

A change may be as good as a holiday for biodiversity management

Conservation decision-making is restricted by a paucity of knowledge regarding the systems we are trying to conserve. Given the urgency of conservation issues many conservation scientists and managers have been contemplating how best we can learn about these systems whilst we manage. This is the crux of adaptive management, a term now synonymous with the policy of most environmental agencies. Indeed, adaptive management has been widely discussed as the best, and maybe only, way to track and adapt to the environmental impacts of a changing climate.

Monitoring plays a vital role in learning and informing the decisions of management agencies, and is a key component of adaptive management. Despite this, current monitoring practices are generally poorly connected with decision-making. Indeed, even when monitoring is justified by a need to improve management, clear connections between monitoring and management, are rarely formalised. In this talk we will discuss the role of monitoring in how we learn and adaptively manage the environment. We will highlight these ideas with real-world conservation management case studies.

Relevant publications

- McDonald-Madden E, Baxter PWJ, Possingham HP (2008) Making robust decisions for conservation with restricted money and knowledge. *Journal of Applied Ecology* 45, 1360-1638.
- Chadès I, McDonald-Madden E, McCarthy MA, Wintle B, Linkie M and Possingham HP (2008) When to stop managing or surveying cryptic threatened species. *Proceedings of the National Academy of Sciences*, 105, 13936-13940.
- McDonald-Madden E, Bode M, Game ET, Grantham H, Possingham HP (2008) The need for speed: informed land acquisitions for conservation in a dynamic property market. *Ecology Letters* 11, 1169-1177.
- McDonald-Madden E, Gordon A, Wintle B, Grantham H, Walker S, Carvalho S, Bottrill M, Joseph M, Ponce R, Stewart R, Possingham HP (2009) 'True' conservation progress. *Science* 323, 43-44.



Dr Eve McDonald-Madden

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University of Queensland

Day 2, 9.00am

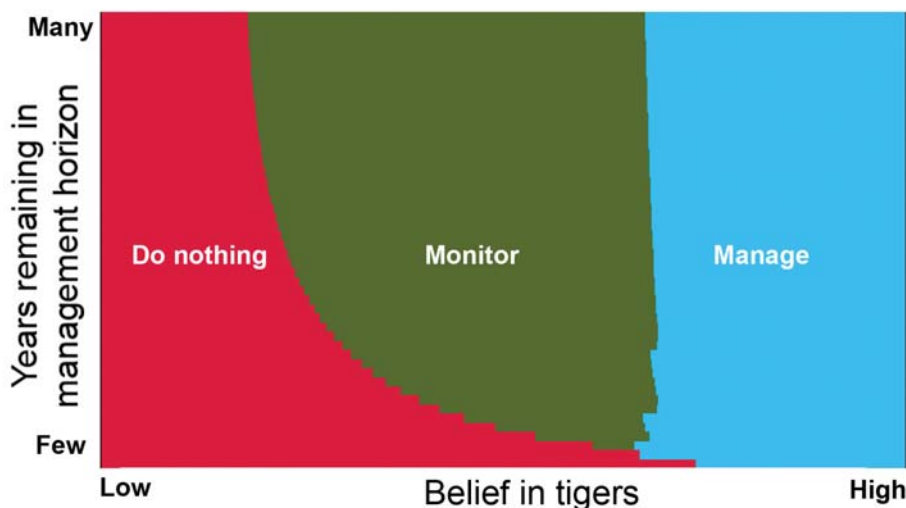
Area of work: Conservation Management

Area of speciality: My research is essentially applied theoretical ecology focussing on integrating optimal monitoring strategies into a decision theory approach for wildlife management and conservation planning.

In particular, I am interested in the use of this framework for evaluating the ecological and economic costs and benefits of adaptive management in conservation for threatened species management, invasive species control, land acquisition for reservation and zoning of conservation areas.

Take-home messages:

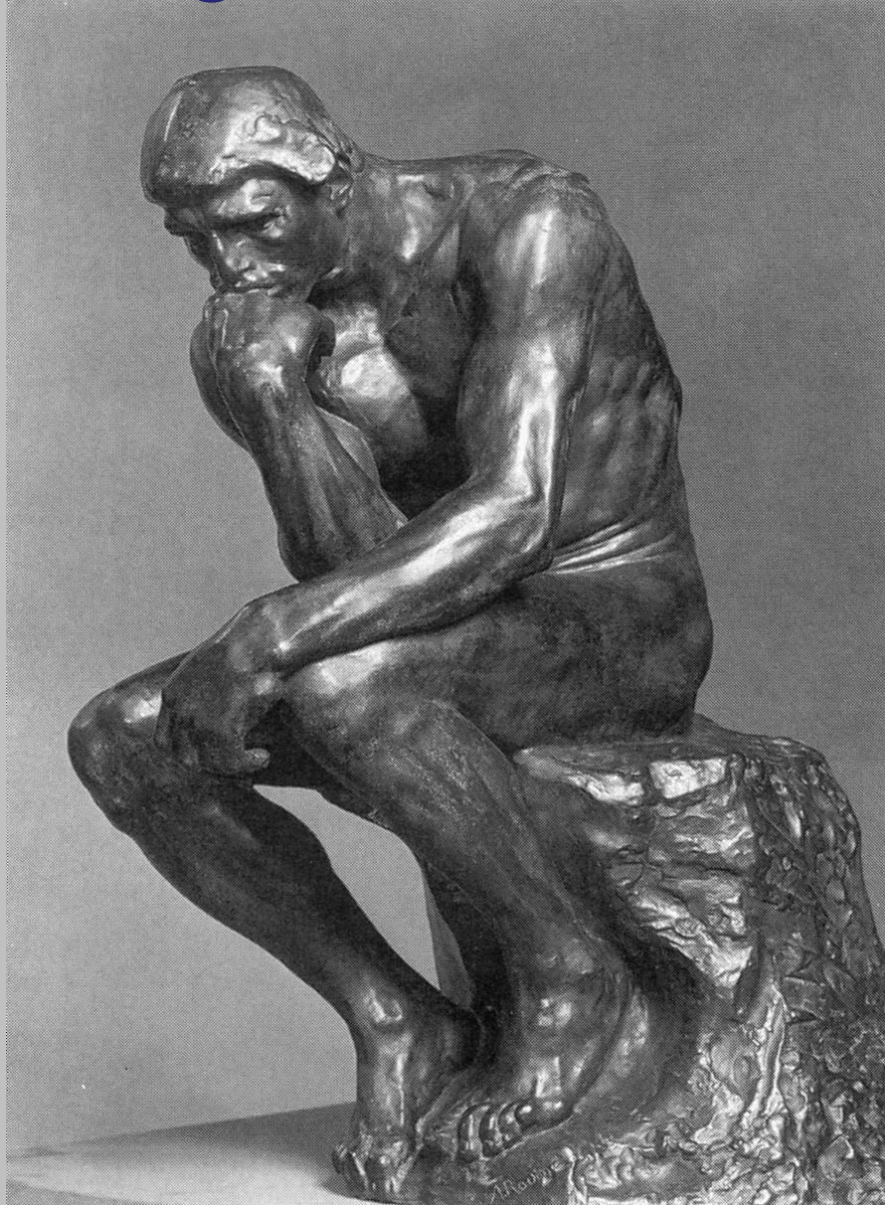
1. Contemplate the wise words of Confucius who once said "Learning without thought is labour lost".
2. Monitoring can benefit management for a variety of reasons but should not be considered a compulsory action.
3. It is important to realise that sometimes the best monitoring plan may be to not monitor at all!



Drs Eve McDonald-Madden and Iadine Chades along with other collaborators from AEDA headed a study to investigate when to protect, monitor or do nothing for a threatened species given the costs and benefits of implementing these actions. Decisions in this study were based around how strongly managers believed a species was present in an area. Particularly interesting was the incorporation of the ability of a monitoring strategy to detect the species of concern and thus impact a manager's belief in species persistence. As a case study they focussed on management of the highly valued Sumatran Tiger in Kerinci Seblat National Park.

thought is labour lost.

Learning without



Confucius

Limits of time and money



GET ALL THE
INFORMATION YOU CAN,
WE'LL THINK OF A
USE FOR IT LATER.

