

Right-sizing observation systems: A biodiversity example using a cost-benefit approach

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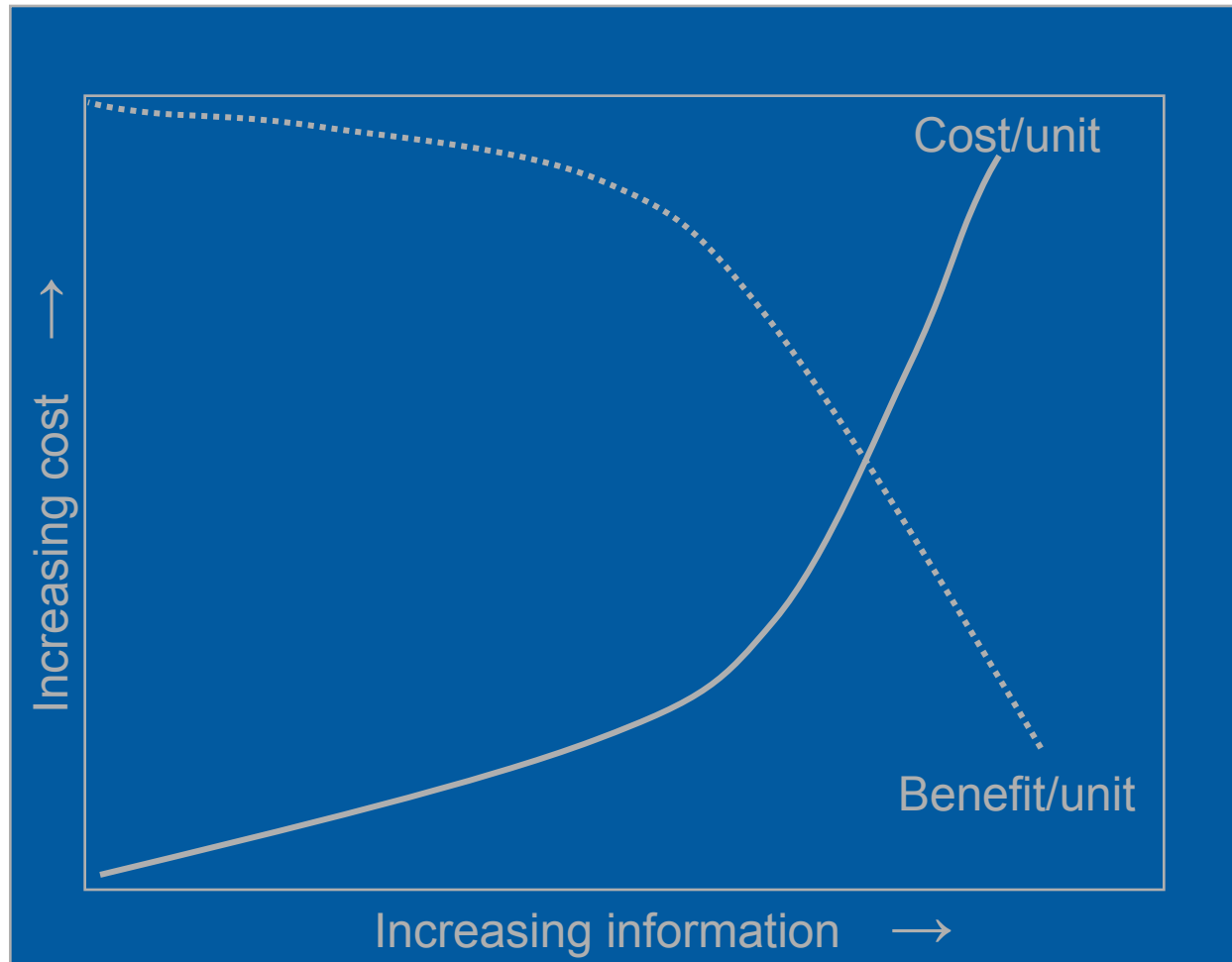
Natural Resources and the Environment

