

Challenges in using eDNA for feral pig detection in disease surveillance

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Why monitor feral pigs

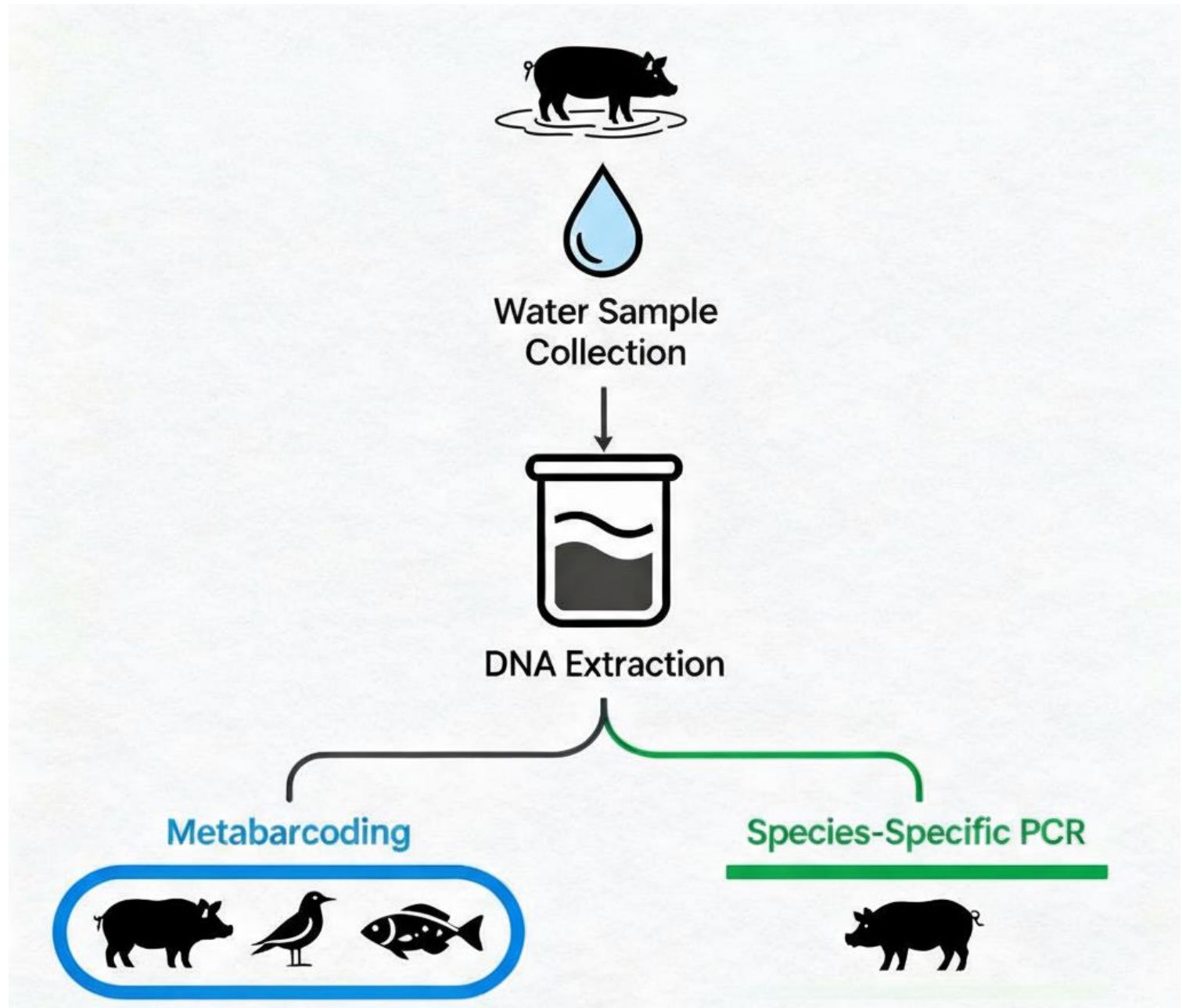
- Feral pigs pose major biosecurity risks
- Hosts for several bacterial and viral diseases
- Risk to livestock health
- Key surveillance question: Are pigs present on farms, and do they carry pathogens?
- Detecting presence is the first step
- We used eDNA to address this question within a disease surveillance project