SLANE

Mantra for wise conservation

‘Monitoring without thought
is a loss of **time** and **money**
and ultimately **biodiversity**’

Monitoring *with* thought



Opinion

TRENDS in Ecology and Evolution Vol.21 No.12

Full text provided by www.sciencedirect.com



Monitoring for conservation

James D. Nichols^a and Byron K. Williams^b

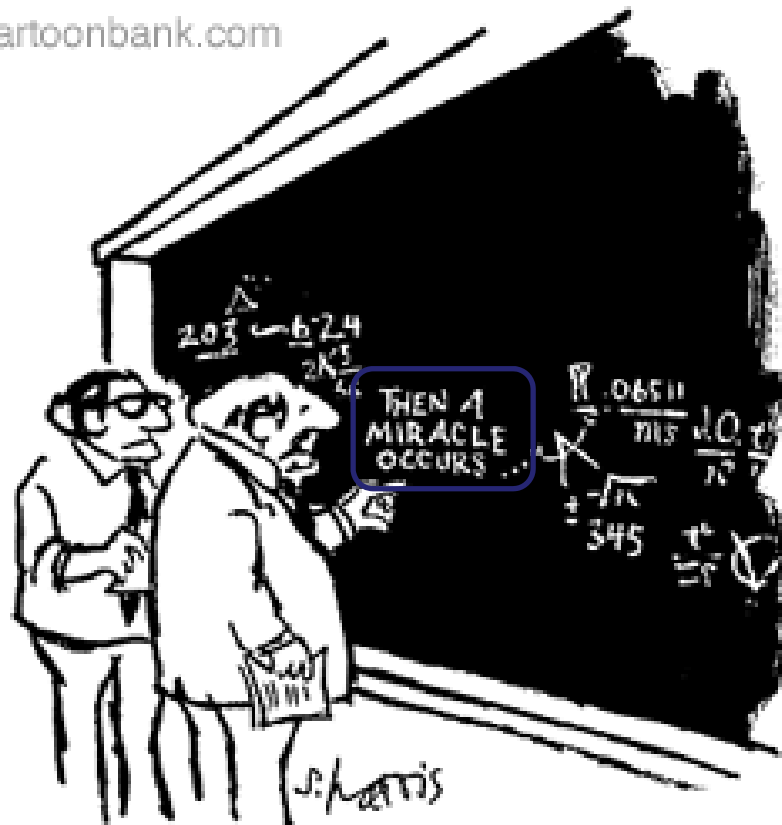
^a USGS, Patuxent Wildlife Research Center, Laurel, MD 20708, USA

^b USGS, Cooperative Research Units, Reston, VA 20192, USA

- State dependent management
- Learning and adaptive management

Deciding to monitor!

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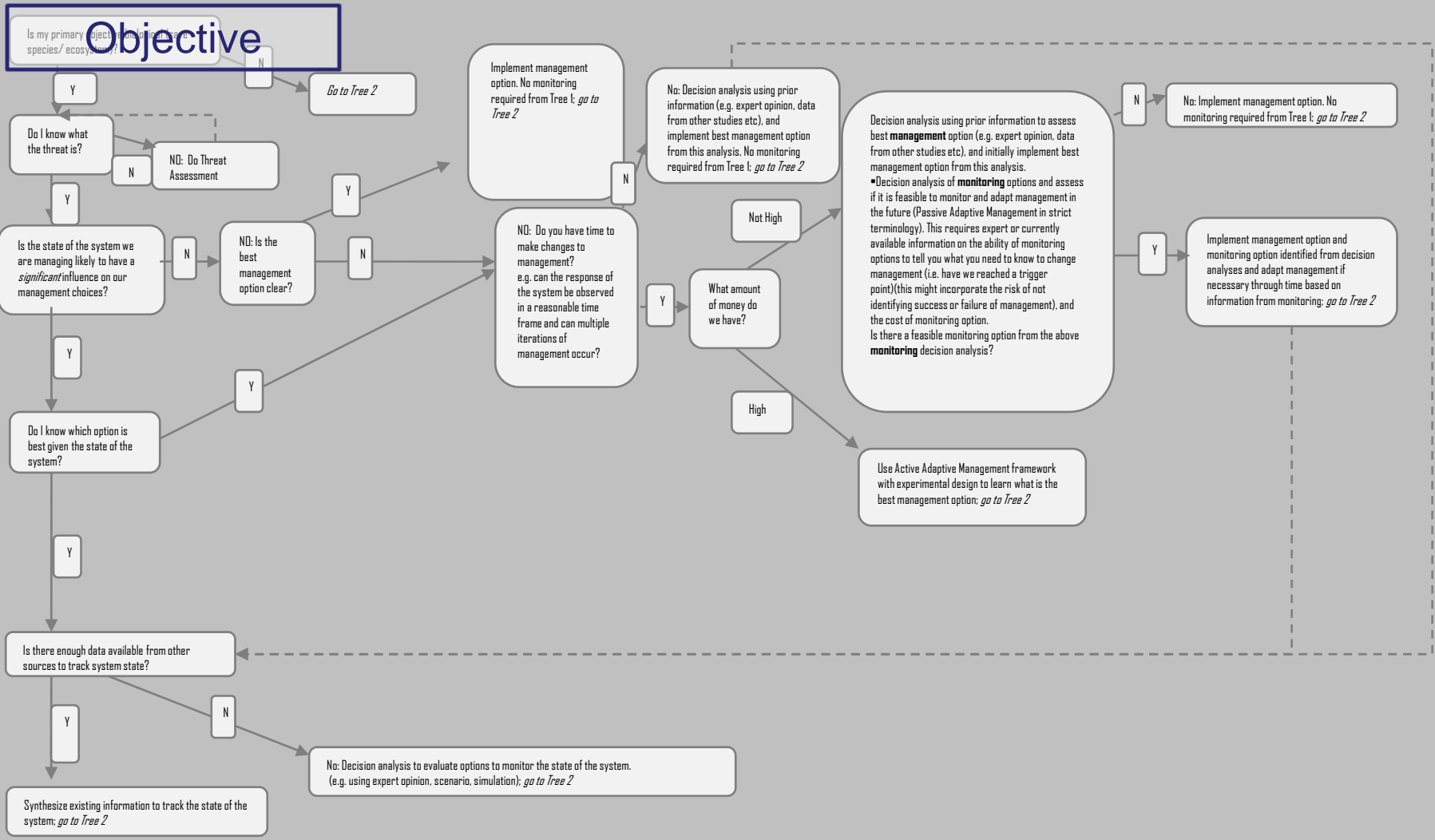
"I think you should be more explicit here in step two."

Key components of explicit framework

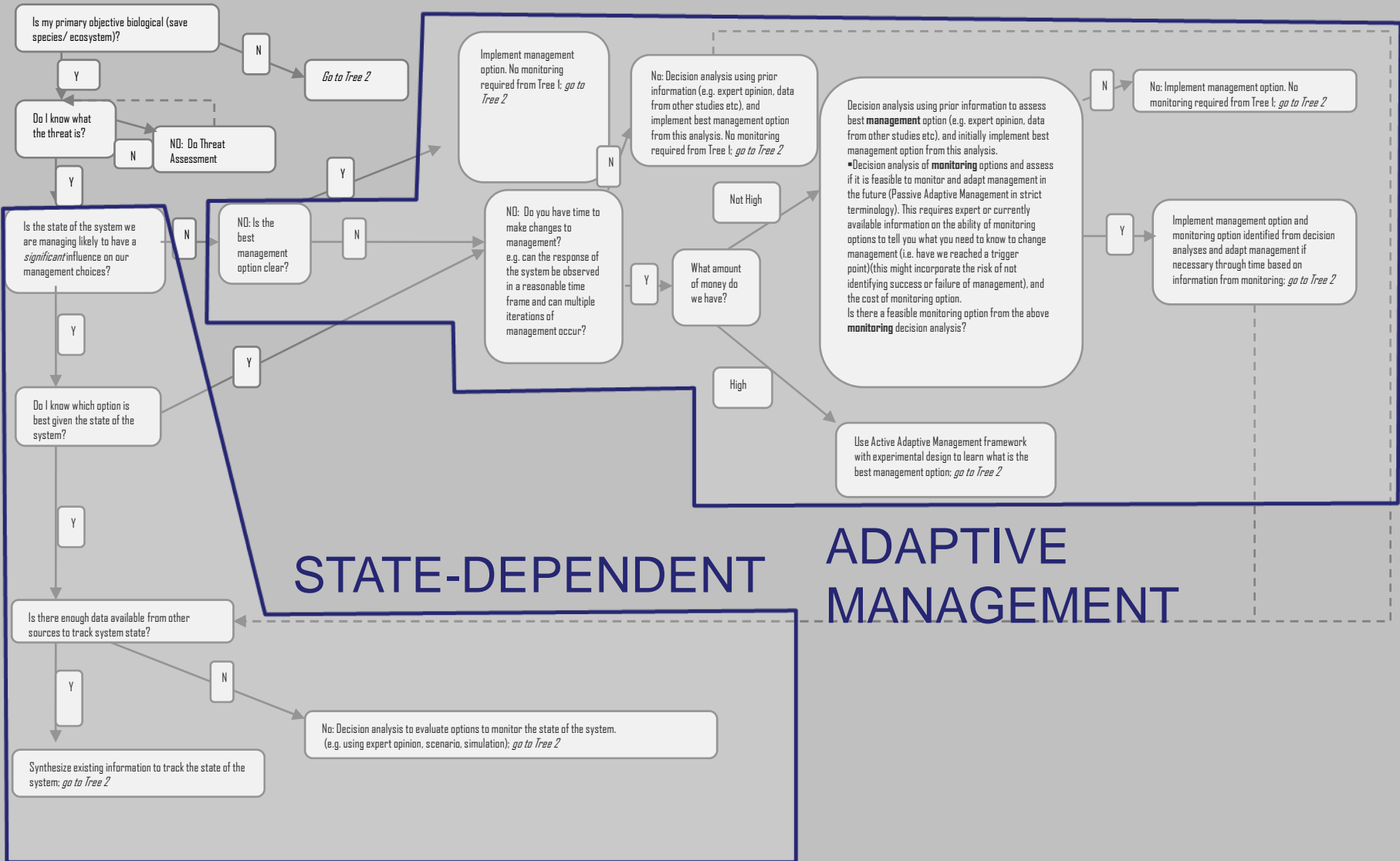
- Objective of program
- Management decisions
- Why of monitoring?
- How of monitoring?
- If we should monitor!