Council for Scientific and Industrial Research

South Africa

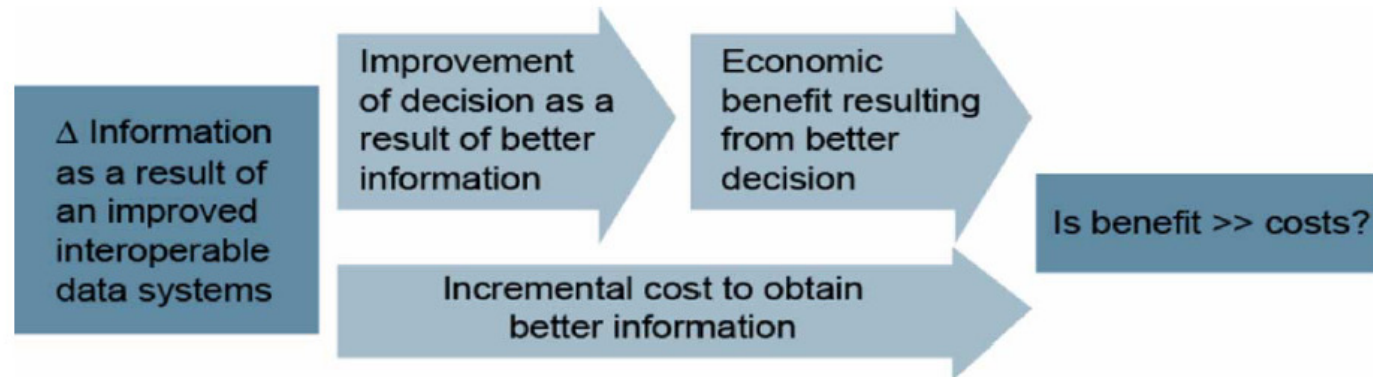


Optimum investment in observation





Benefit chain framework



What is the shape of the cost-benefit relation?

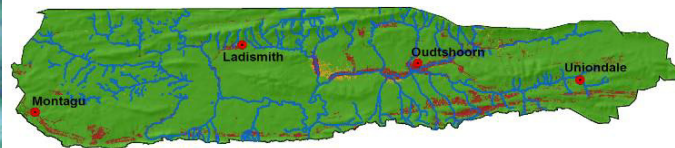
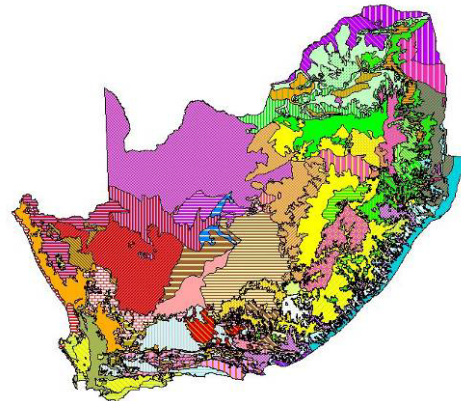
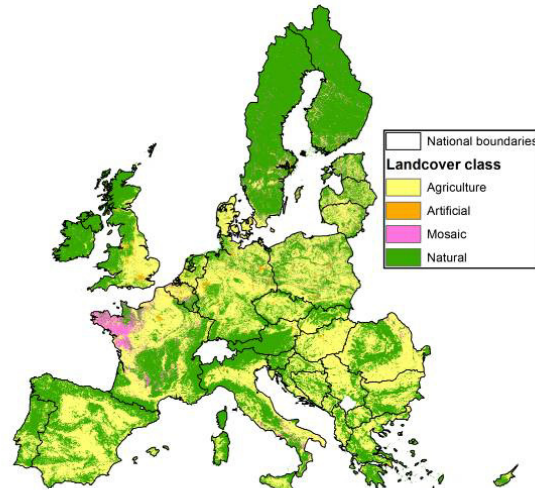
Can global collaboration reduce the cost or increase the benefit?

What variables are most sensitive to increased accuracy?