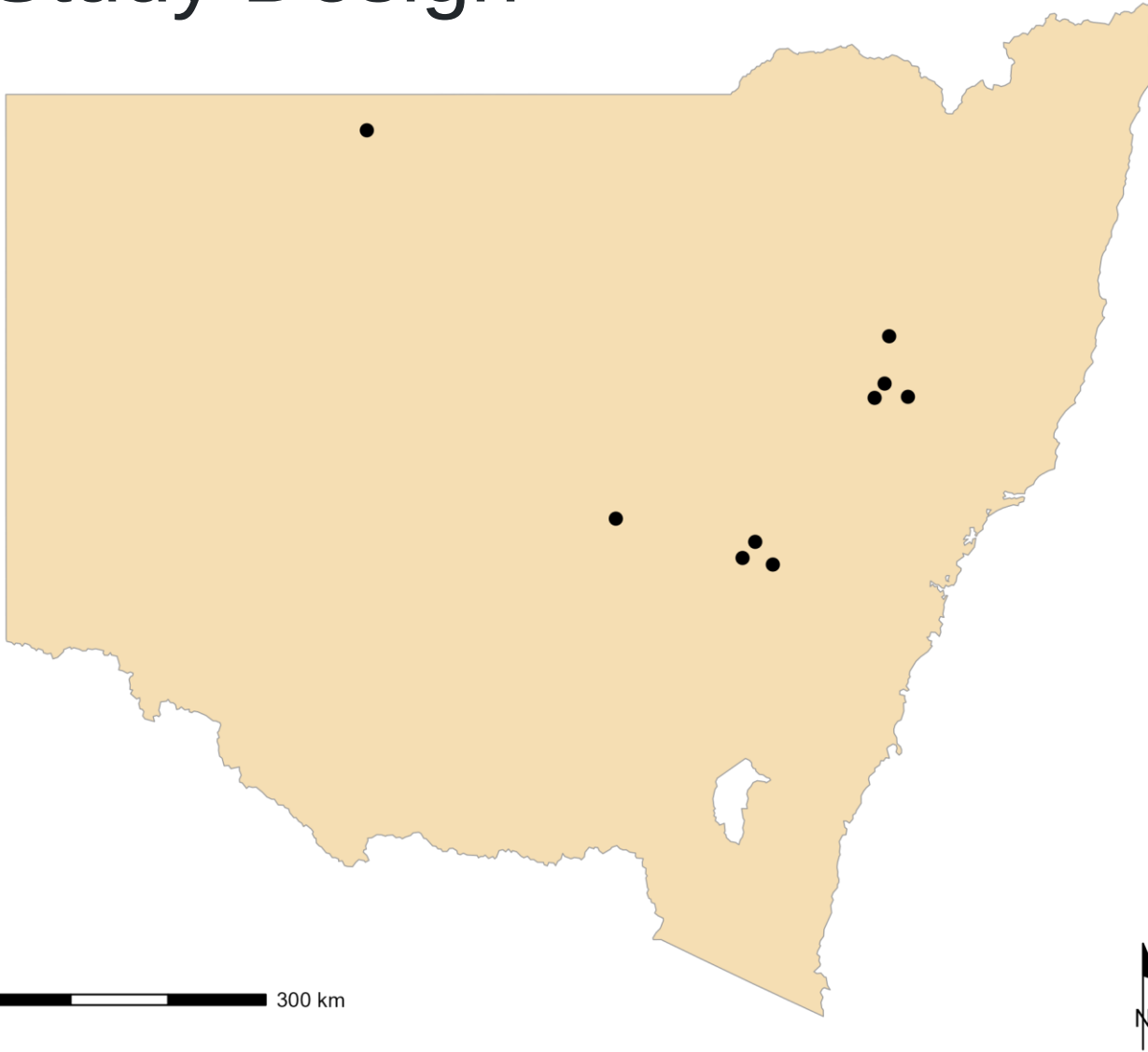
Illustration generated by AI

What is eDNA?