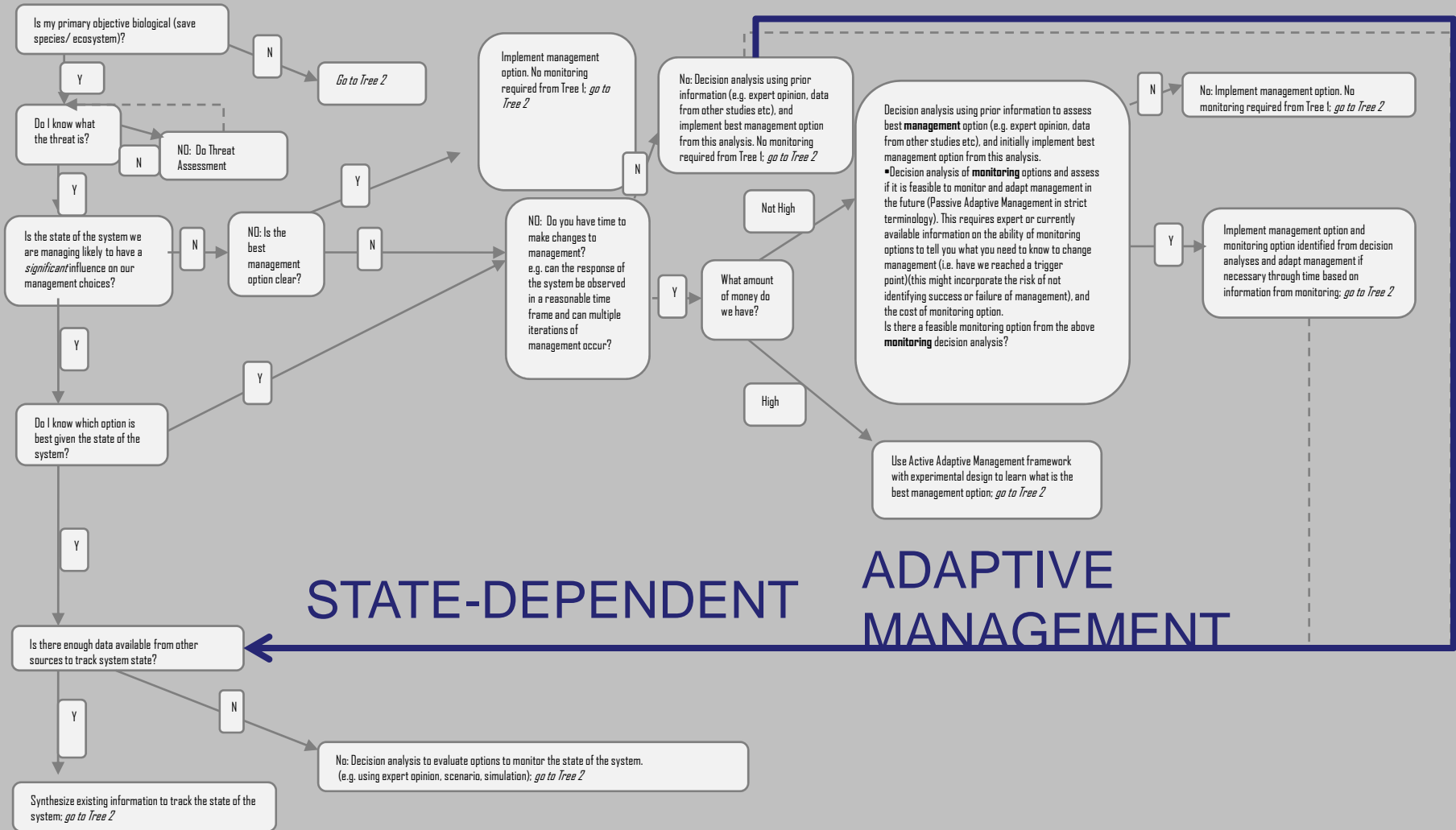
Decision tree - objective



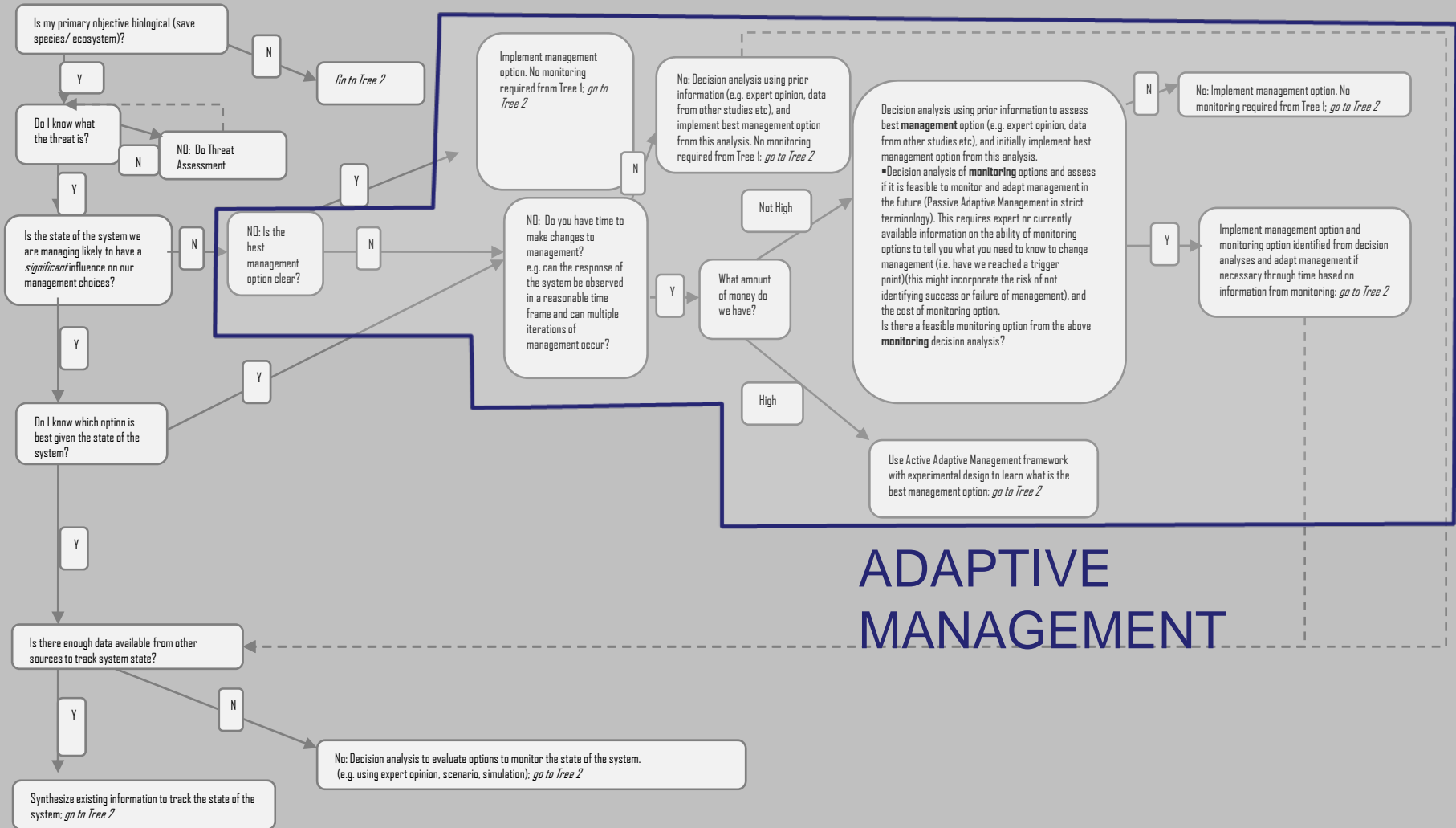
Monitoring – Why, how and if



Links



To adapt



Hypothetic 'real' example – managing the Tassie devil

- Dramatic decline
- Facial tumour disease
- Should we monitor to adapt?



