



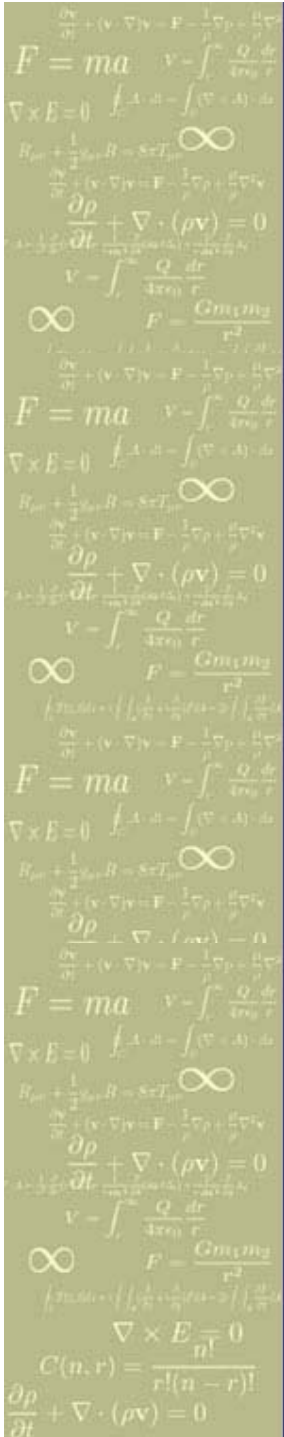
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What exactly are you asking?

The role of survey design in policy implementation

Dr Elizabeth Stark, Dr Stuart Muir

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Survey design is about...

... choosing **what** to monitor (“it”) and **how to collect data** in an optimum way to allow

- Trends towards intermediate outcomes
- Trends in Resource condition
- Trends relating to compliance
- Whether our program logic assumptions are valid.

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Survey Design exposes and minimises errors

Detected impact

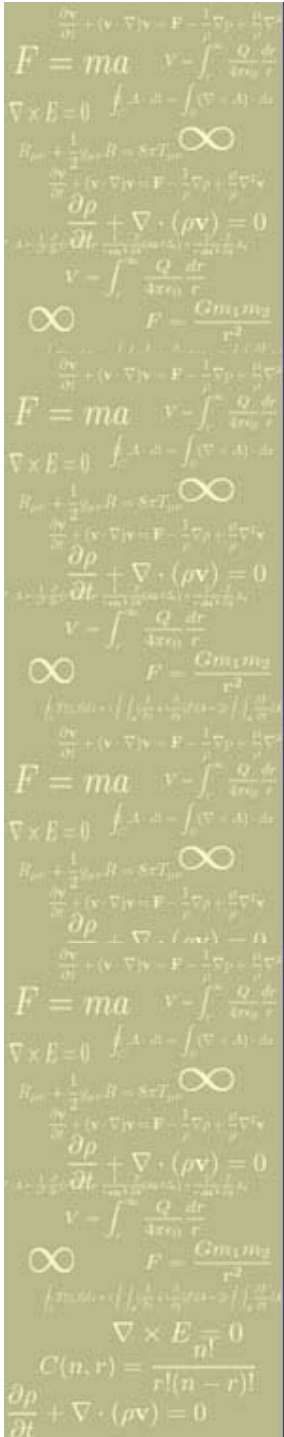
True impact

	Yes	No
Yes	✓	✗
No	✗	✓

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Steps in survey design – What is “it”? (what are we trying to measure?)

- For investment programs:
 - Raised level of appreciation for biodiversity values
 - X% less vegetation threats on farms
- For compliance programs:
 - Less than X birds per year struck by wind turbines
 - Less than X% decrease in fish population downstream from development runoff

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Steps in survey design – Can you measure IT?

- Evaluate choice of metrics
 - Physically difficult
 - Too vague (i.e. stream health)
 - Too specific
 - Timelines (what does one in a year mean?)
 - Representative and repeatable

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Steps in survey design – Can you accurately detect “it”?

