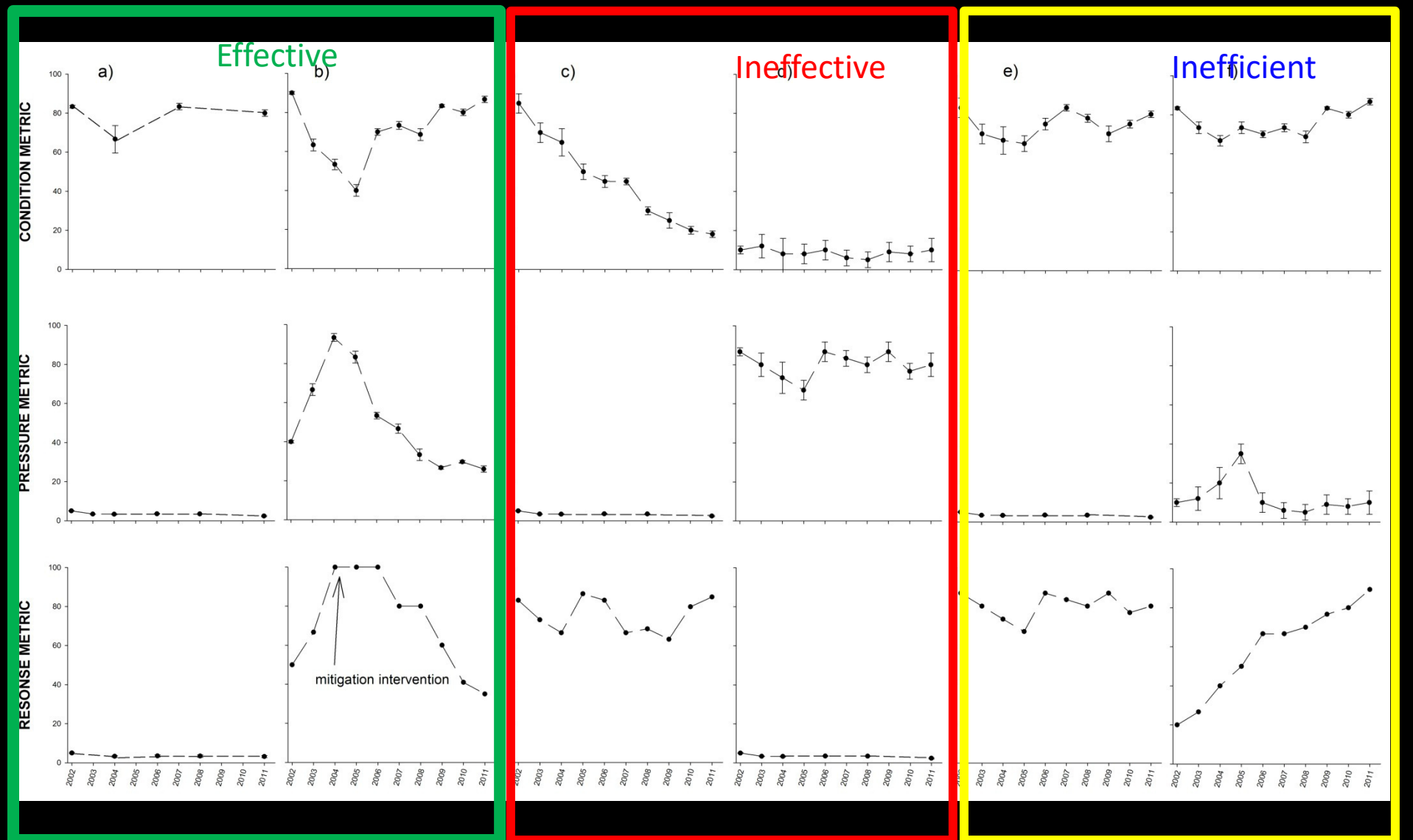




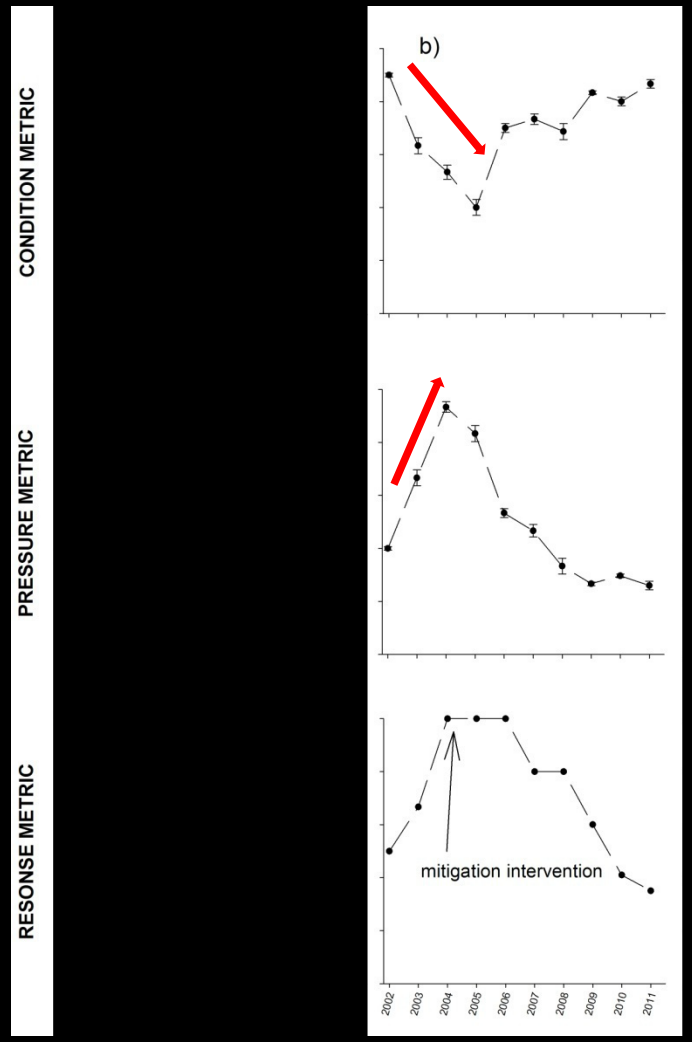
What does monitoring look like?

- Consistent
- Repeatable
- Long enough time series
- Representative (for turtles – eg the rookery, management unit)
- Effective
- Efficient

Examples of a MER program showing single metric displays of long term asset condition, pressure and management response data. An effective and efficient management program maintains asset condition in both a) a static system and b) a system impacted by a pressure through adaptive management. An in-effective program might allow c) condition to decline as the response was high due to an incorrect understanding of pressures on an asset, or d) fail to respond to a recognised local scale anthropogenic pressure impacting on the asset. Finally an in-efficient MER program might e) maintain or f) initiate and continue to deliver an excessive or unnecessary response for an asset that was not subject to significant pressures.

