

Investment Framework for Environmental Resources INFFER

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USA/Aust cultural differences

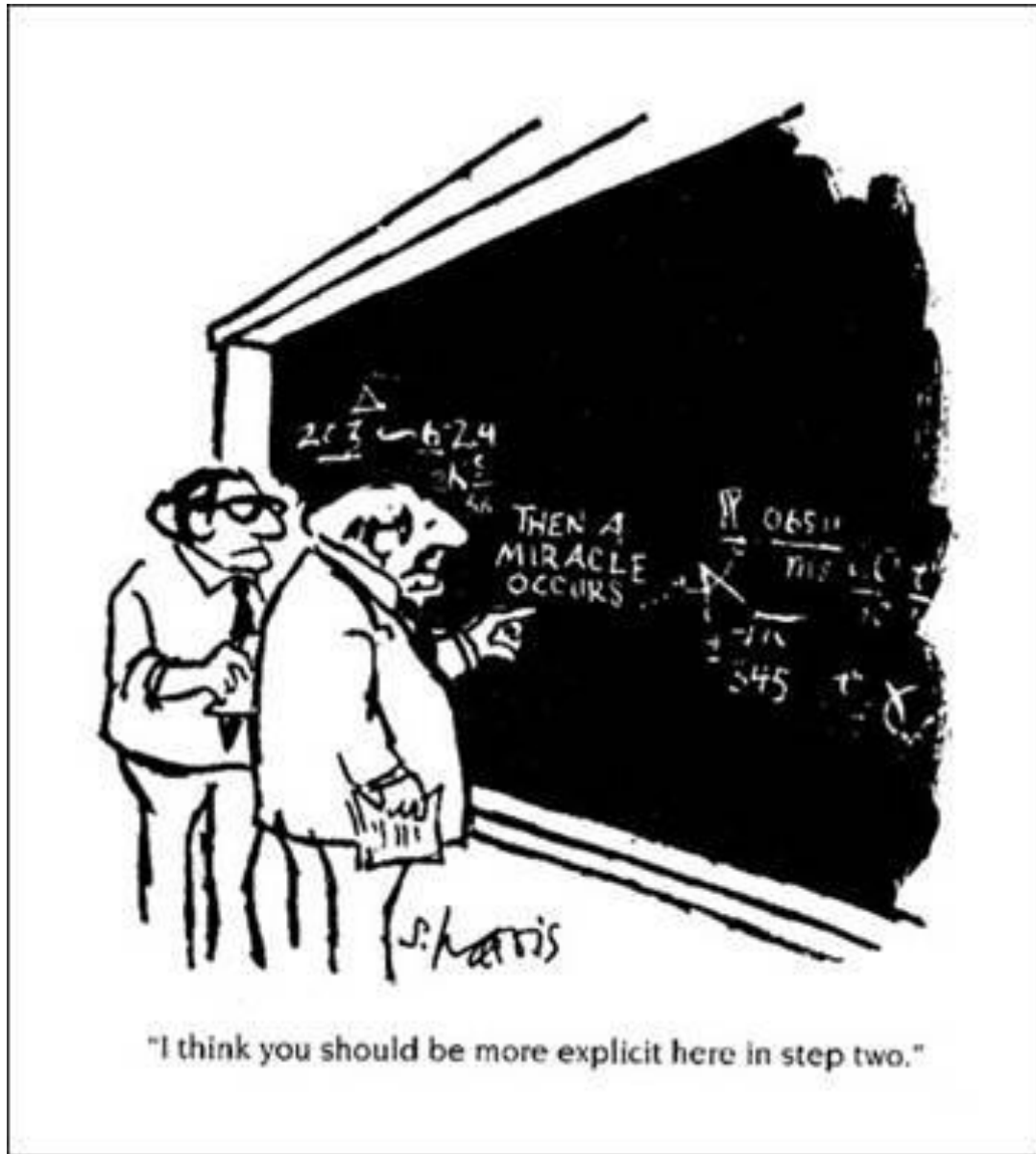
USA Approach

- Strong target setting
- At least the possibility for enforcement
 - Federal EPA
 - Citizen suits
- Powerful farm interests
 - Likely to lead to inefficient environmental spending
- More adversarial