- DNA shed by organisms in the environment (e.g. water)
- Detects traces of cells, waste and remains
- Non-invasive monitoring
- Potential to detect hidden or elusive species
- Metabarcoding: multiple species
- Species-specific: one target species



Study Design



- 6-8 samples collected from 24 water bodies at nine sites in NSW
- Aim to collect 2L per sample
- One camera fitted per dam
- eDNA analysis (species-specific & metabarcoding)

How samples are taken and processed



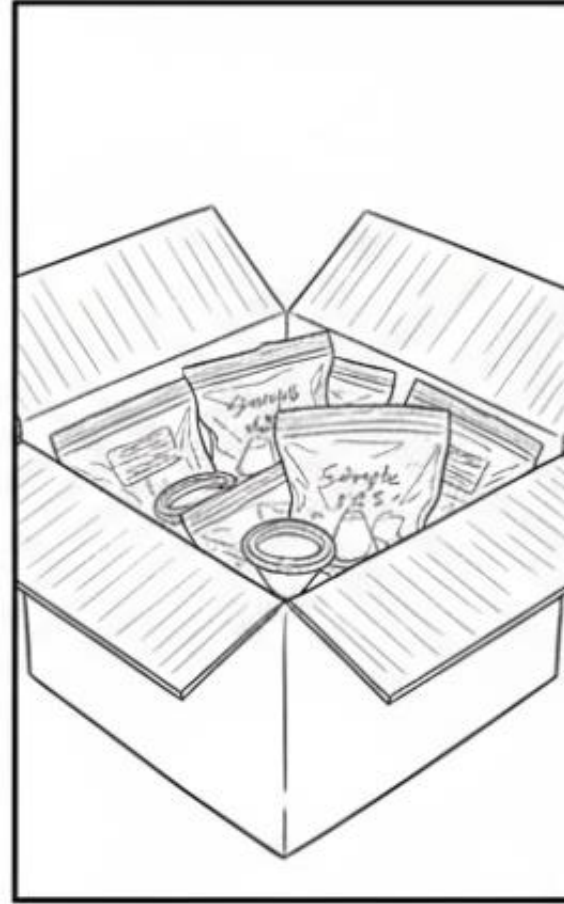
How samples are taken and processed