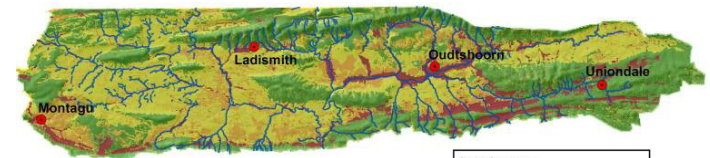
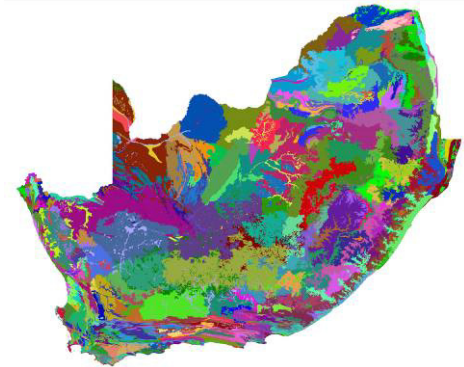
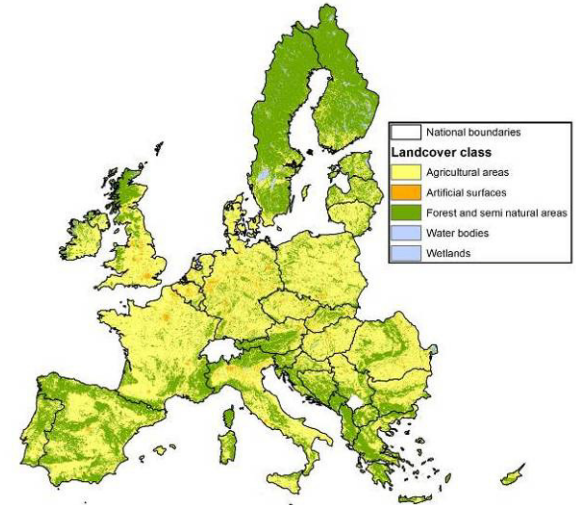


Application

Non GEOSS scenario

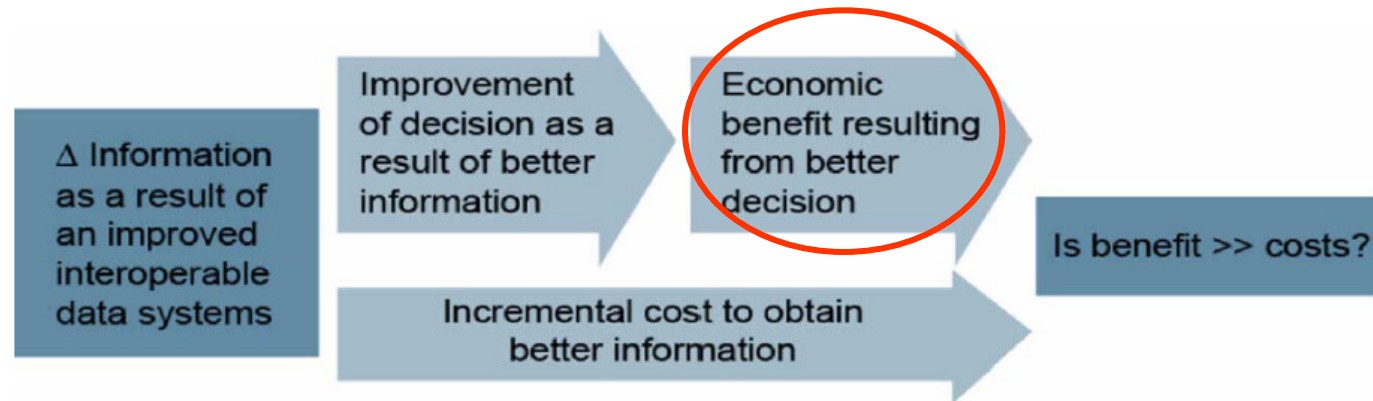


GEOSS scenario





Benefit chain framework



What is the shape of the cost-benefit relation?
Can global collaboration reduce the cost or increase the benefit?
What variables are most sensitive to increased accuracy?



Applying the benefit chain:

Wildlife census



Wildlife census

Cost

= US\$ 70 000



Benefit

= US\$ 40 000





Census sampling effort





How much sampling is enough?