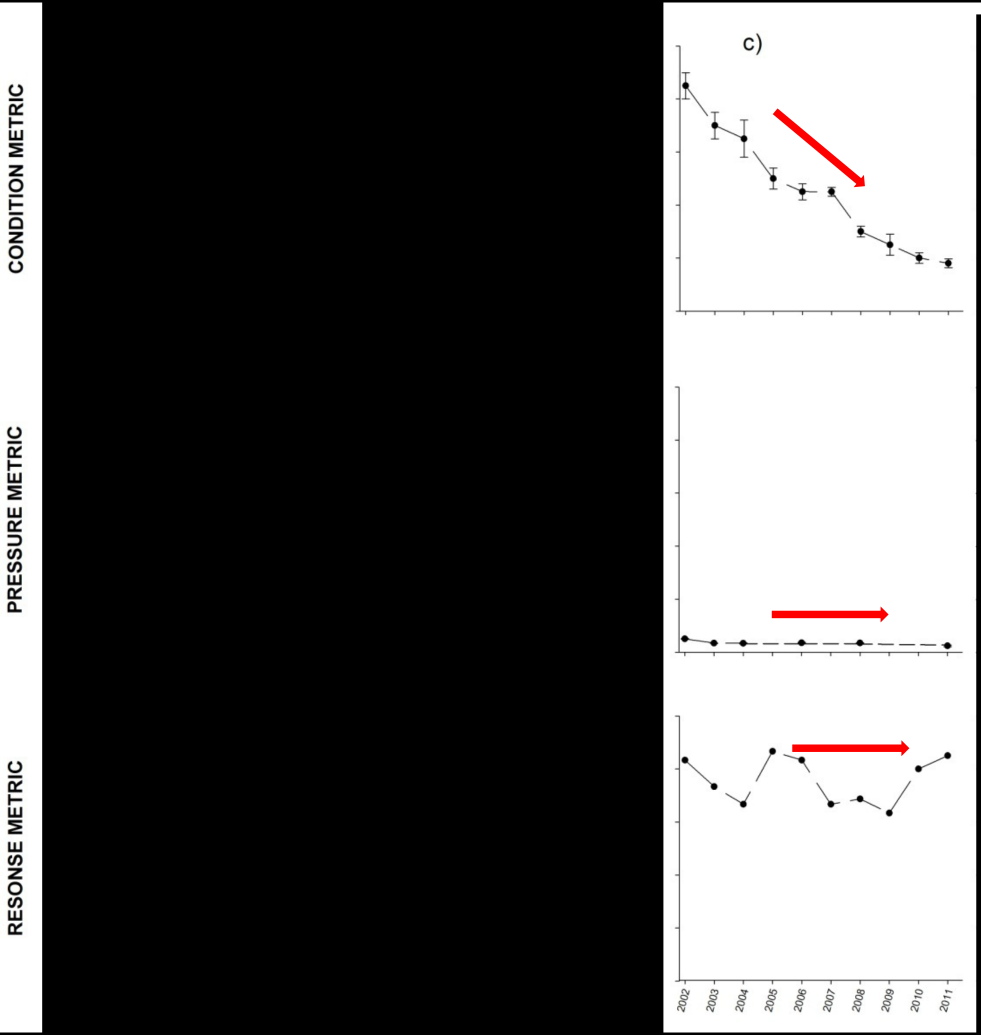


Effective and Efficient Monitoring

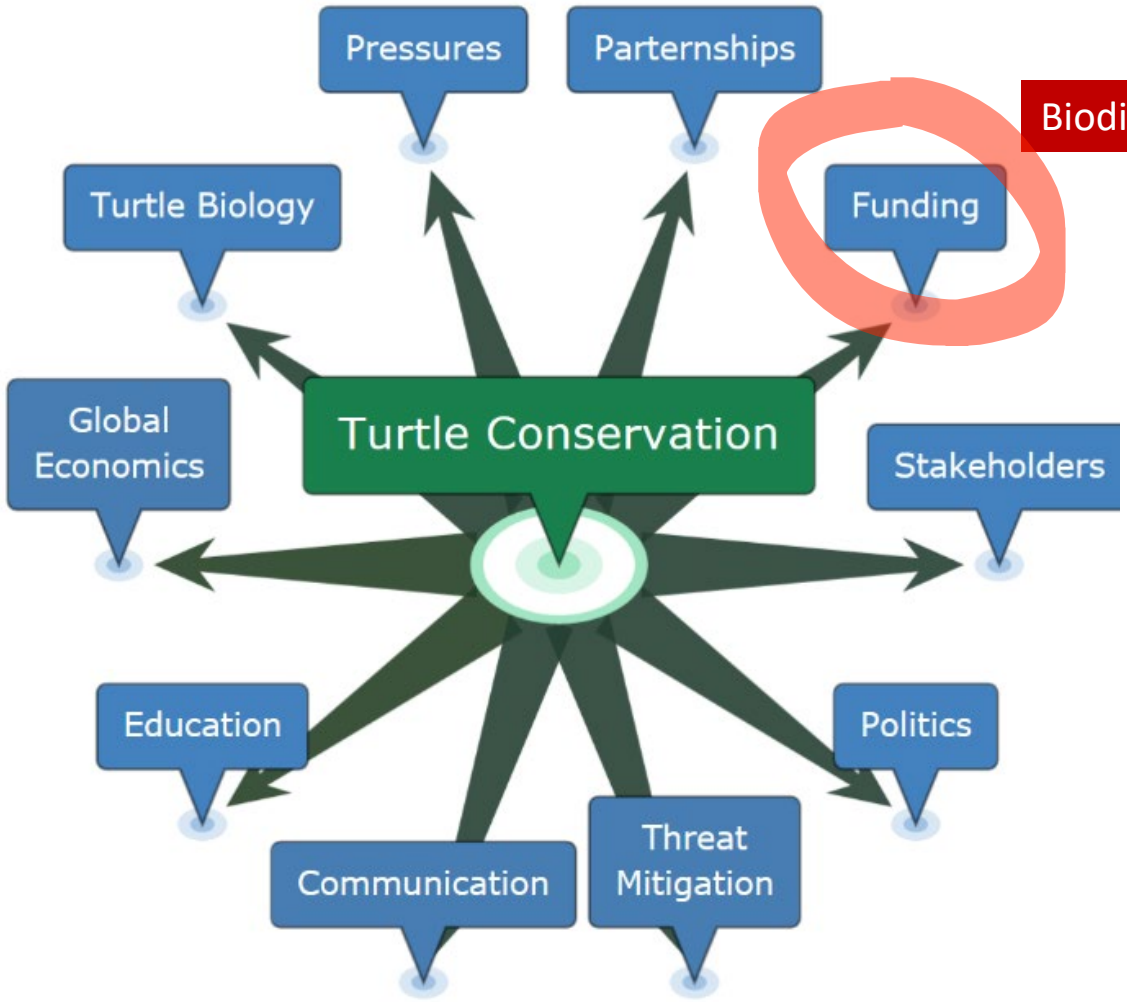


Inefficient Management

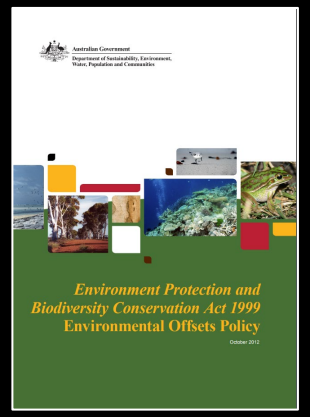
Ineffective Management

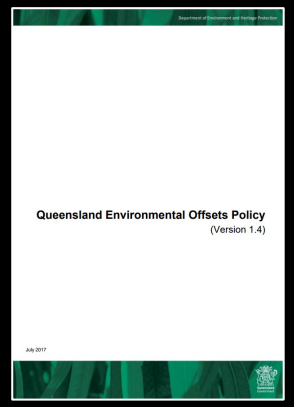


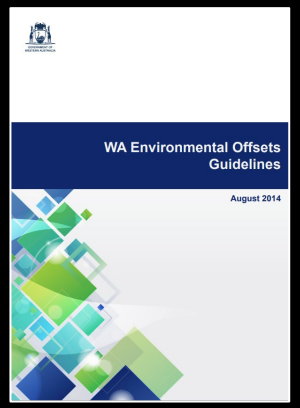
Scope


Pressures
Parternships
Biodiversity Offsets
Turtle Biology
Funding
Global Economics
Turtle Conservation
Stakeholders
Education
Politics
Communication
Threat Mitigation

Funding – Biodiversity Offsets







- **Definition**

  To offset or compensate for residual impact from a proposal or activity – no net loss/net gain

  - Direct Offsets
    - Protection or Restoration
    - "Like for like" habitat protection
  - Indirect Offsets
    - Research or education to benefit the asset.

  - Voluntary Offsets

    Usually proposed by the proponent in a country where no offset legislation exists

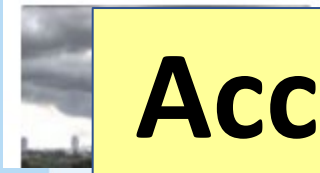
- References
  - google "Biodiversity Offsets" or "Environmental Offsets"

Biodiversity Offsets – Hot Debate

June 6, 2013

Biodiversity offsets could be locking in species decline

Martine Maron, *The University of Queensland and Ascelin Gordon, RMIT University*



Accepting biological loss for uncertain future gains

May 6, 2013

Can we offset biodiversity losses?