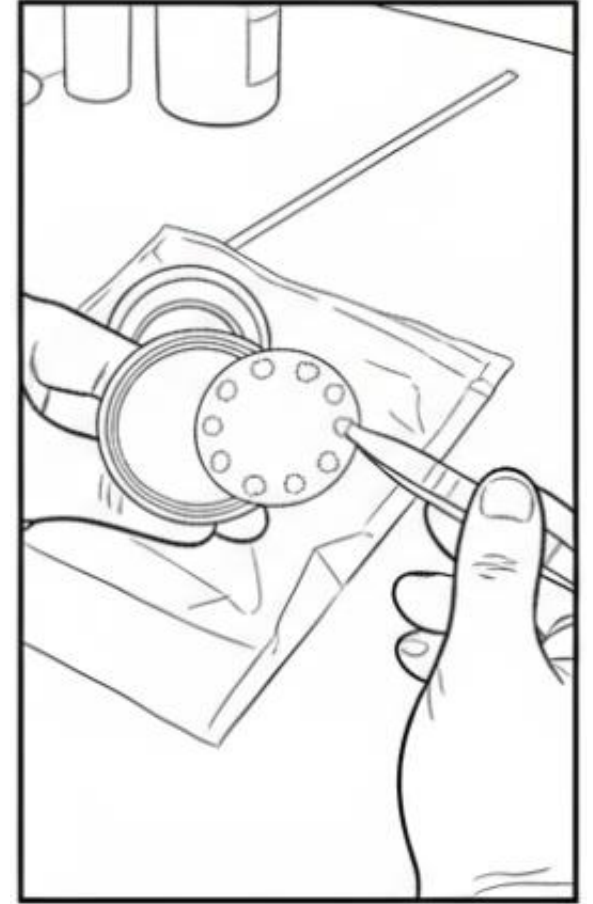
Water filtered



Self preserving filter



Filters sent to lab



Filters processed

Pigs detection



Site: **Yantabulla**

Detected by

- Camera ✓
- Metabarcoding ✓
- Species-specific ✓

Pigs detection



Site: **Trundle**

Detected by

- Camera ✓
- Metabarcoding ✓
- Species-specific ✗

Pigs detection

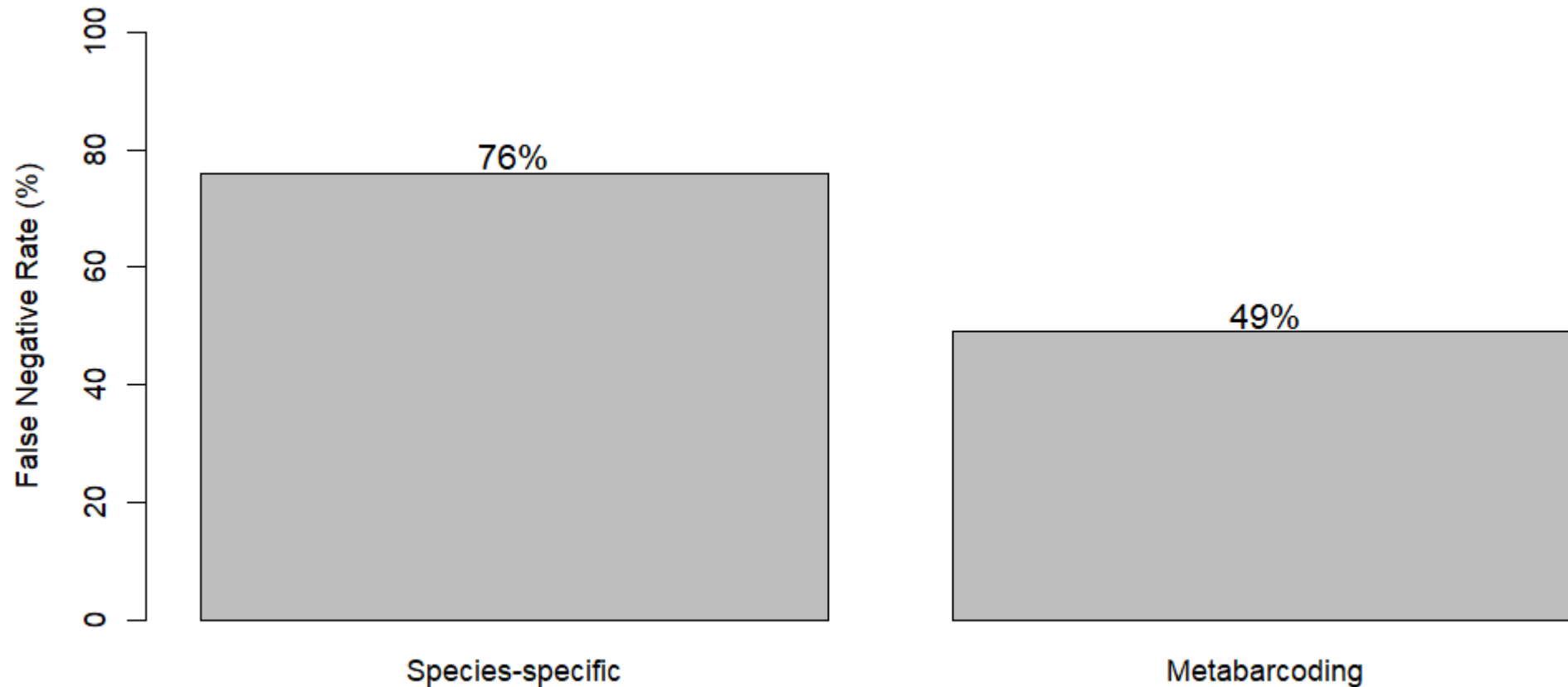


Site: **Oakley Park**

Detected by

- Camera ✓
- Metabarcoding ✗
- Species-specific ✓

Species-specific and metabarcoding detection in sites where pigs were detected by camera