Hypothetic 'real' example – managing the Tassie devil

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The Objective

What is the Objective?

The Objective

What is the objective?

- maximise number of individuals
 - maximise growth of population
- or
- **decrease prevalence of disease**

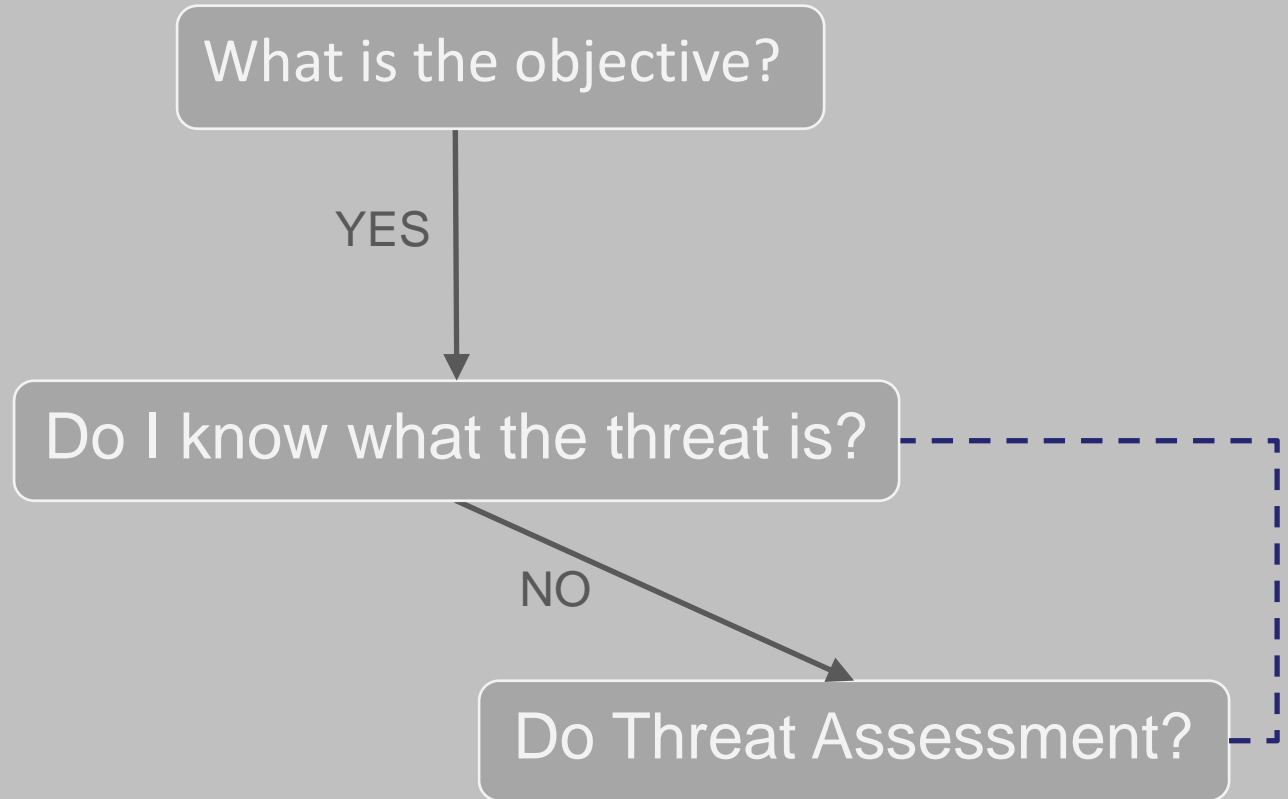
The threat

What is the objective?

YES

Do I know what the threat is?

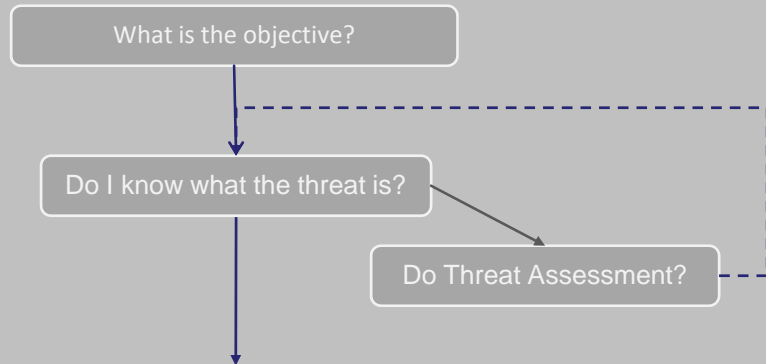
Unknown threat



Knowing what to do



Remove the diseased

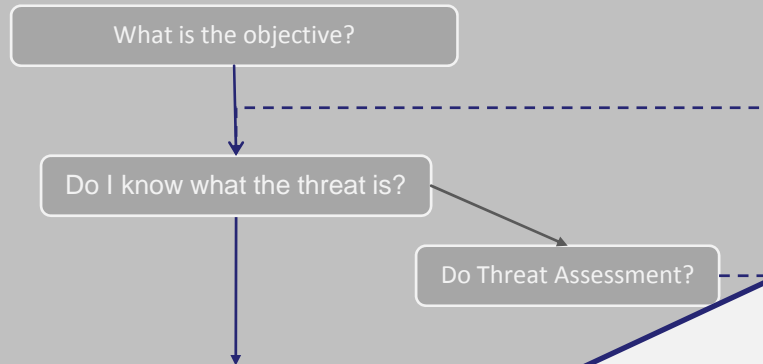


Is the best management option clear?

YES

Implement this action
No monitoring!

Remove the diseased



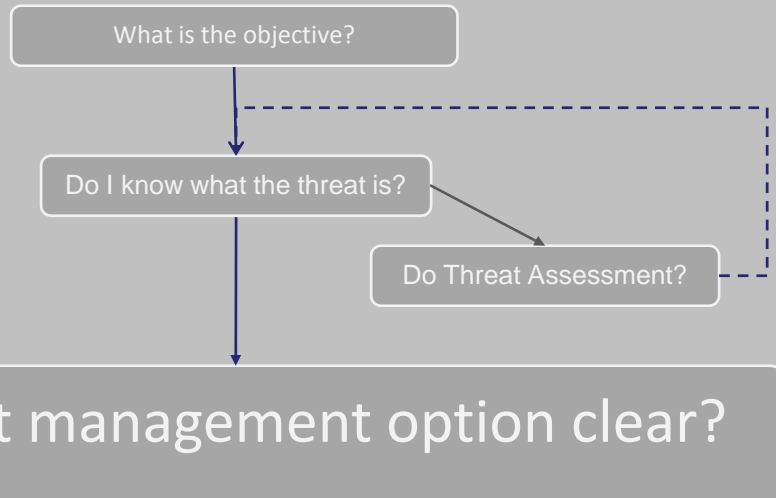
Is the best management option?