Megan C Evans, *Australian National Univ*

October 30, 2013

Biodiversity offsets

Carlos Ferreira, *University of*

Home - Policy - Envi… …versity Offsets

Biodiversity Offsets

Strategically targeted offsets can help to achieve positive long-term environmental results for a protected species or community

SBS NEWS

Home Latest Videos Australia World Podcasts | Dateline Insight The Feed Small Business Secrets

Comment: Can we offset biodiversity losses?

Environmental Offsets - Debate

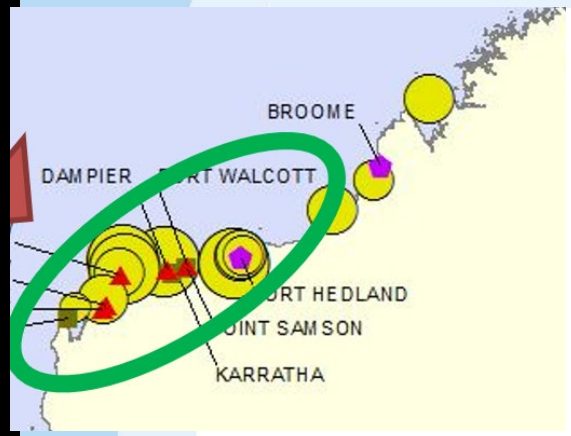
Arguments Against…	Arguments For…..
Most things can't be replaced or offset – there is no "like for like"	Link proponent with likely damage - "polluter pays"
Unmeasurable benefit – there are no universal metrics for biodiversity	Provide a market value for land or asset.
Uncertainty - Time lags - Lack of knowledge for many systems	There is almost always residual impact
If we fail – consequences are high	Long term additional funds
	Promotes social conscience by industry

Recent Marine Offsets in Australia

- Marine Turtle related offsets >2009
  - $75 M

Project	Amount	Duration (years)	Target
Chevron – Gorgon Gas 2009	$32.5M	30	Flatback Turtles
Chevron – Gorgon Gas 2009	$5M	0	Flatback Turtles
Chevron – Wheatstone Gas	$3.5M	4	Megafauna
Woodside – Pluto Gas	$1.8M	4	Megafauna
Woodside – Pluto Gas	1.6	4	Marine
Inpex Gas -	$24M	20	Megafauna
Inpex Gas	$20	20	Darwin Harbour
Inpex Gas	$2.5M	5	Marine mammals
BHP Port Headland	$3M	4	Megafauna
Ankatel	$3M	4	Megafauna
Dredging	$8M	5	Dredging
Gladstone area			

Northwest Shelf Flatback Turtle Conservation Program (NWSFTCP) –



- **Objectives**
  - increase the conservation and protection of the stock through:
    1. monitoring and research;
    2. mitigation of threats; and
    3. information and education programs

Conclusion - Long term funding - Time and money

Foundations
Plan
Build systems (accountable finance)

Partnerships/stakeholders
Trust, consistency
Leverage collaborative projects – using cash

Knowledge
Work of big questions
Long term monitoring
Transfer knowledge to decision makers

Mitigation
Funds for mitigation
Time to change policy, law

Politically
It is legislated: Department and Government support

End

EG Flatback Turtles and Feral Animal Predation

TARGET - The impact of feral animals on hatchling production is maintained at insignif. levels

Admin. Frameworks	• Develop and integrated approach to managing leased land, private land, and government land
Education	• Develop and maintain education programs across stakeholder groups
Public Participation	
Patrol and Enforcement	
Mitigation	• Control feral animals at key nesting sites
Research	• Ensure measure of success are used in all mitigation • Use economic models to plan mitigation events
Monitoring	• Monitor feral animal numbers and their impact on turtles at key beaches

Strategies of Management

Administrative frameworks
Education
Public Participation
Patrol and Enforcement
Mitigation
Research
Monitoring

Strategies of Management

Administrative frameworks
Education
Public Participation
Patrol and Enforcement
Mitigation
Research
Monitoring

Long Term Funding

- **Benefits**
  - Long term strategic planning
  - Opens dialogue with uncommon stakeholders
  - Time to establish foundational base:
    - finance, data systems, protocols, governance, education
  - Establish strong partnerships
  - Provides leverage to increase the value of our program (Over 2million dollars leveraged in last 4 years)