- High false negative rates

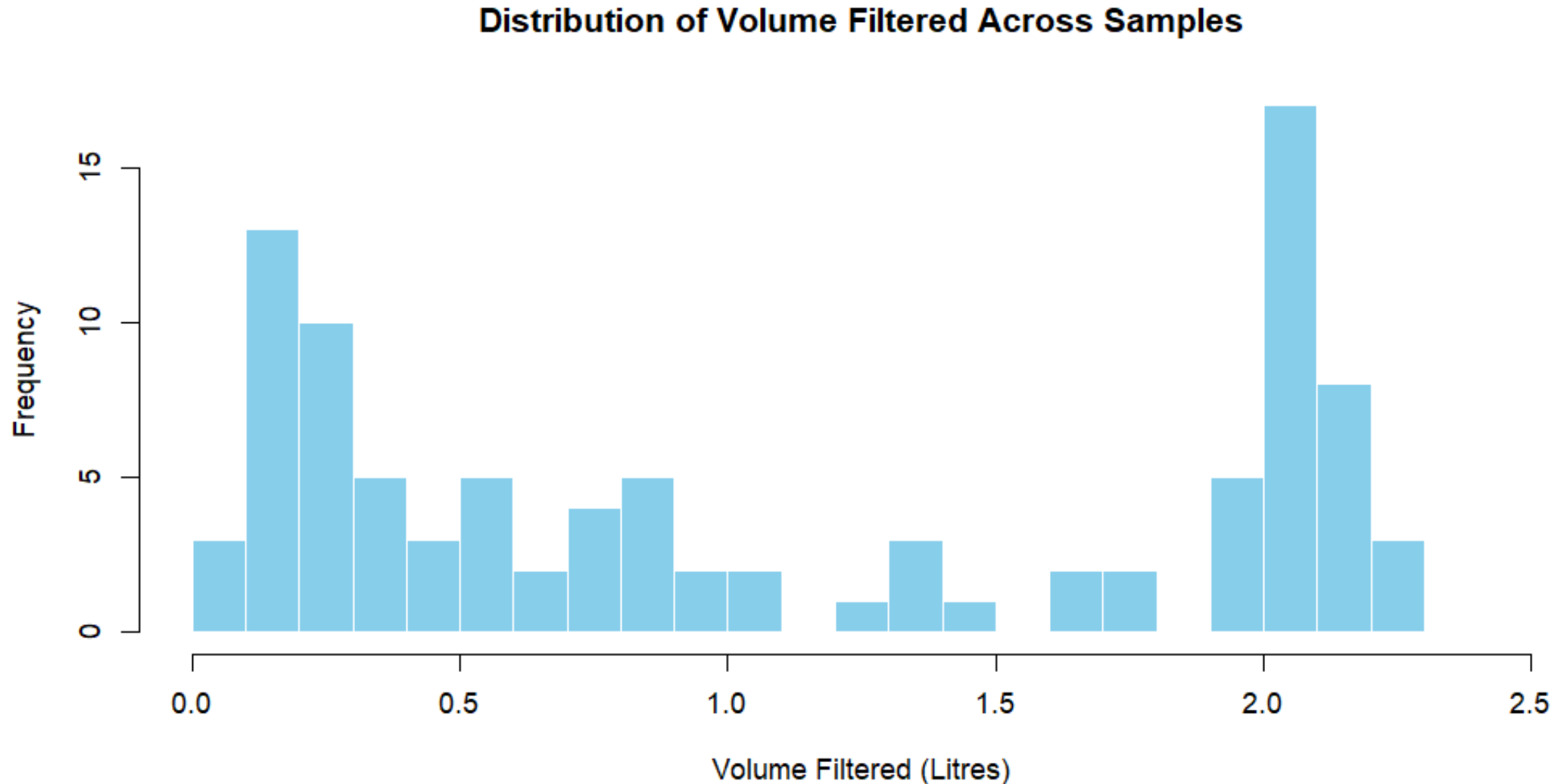
How sampling volume & replicates affect detection