Australian approach

- Weak, unenforceable target setting
- Less powerful farm interests
 - Much less subsidized
 - Less perverse signals
- Less adversarial/litigious culture
- Strong reliance on volunteerism

Challenges with both approaches

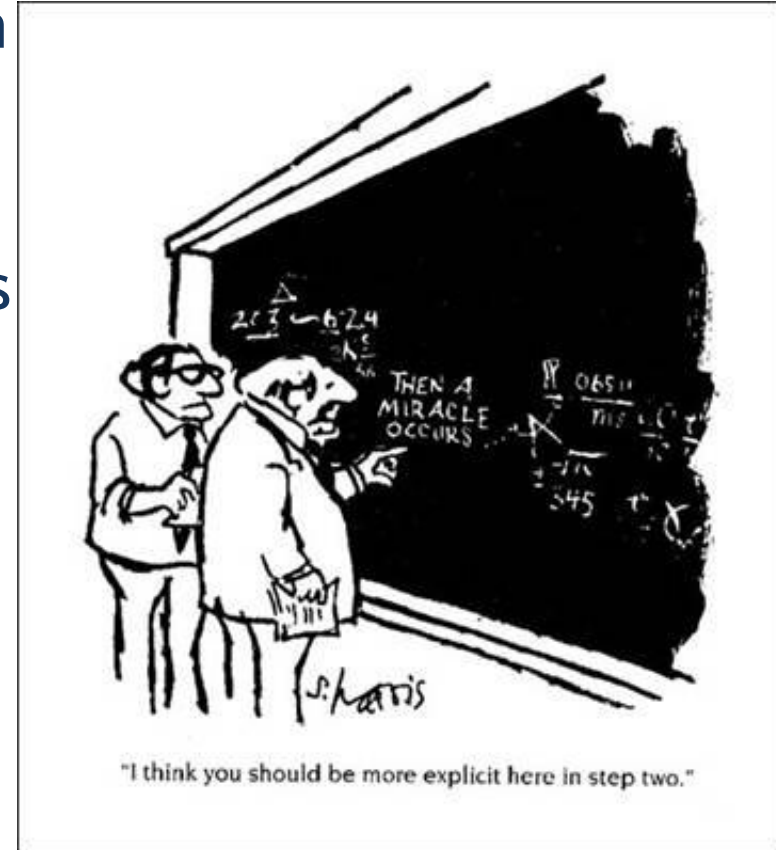


INFFER

- Framework for decision-making about investment to protect the environment
- Rigorous, transparent approach - incorporates expert and community knowledge
- Cost-effective environmental investment
- Australian Museum 'Eureka Prize' for Excellence in Interdisciplinary research 2009
- 'Top 10' Australian university research impact in 2012

What INFFER is designed for

- How to get value for money from available budget?
- What is realistic/feasible?
- Appropriate delivery mechanisms
- Rigorous project design
- Development of sound funding proposals
- Assumptions are transparent
 - Cant get away with ‘miracles’



Why value for money is important

- Limited resources for environmental actions
 - Salinity program: \$1.4 billion
 - Full mitigation cost: \$65 billion
- Achieving outcomes is expensive
 - Gippsland Lakes, Australia
 - Target 40% reduction in nutrients over 25 years
 - Budget: PV \$30m
 - Min cost: PV \$1 billion
 - Chesapeake Bay
 - 2003 costs \$18.7 billion
 - 2003 budget \$5.9 billion

