What improvements to CBM would be most effective to increase data value in a 10-20 years perspective?

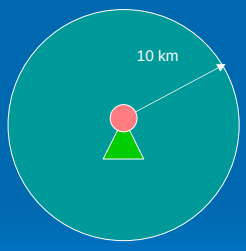
Effective = Aims / Volunteer Effort

Aims

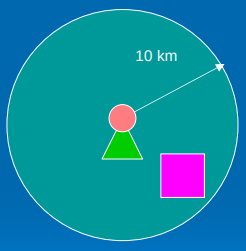
Let's predict the trend in ecology!

- **Unbiased** trends & indices
  - **Increase accuracy**
    - also precision if possible
- Ecological questions
- Atlas modelling – densities, national popupaltion estimates

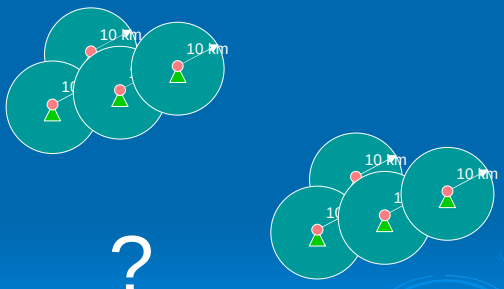
Semi-random sampling design



Site sampling design



Problem – clusters, distant areas



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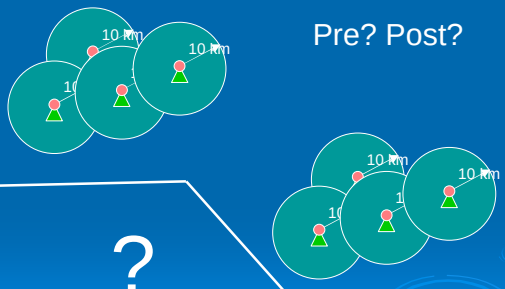
problem - distant areas

Stratification by distance?

Pre? Post?



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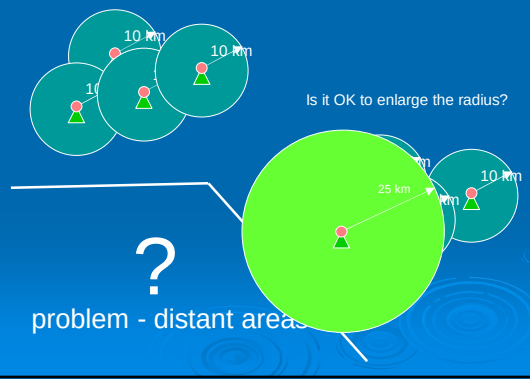
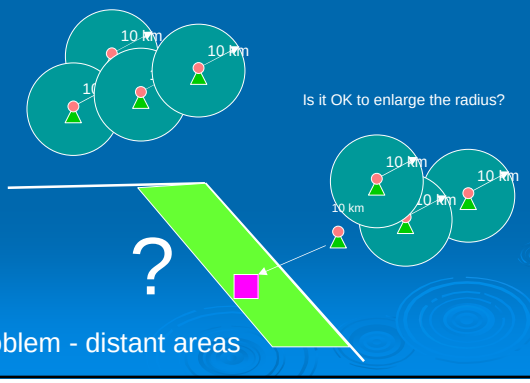
problem - distant areas

More willing volunteer



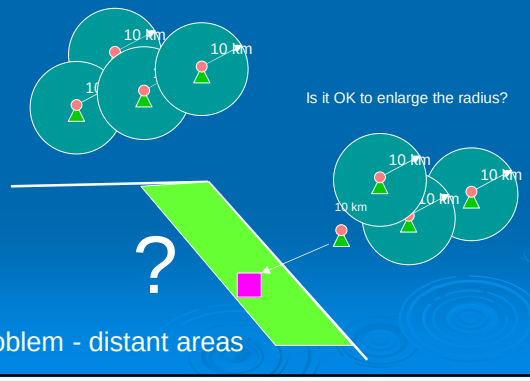
problem - distant areas

More willing volunteer



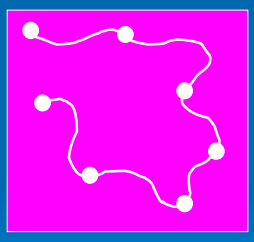
problem - distant areas

More willing volunteer



problem - distant areas

Within the square – free choice?



- we must be representative – not overestimate density!!!
- problem with linear features etc.

What to count?

- record individuals, pairs, or territories?
- record juveniles? (UK: ignore)
- distinguish territorial/non-territorial behaviour?
- approach in modelling?

Goals (reminder)

- Unbiased trends
- Ecological questions
- Modelling: Density maps & Abundance estimates

Flyover birds / Aerial feeders

- aerial feeders – defined as species or behaviour? (UK: aerial-feeding swifts, swallows and martins not landing or flying into a nest site)
- record in a special category - no distance sampling (UK)
- aerial feeders -> flyovers? (UK)
- approach in modelling – ignore? (UK, DE)

Goals (reminder)

- Unbiased trends
- Ecological questions
- Modelling: Density maps & Abundance estimates

Other improvements

- Heard/seen?
  - Expensive. How important? Workarounds?
- Record habitat for each individual?
  - Expensive
- Record flock sizes
  - Use in modelling?

Goals (reminder)

- Unbiased trends
- Ecological questions
- Modelling: Density maps & Abundance estimates

Feedback is welcome!

Thank you for your help

Flocks

- recording flock sizes: increase in precision, more accurate SE, (A. Lindén 2011)
- ecology questions
- other benefits for modelling?

Goals (reminder)

- Unbiased trends
- Ecological questions
- Modelling: Density maps & Abundance estimates