- Baselines
- Trends
- Effect size
- Power analysis and significance
- Balance error types

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Steps in survey design – Can you adapt “it”?

- Strength
 - i.e. if population doubles/halves will the monitoring program still detect change?
- Robustness
 - Want to give on-ground guys some leeway in collection

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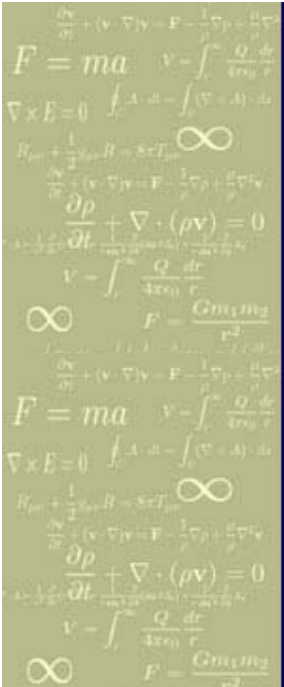
An example - Avian mortality surveys at wind-farms

- Goal is to minimise impact to species
- “it” varies, one approach is bird strike/year
- Problem:
 - Up to \$1 million spent on monitoring per year
 - Typically results are inconclusive

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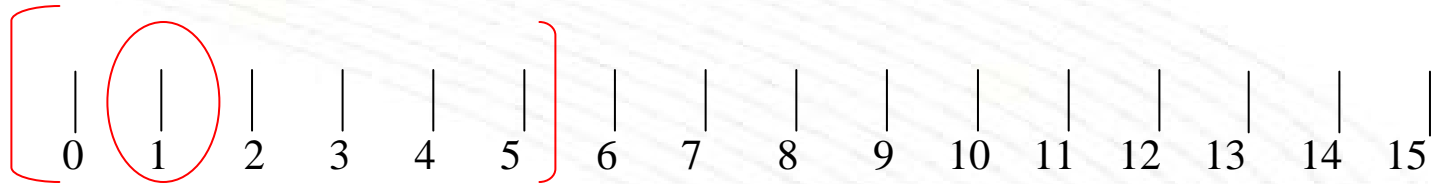
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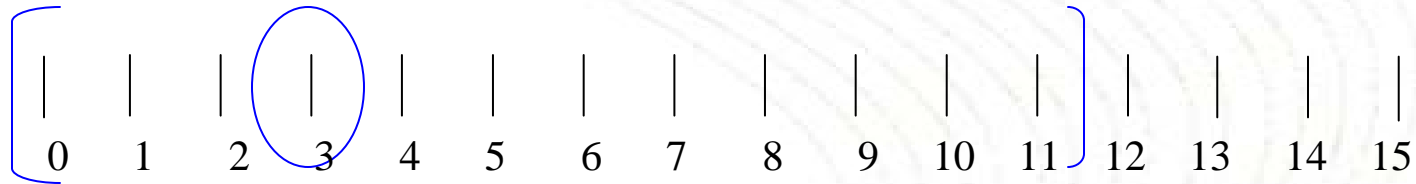
A survey design approach

- Proposed site – low absolute risk
- Desired survey resolution of < 1 strike /year
- Survey design showed that even continuous whole farm surveys (impractical) could not resolve mortality to the required level
- Money better spent on other monitoring or conservation programs