Asset types



River reach

- Intact native veg
- Cultural heritage
- Colonial nesting birds



Wetland

- Listed on register
- Last of its type



Fauna species

- Iconic/focal/indicator
- Endangered

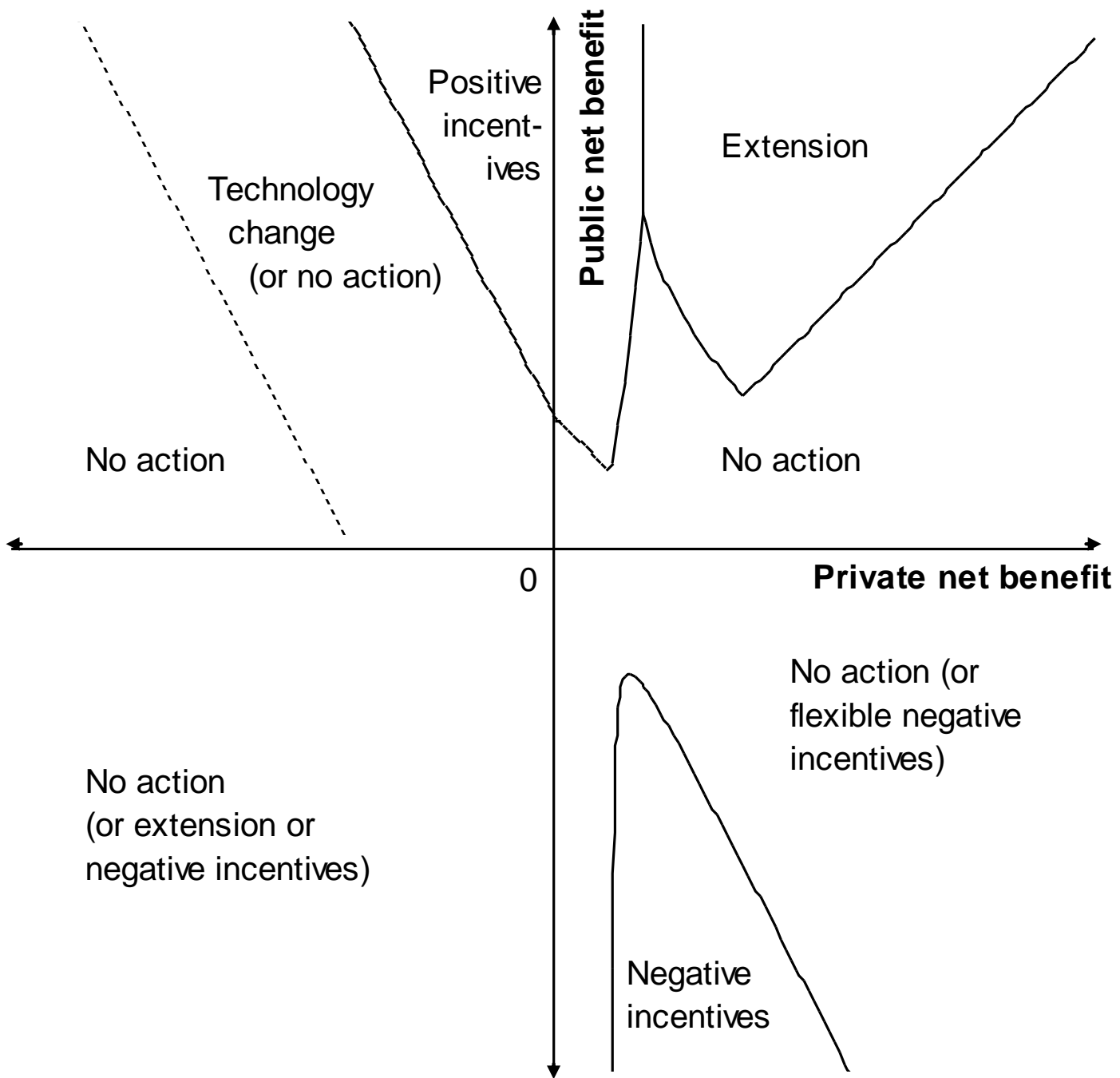


Soil/Ag. land

- High productivity/capability
- Unique soil type

Native vegetation/habitat

- Concentration of threatened species
- Near pristine condition
- Important location