- 2 L or more per replicate recommended
- Murky/muddy water
- Filters get clogged



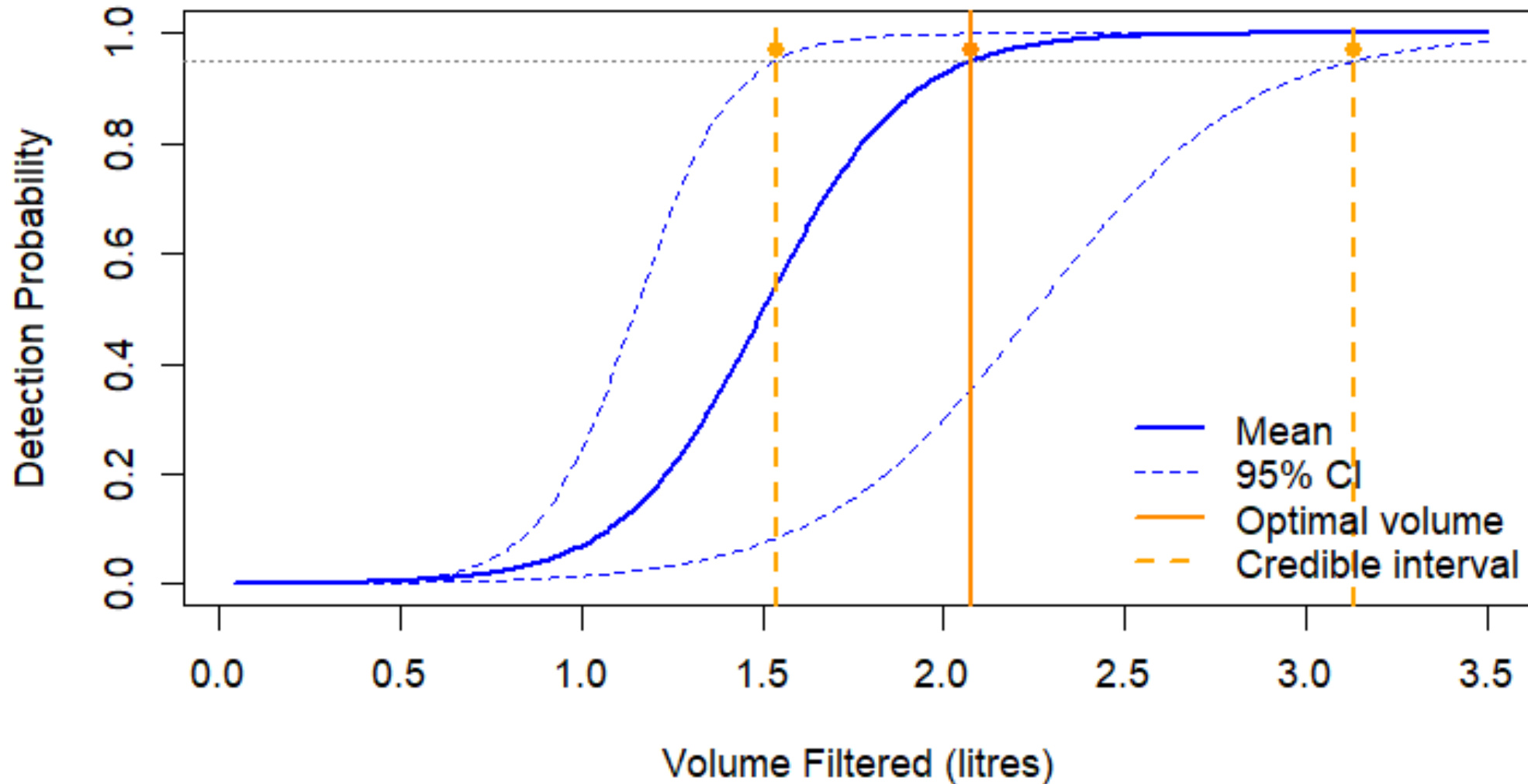
How sampling volume & replicates affect detection