Current practice

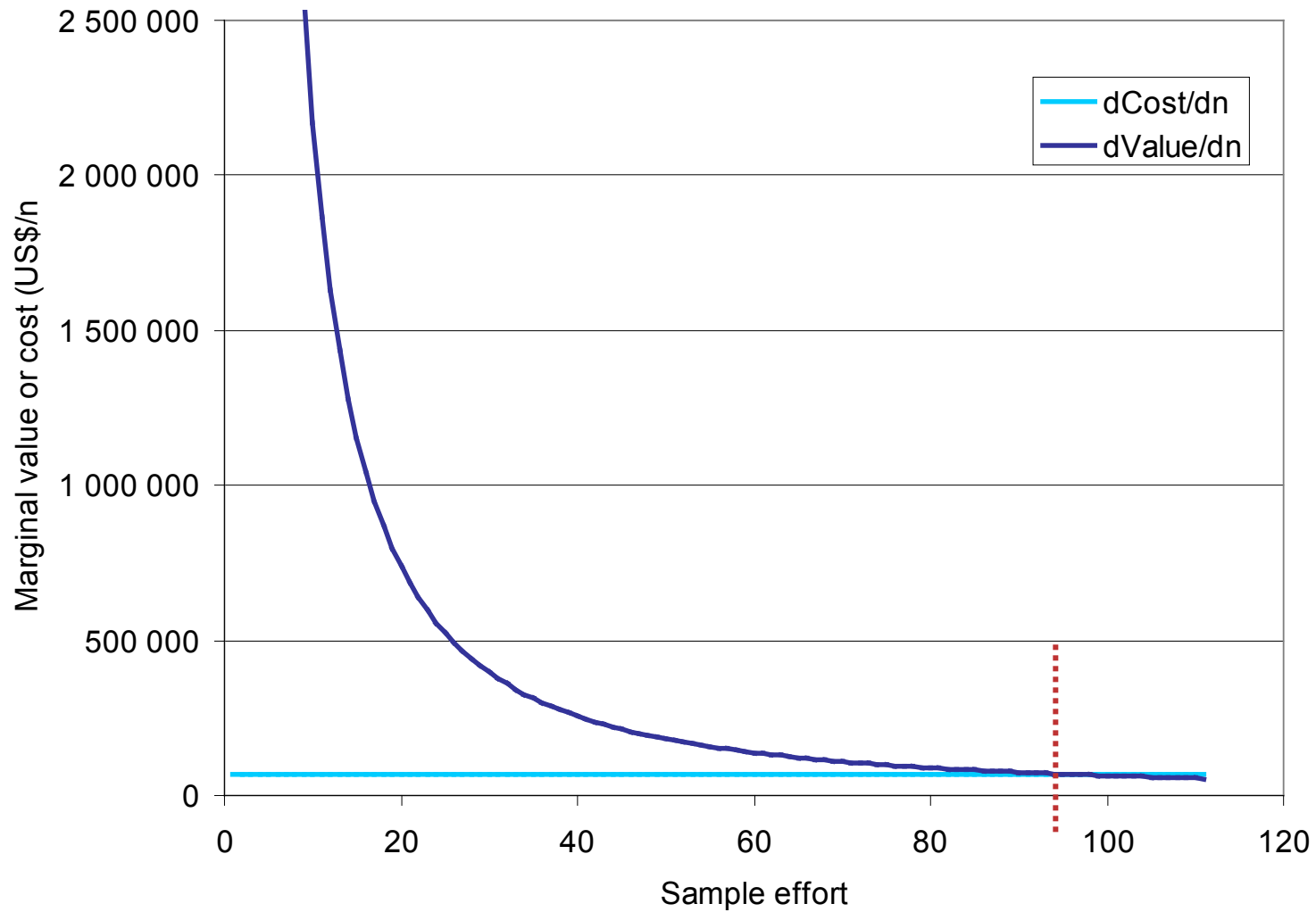
- Effort which reduces the coefficient of variation for the target populations to within an acceptable range (often arbitrarily set at 10%)
- Currently = 15% of area and ~15% CV

Benefit chain logic

- Optimum: cost of an additional unit of effort < marginal value delivered by that effort
- Value = number of animals confidently claimed to exist in the area * market value
- 'Confident claim' = *lower* error range (CV)



Marginal value and cost



Breakeven per species



Species	CV	Value	n
Elephant bulls	15.4	39 370	38
W Rhino	15.1	38 921	71
Impala	11.3	95	8
Giraffe	13.6	1 938	10
Zebra	13.1	643	11
Wildebeest	23.1	203	5
Kudu	15	303	4
Warthog	40.6	106	3
Waterbuck	31.8	670	6
All			95



The value of information in KNP

- Market value \neq Social value



Information for managers

- Why do managers need to know numbers?
- How accurate must the numbers be?
- How much is this improved information worth?