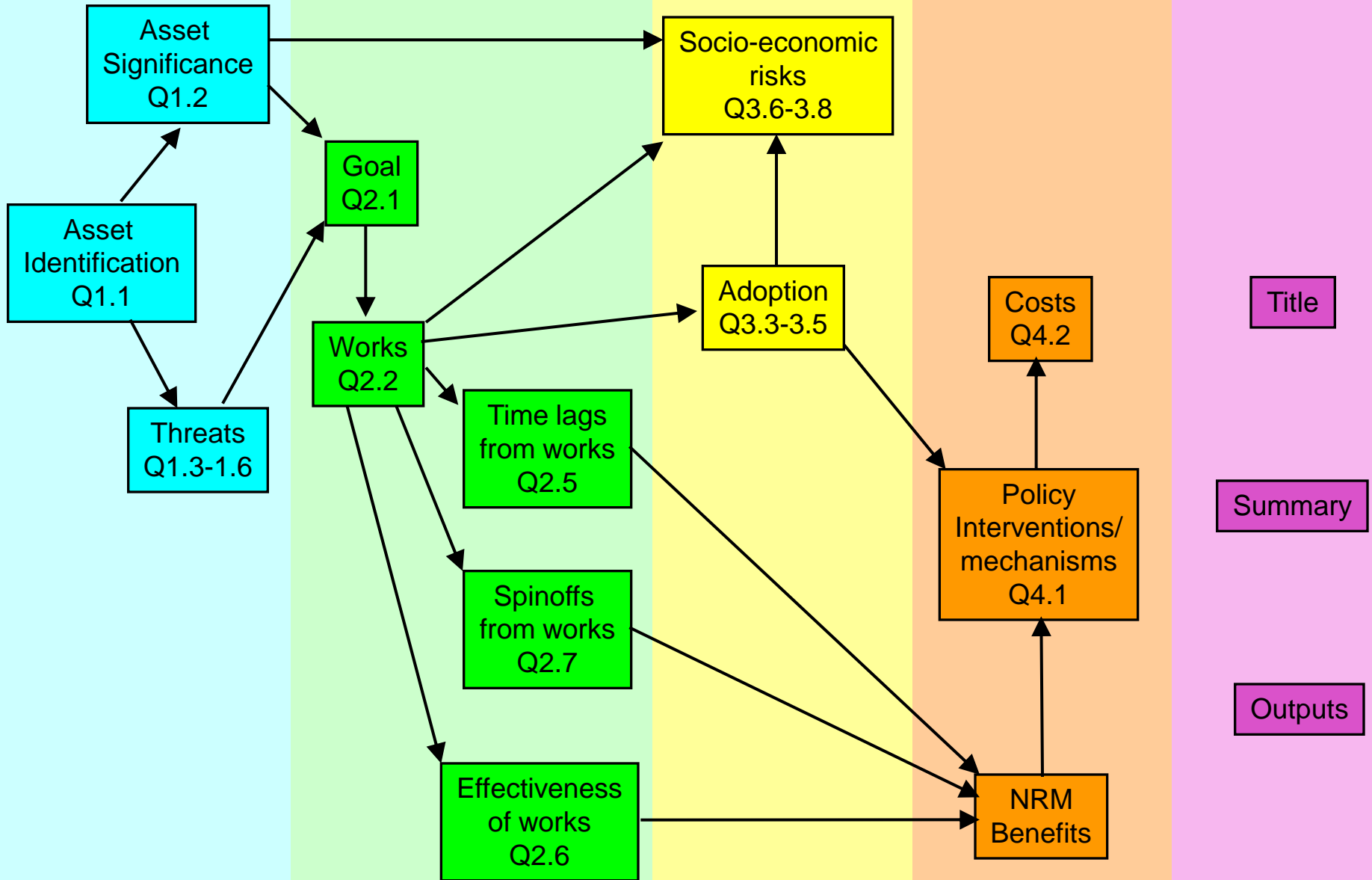
1. The Asset

2. Goal, Works

3. Socio-
economics

4. Budget

5. Project
info



$$V \times W$$

V: asset value
W: effectiveness of works



Potential project benefits

$$A \times B$$

A: adoption
B: compliance



E(prop'n of required adoption)

$$F \times P \times G$$

F: feasibility
P: socio-political
G: long-term funding



(1 - Risk of failure)

$$1 / (1 + r)^L$$

L: time lag to benefits
r: discount rate



Discount factor for time lags

$$BCR = \frac{\text{Potential project benefits} \times \text{E(prop'n of required adoption)} \times (1 - \text{Risk of failure}) \times \text{Discount factor for time lags}}{\text{Project cost}}$$