STOP

Implement

No monitoring

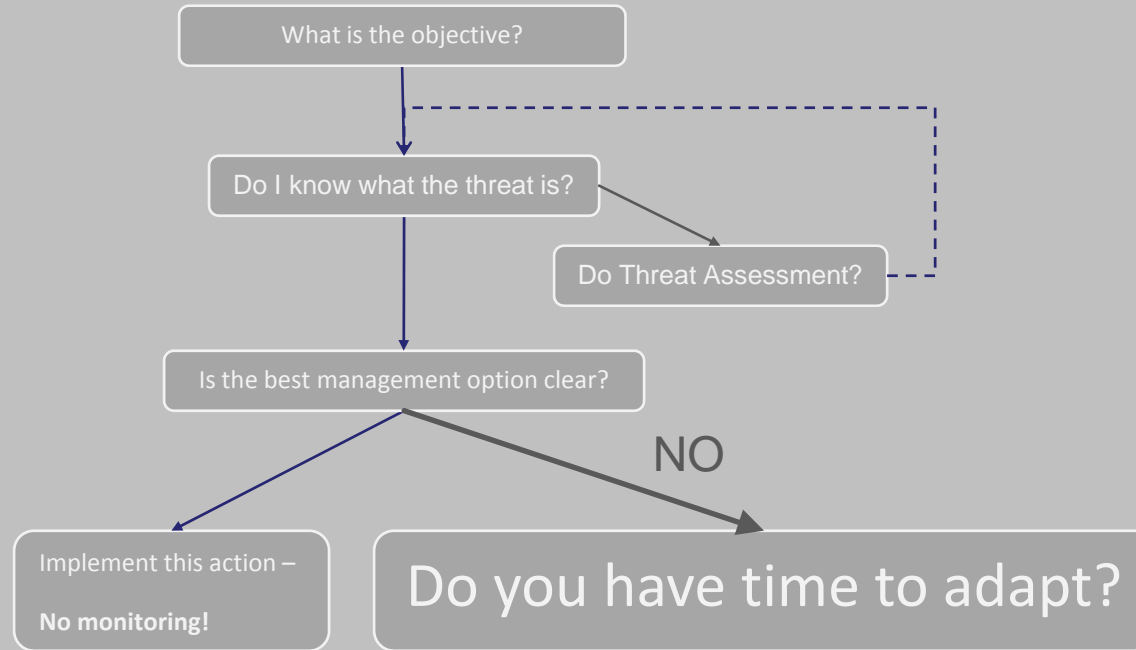
More than one option



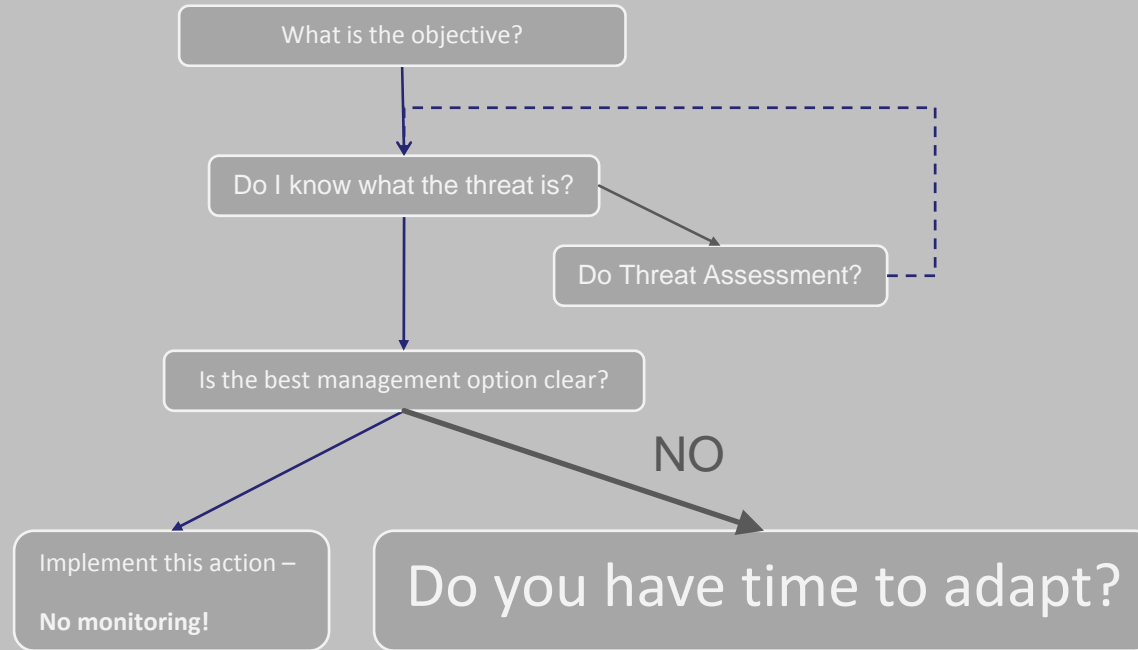
- remove diseased individuals
- remove all adults

Can we learn which?