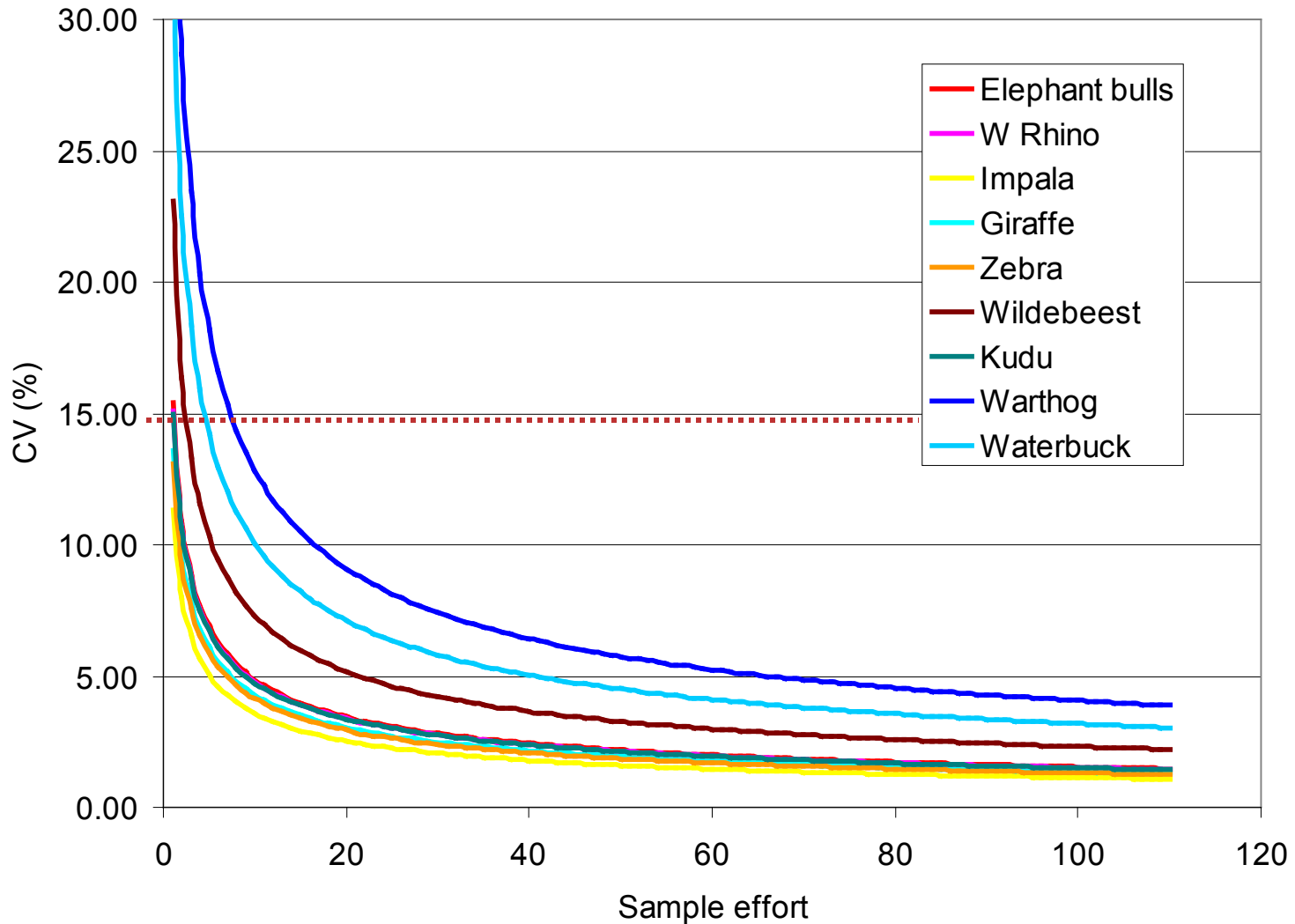


Thresholds of potential concern

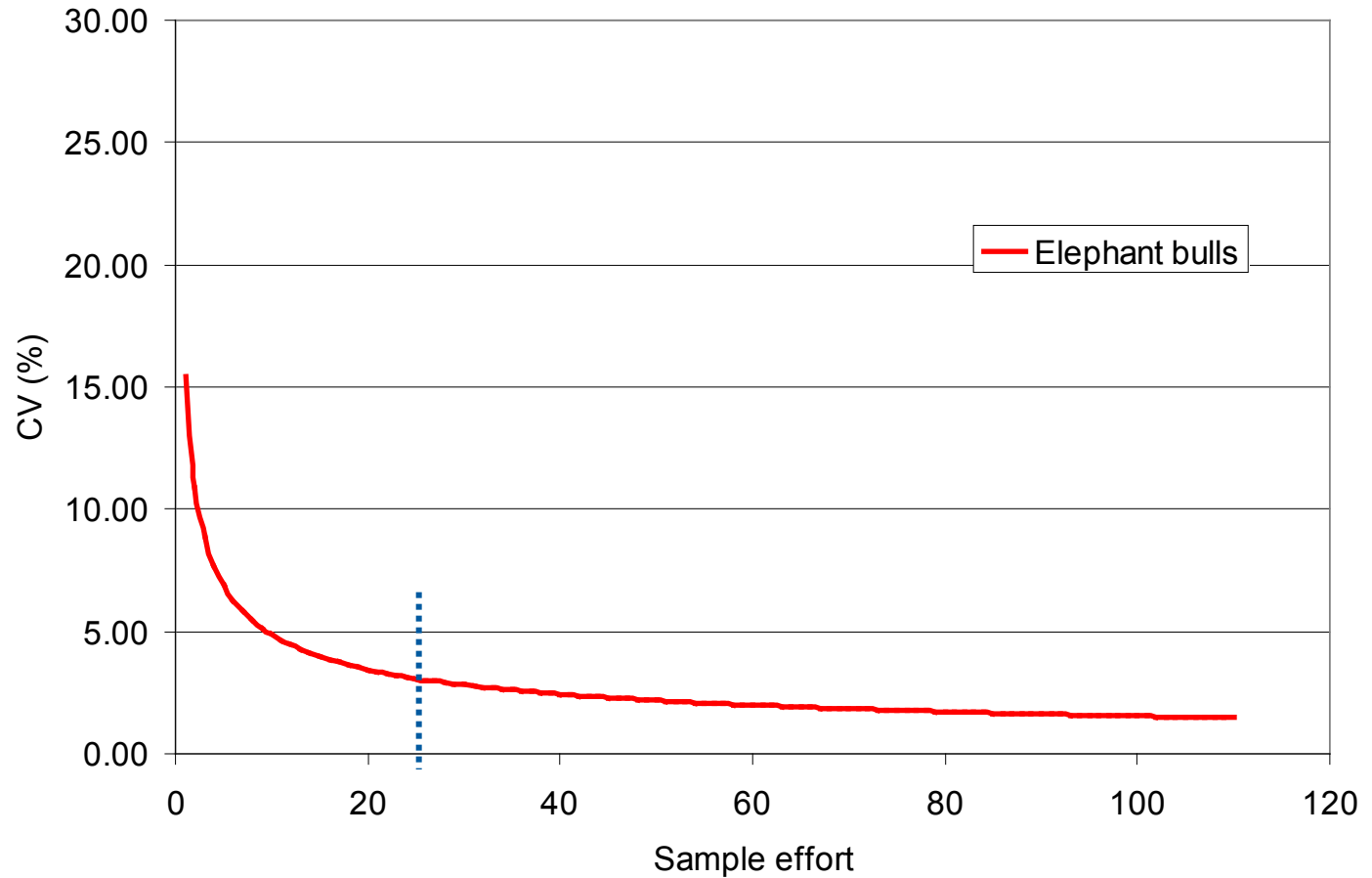
<15% CV