Project cost



$$C + PV(M+E) \times G$$

C: project cost
M: annual maintenance cost
E: polluter-pays compliance costs
PV: summed present value over 20 years
G: long-term funding

Uses of INFFER

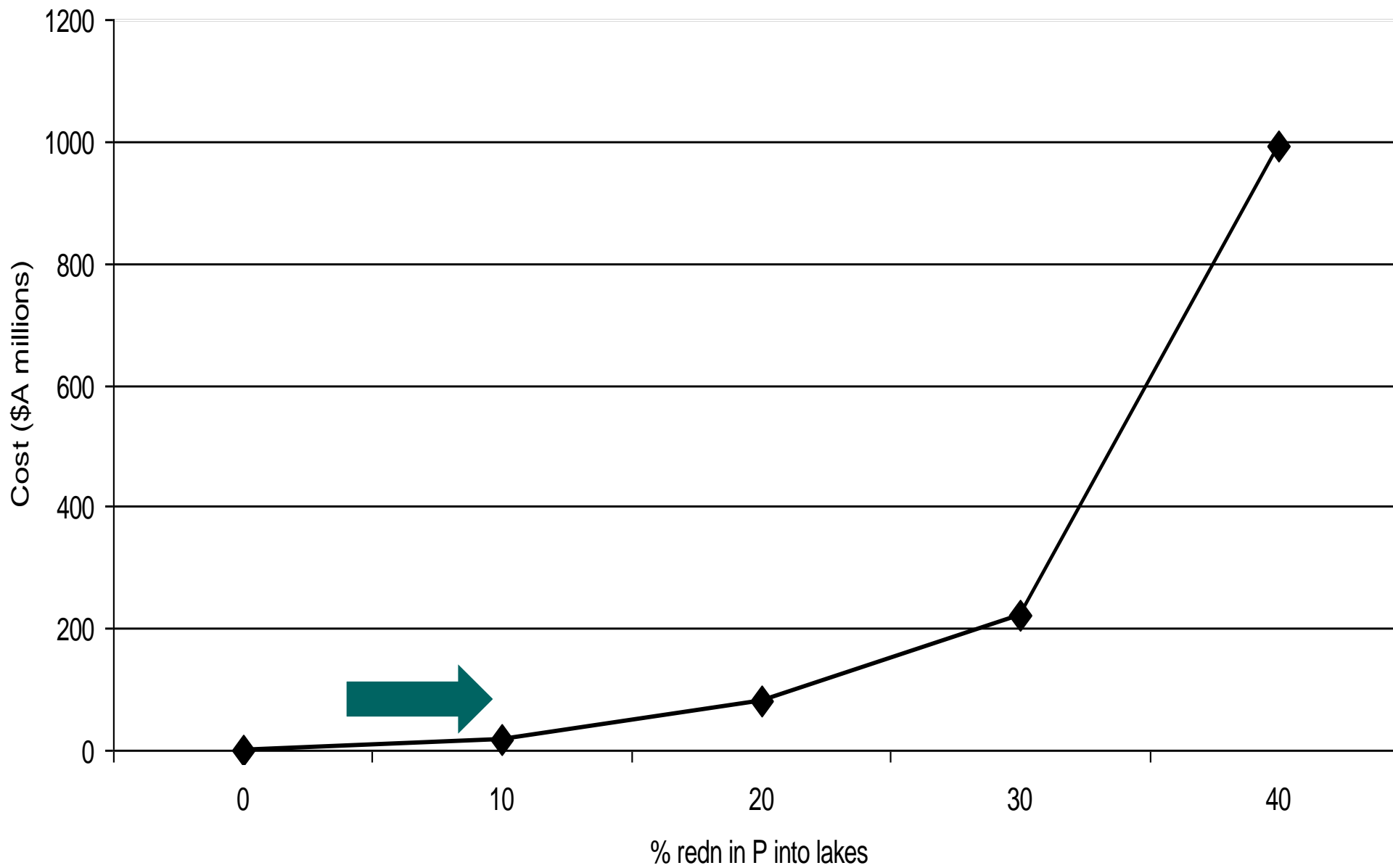
- Integrates science, social, economic, political factors
- Select most cost-effective investments
 - ◆ **Between different assets (scales and types)**
 - ◆ **Between different project scenarios**
- Inform more realistic target setting
- Think harder about pollutants & costs
- Inform realistic farm adoption/BMP scenarios
- Inform more realistic costs