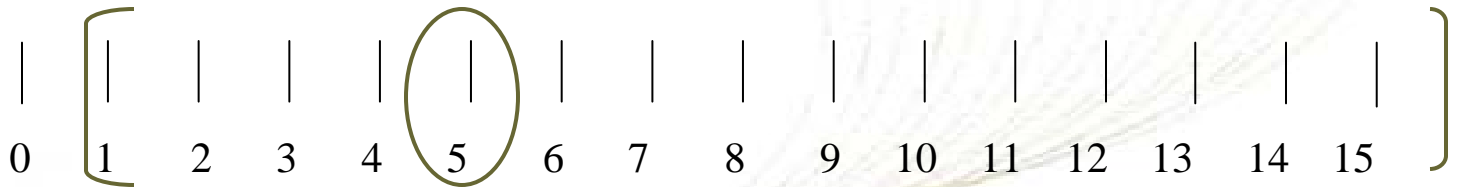
Detect 1 -
95% confidence interval
of 5



Detect 3 - cannot
distinguish between
1/yr and 11/yr



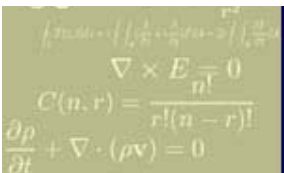
5 carcasses must be
found before the
long-term rate is
likely to be greater
than 1/year

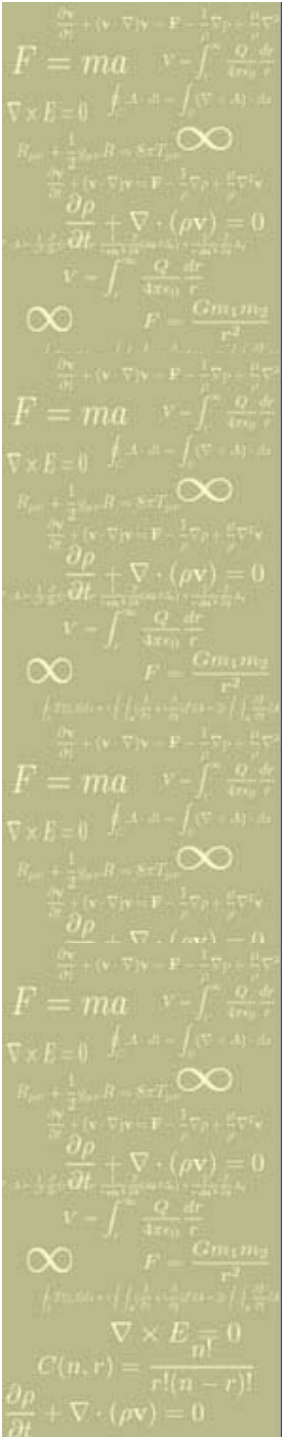


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Designed approach ensures

- Reduces wasted resources in ineffective monitoring programs

Policy

Objectives

/

Resource

Condition

Impact

Program Logic

Survey Design

On
Ground
Actions

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Roles and responsibilities

- Policy makers/ program investors /regulators:
 - Clear policy statements
 - Survey design approach to outline monitoring requirements and guidelines
- On-ground
 - Contribute to survey design (practical considerations)
 - Consistent reporting and analysis

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Questions?

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$\frac{\partial \rho}{\partial t} + (\mathbf{v} \cdot \nabla) \rho - \mathbf{F} \cdot \frac{1}{\rho} \nabla \rho - \frac{\partial \rho}{\partial t}$
 $F = ma \quad \mathbf{v} = \int \frac{Q}{4\pi\epsilon_0 r^2} dr$
 $\nabla \times \mathbf{E} = 0 \quad \int \mathbf{A} \cdot d\mathbf{s} = \int (\nabla \cdot \mathbf{A}) \cdot d\mathbf{s}$
 $B_{\theta} + \frac{1}{2} \mu_0 B^2 = s r I_{\theta}$
 $\frac{\partial \rho}{\partial t} + (\mathbf{v} \cdot \nabla) \rho - \mathbf{F} \cdot \frac{1}{\rho} \nabla \rho + \frac{\partial \rho}{\partial t}$
 $\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \mathbf{v}) = 0$
 $\mathbf{v} = \int \frac{Q}{4\pi\epsilon_0 r^2} dr$
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 $C(n, r) = \frac{n!}{r!(n-r)!}$
 $\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \mathbf{v}) = 0$