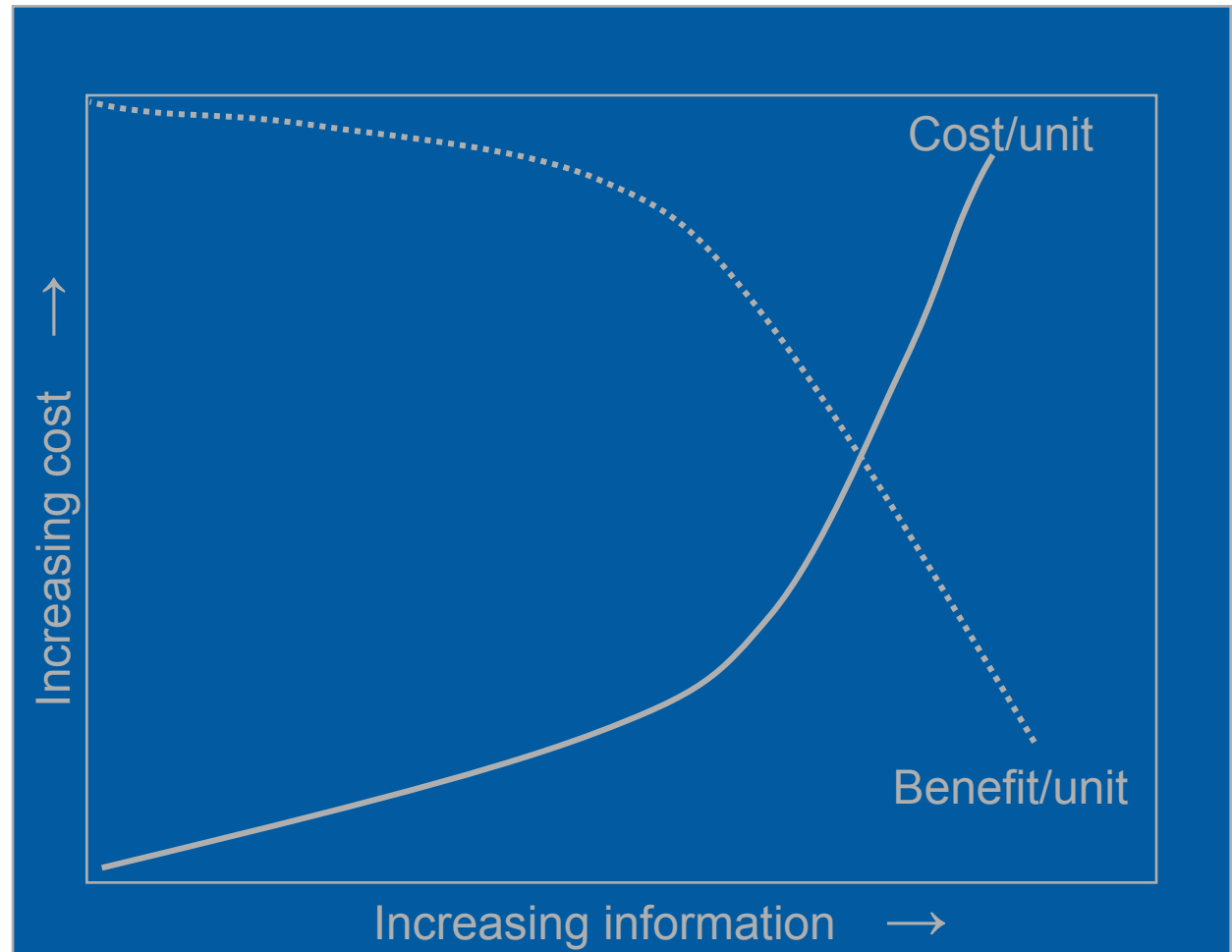
CV of large herbivores census



How accurate do the numbers have to be? *Is a CV of <15% enough?*



The value of improved observation



Thank you

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