GIPPSLAND LAKES



Melbourne





Gippsland Lakes BCR analysis

Scenarios	% P target	Upfront \$ million	Maintenance \$ million	BCR
40% Least cost	40	584	38	0.03
30% Least cost	30	117	10	0.25
20% Least cost	20	54	2.5	1.00
10% Least cost	10	10	0.6	2.57
Dairy incentives	9	14	1	1.73
Waste management	6	5	1	2.81

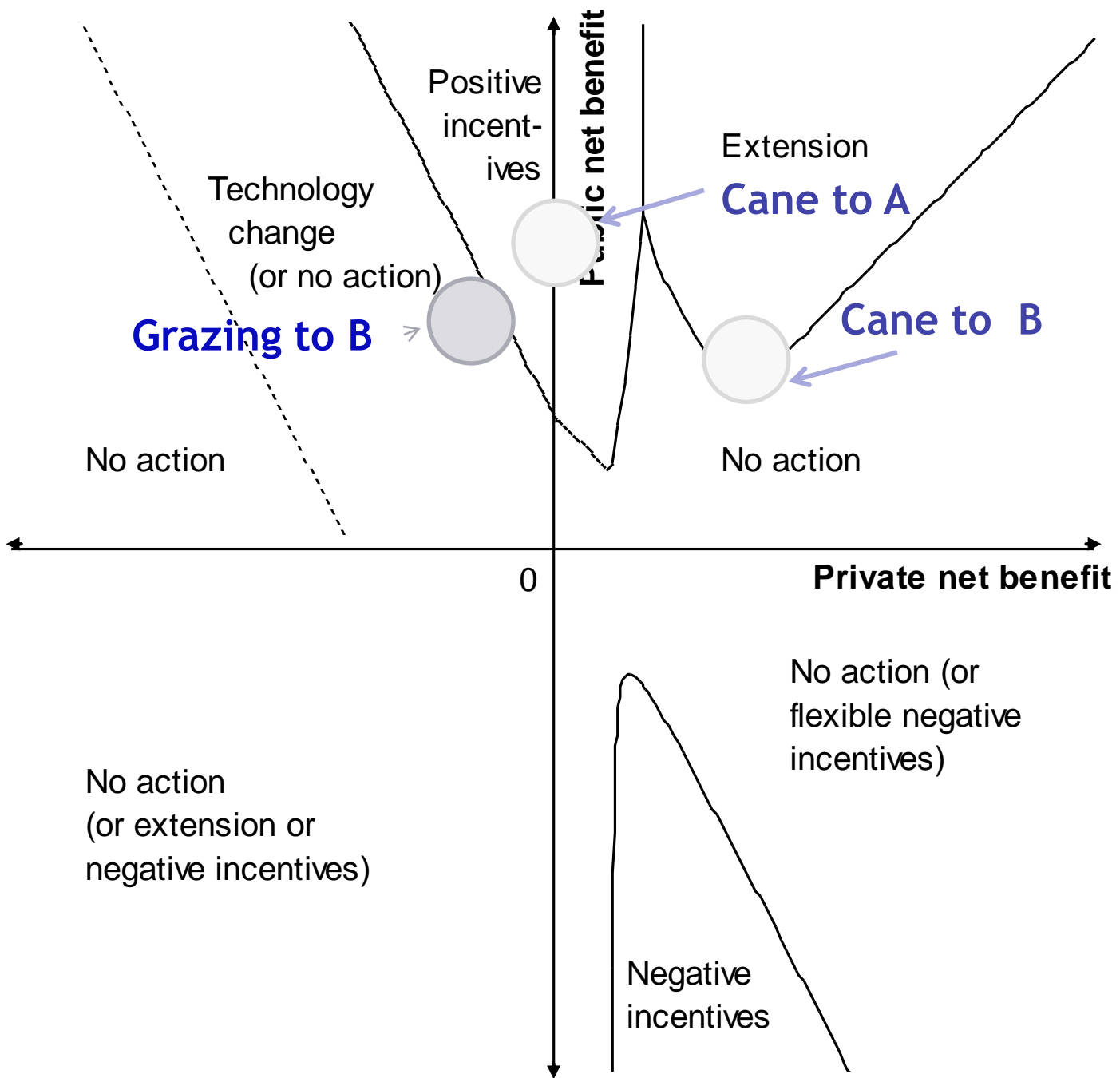


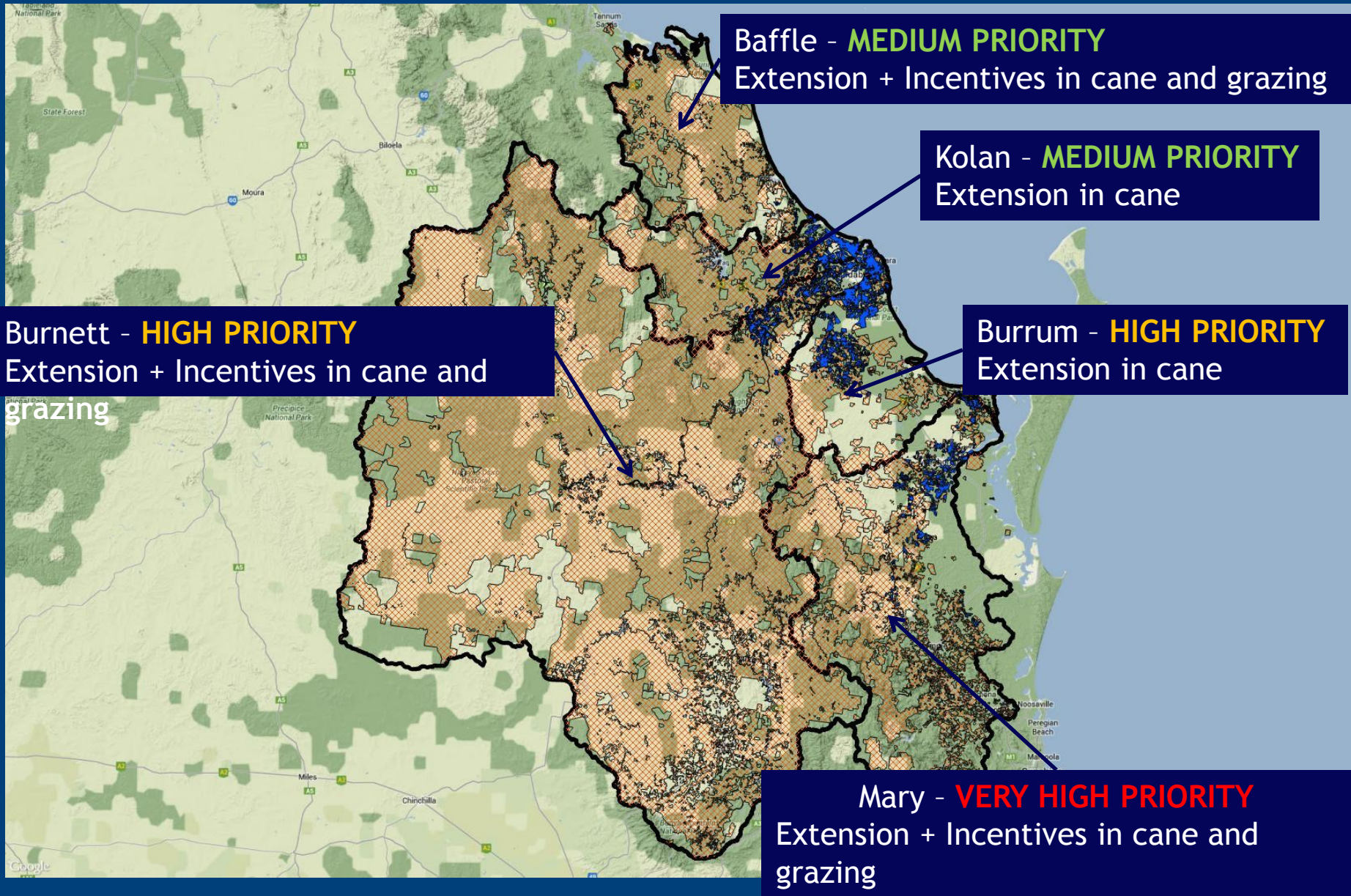
Great Barrier Reef

- One of the 7 wonders of the natural world
- Australia's premier asset
- Under great threat
 - ◆ Water quality (mostly from agriculture – cane, grazing)
 - ◆ Climate change
 - ◆ Development/port dredging
- Targets set (still evolving with science and politics)
- Money allocated
 - ◆ Majority for on-farm BMPs