Time is of the essence

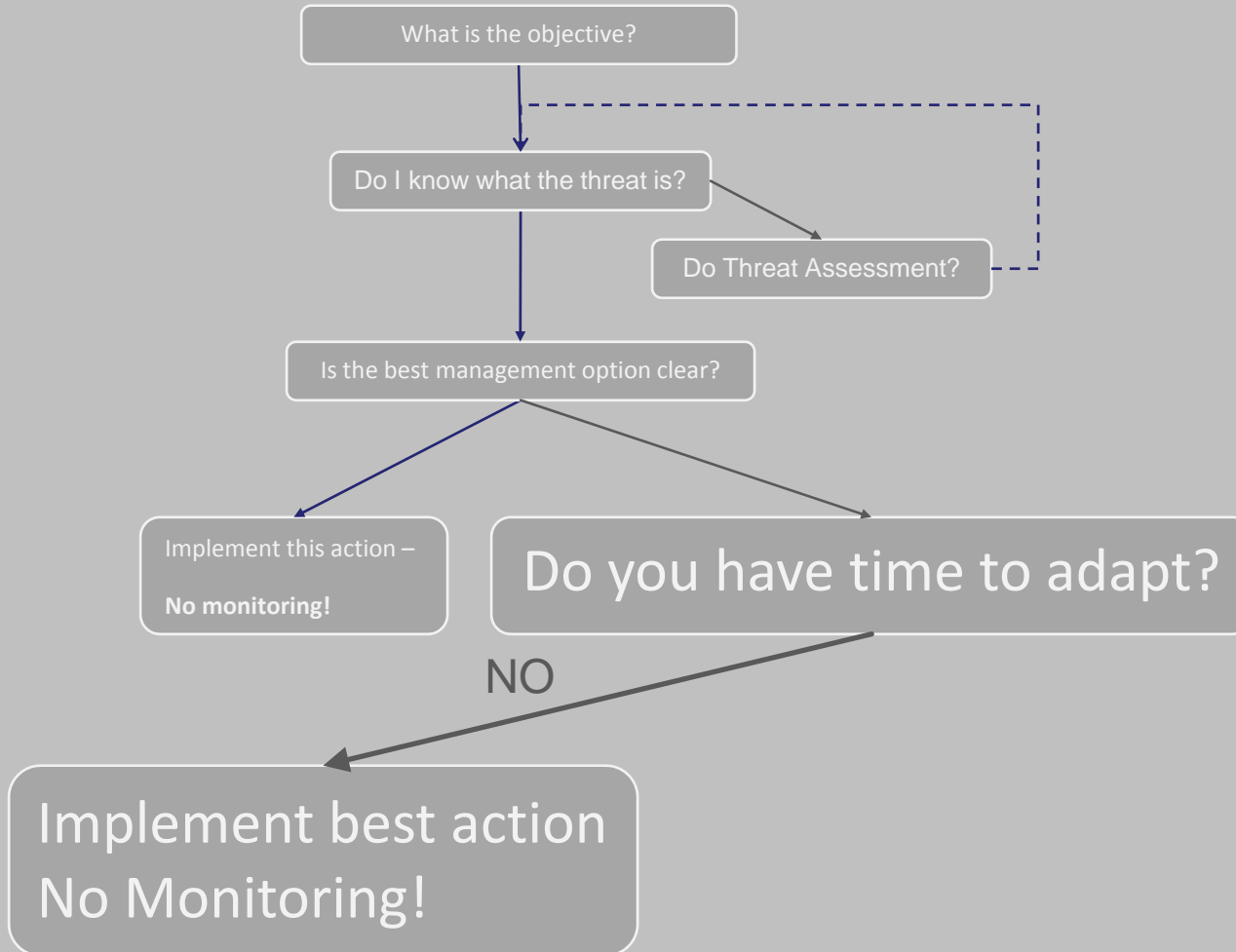


Time is of the essence

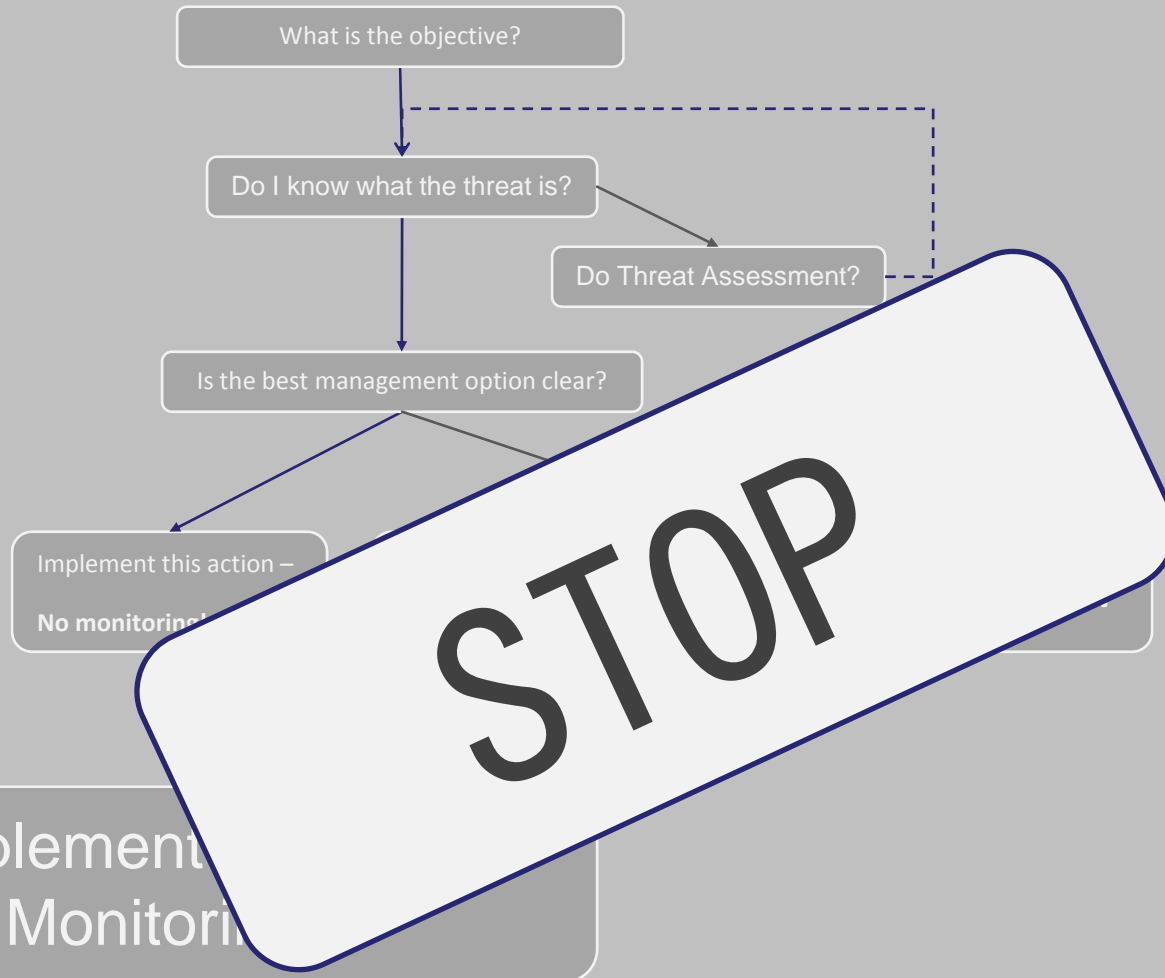


- To observe system response
- Iterations of management
- Before system goes extinct

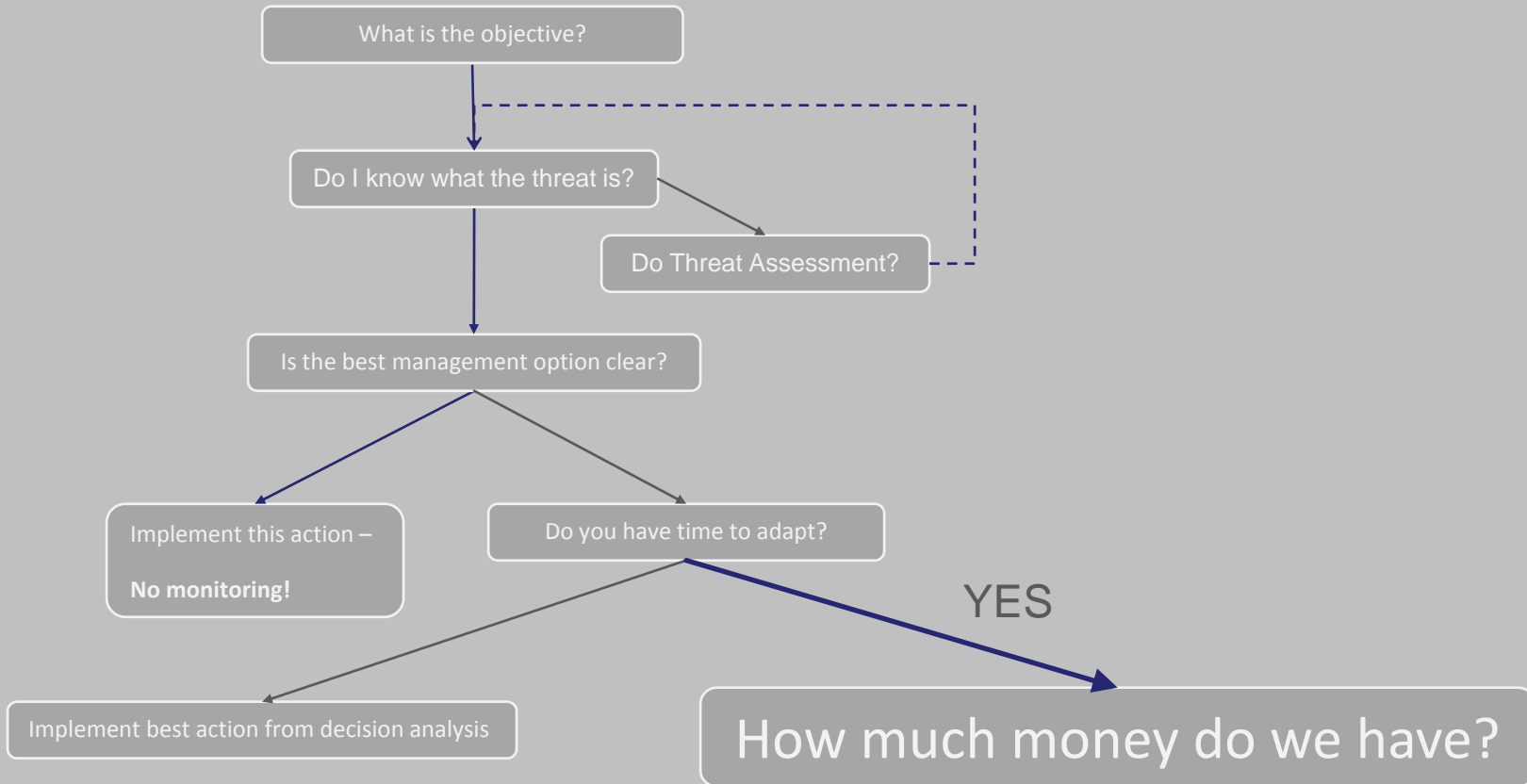
Losing species too fast!



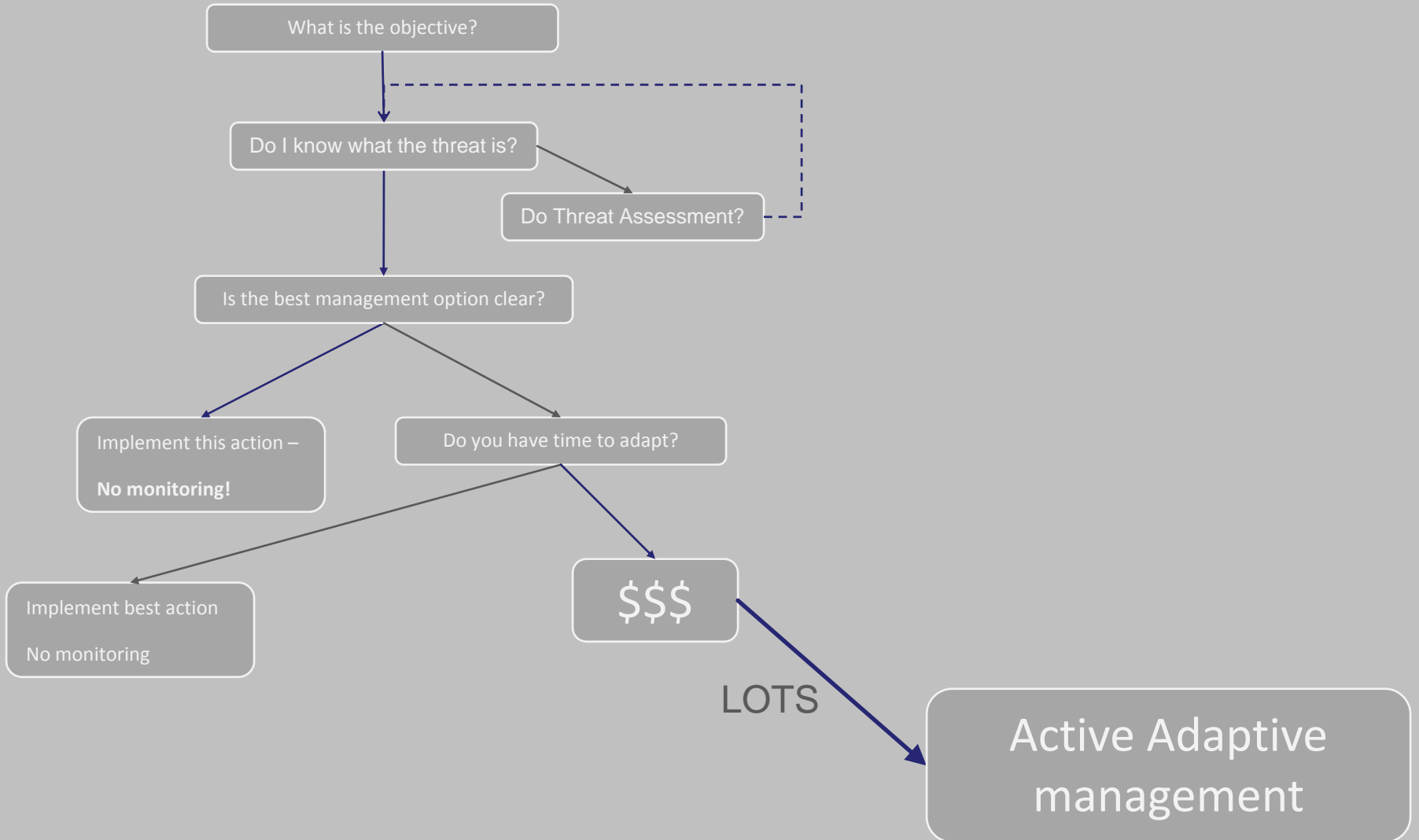
Losing species too fast!