- Weak regulations begun
 - ◆ Government now backing away
- INFFER helping with discussion about costs, feasibility, trade-offs, targeting, balance between policy mechanisms

Agricultural BMPs

- A - Aspirational
 - ◆ Good for environment, not proven commercially
- B - Industry 'best-management'
 - ◆ Leading farmers have adopted
 - ◆ Government and industry encourage
- C - Current practice
 - ◆ Commercial, traditional
- D - Below standard
- Way behind USA in BMP effectiveness estimates





Implications (relevant in US & Aus)

- Choice of pollutant(s) has big impacts on cost and risks
- Massive scale of adoption to achieve modest targets
- Voluntary adoption of BMPs insufficient
- Costs are much higher than program budgets
- Need on-going payments to maintain benefits and/or regulation of land management activities
- Socio-political risks and lack of long-term funding have major impacts on cost-effectiveness

How might INFFER be useful?

- Comparison between local and Bay outcomes
 - ◆ **Easier to cost-effectively remove impairments on some assets than others**
- Integration and more transparent consideration of science, modelling, economics, socio-political factors
- Enables a ‘less finger pointing’ discussion on the really difficult issues facing the Bay
- More discussion on targeting and more cost-effective policy approaches
- Balance and cost-effectiveness considerations between voluntary and regulatory approaches