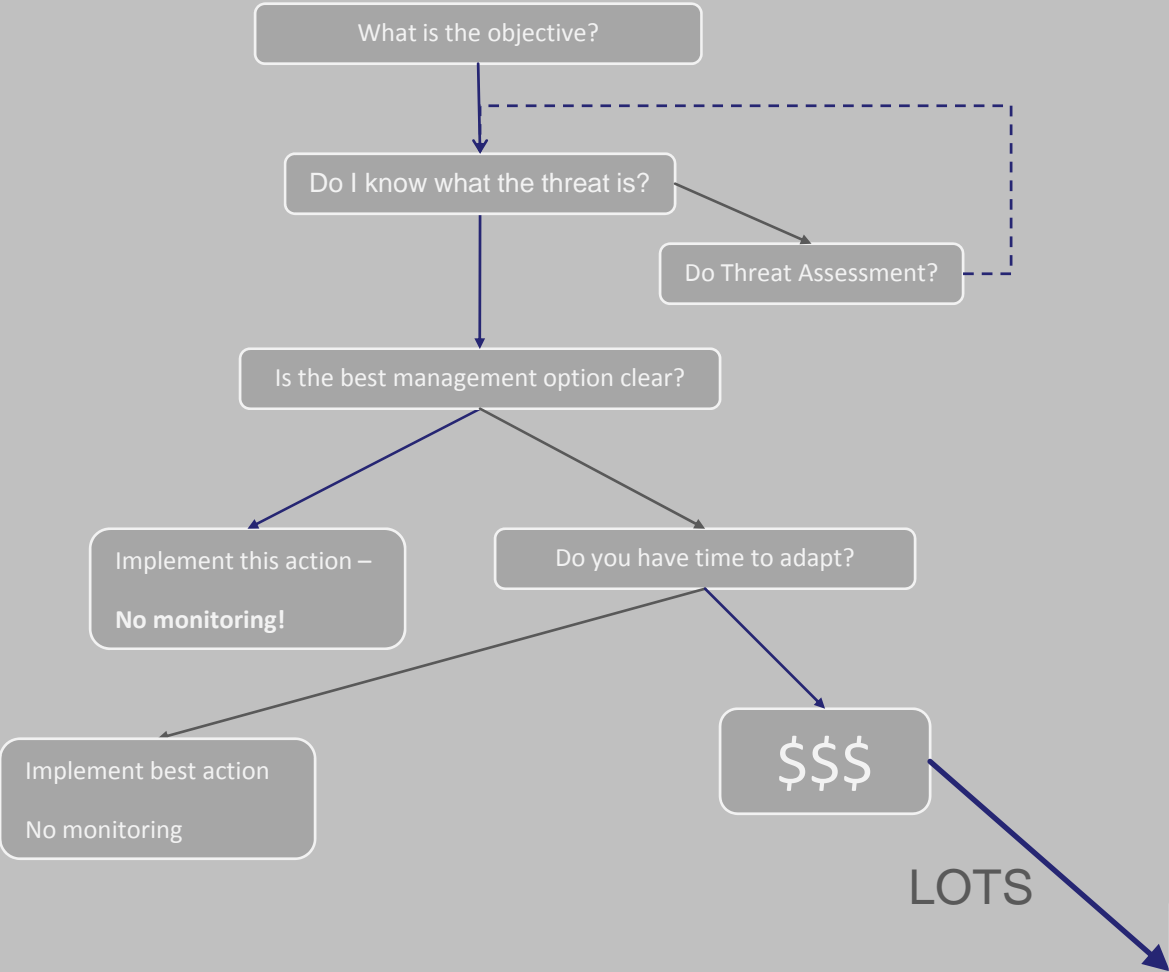
Money matters



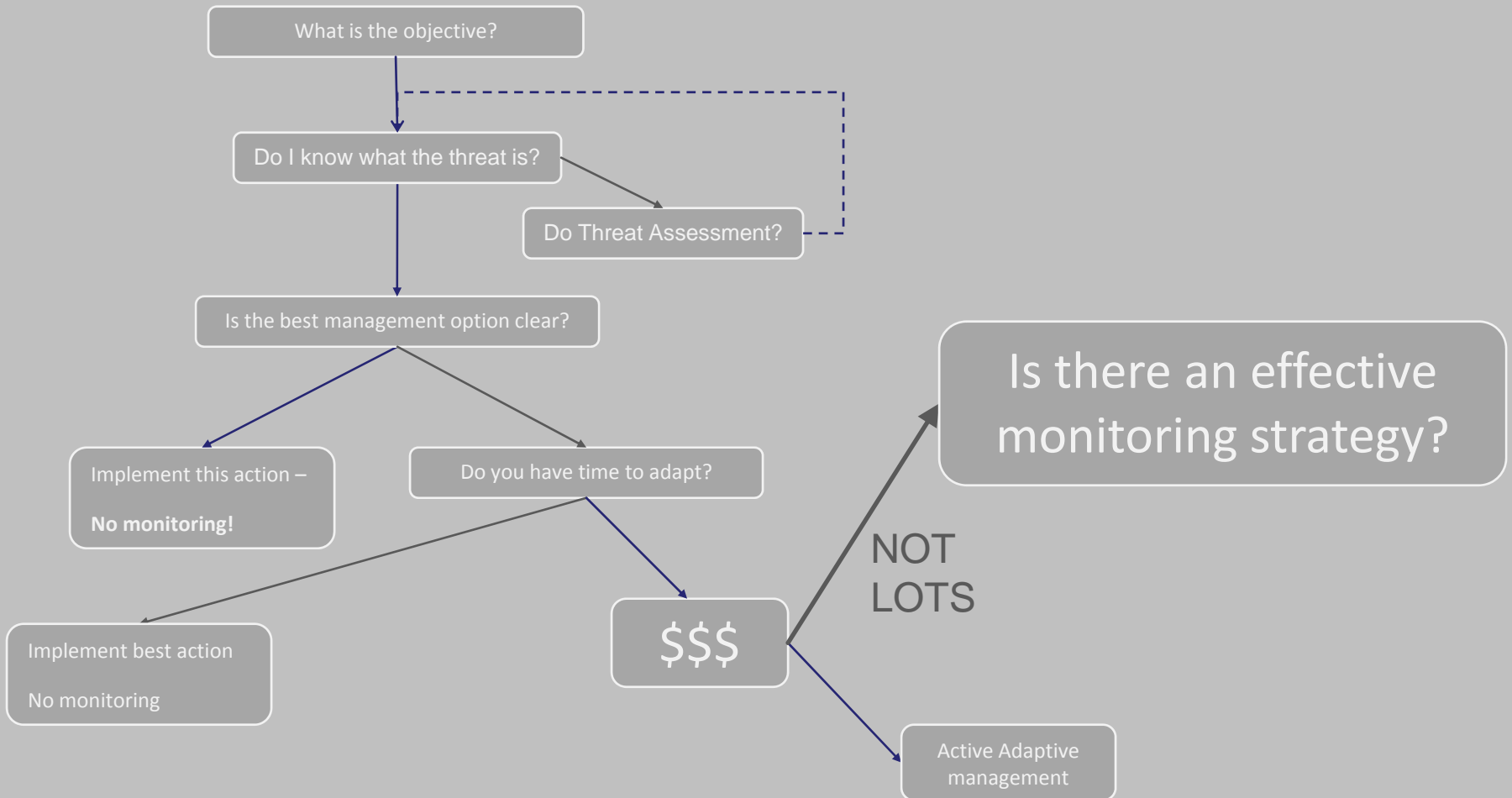
A nice place to be



Not always where we are



Should we monitor?



Effective Monitoring

Decision analysis given *monitoring objective*:

- Cost
- Benefit



Effective Monitoring

Decision analysis given *monitoring objective*:

- Cost
- Benefit



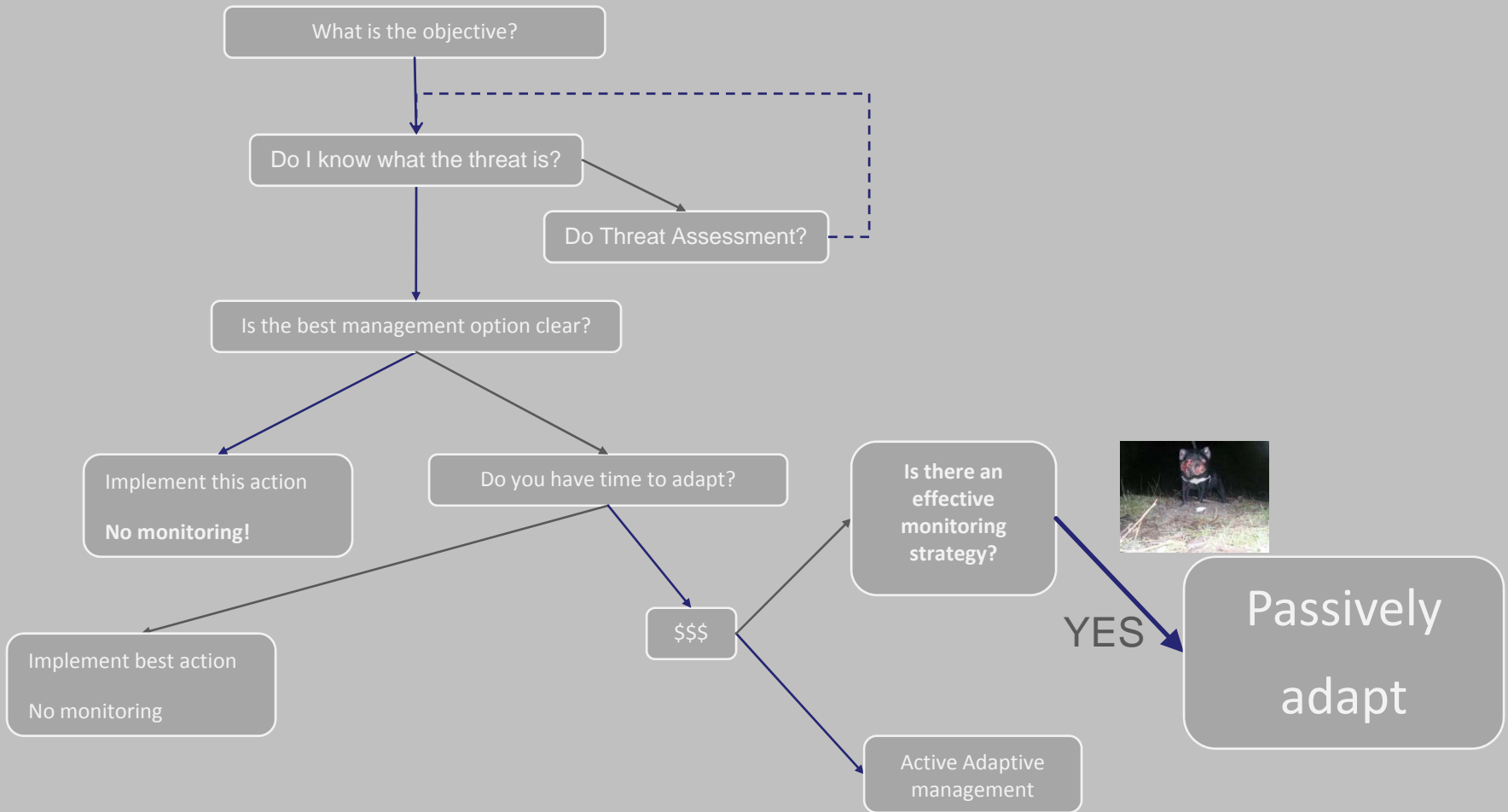
Monitoring - uncertainty



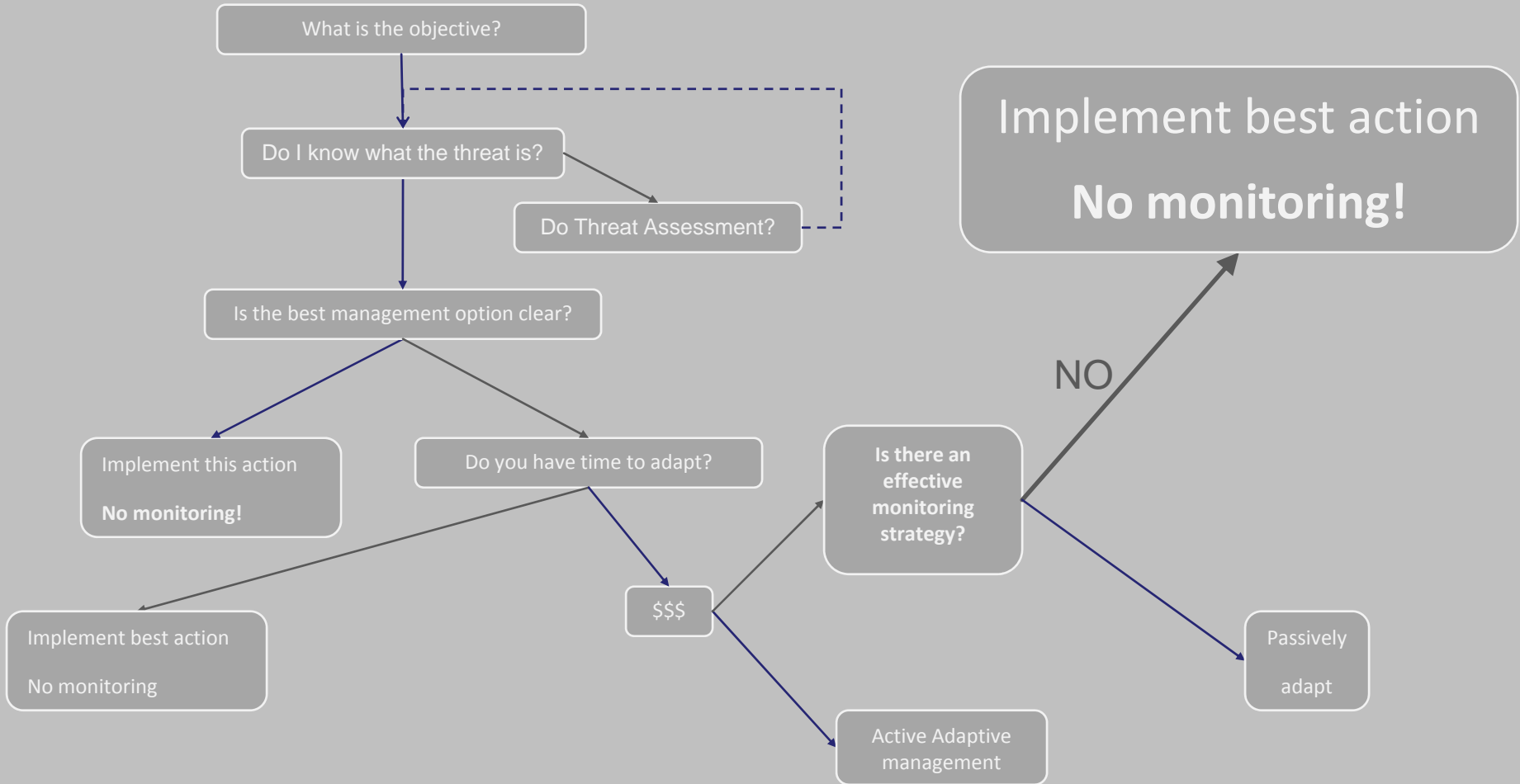
Spotlighting is effective



Passive approach

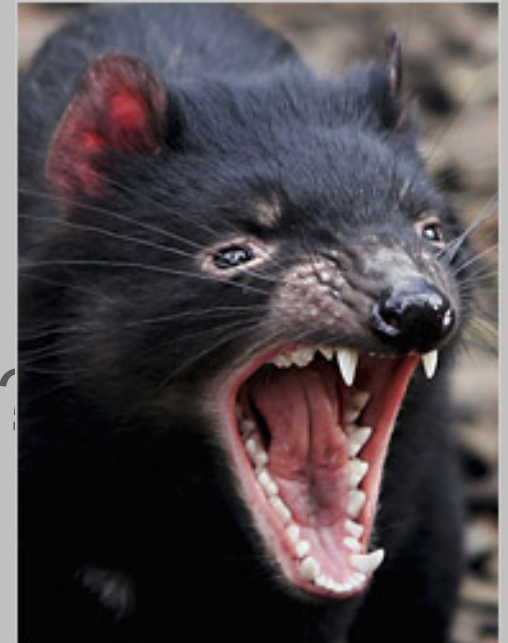


No effective monitoring!



Being explicit about monitoring

- Ask why we are managing
- Why we might monitor?
- Is there effective monitoring?
- Should we monitor?
- The answer in many cases can be.....



NO



Acknowledgement

- **The Nature Conservancy** - C. Groves, J. Montambault, E. Game
- **University of Queensland** - H. Possingham, R. Fuller, P. Baxter
- **CSIRO** - T. Martin