- Mean: 1.10L

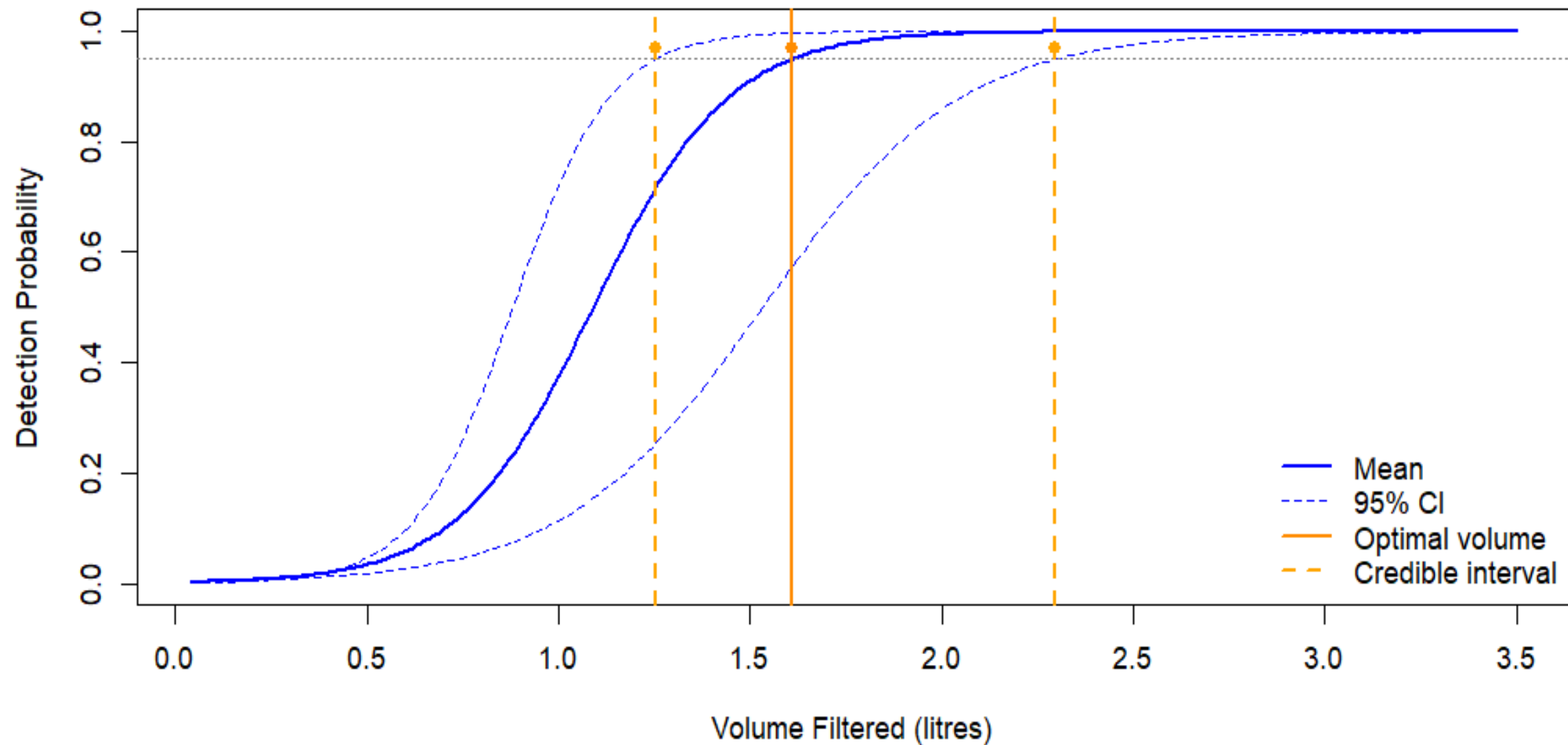


- Detection probability increased with the volume filtered.

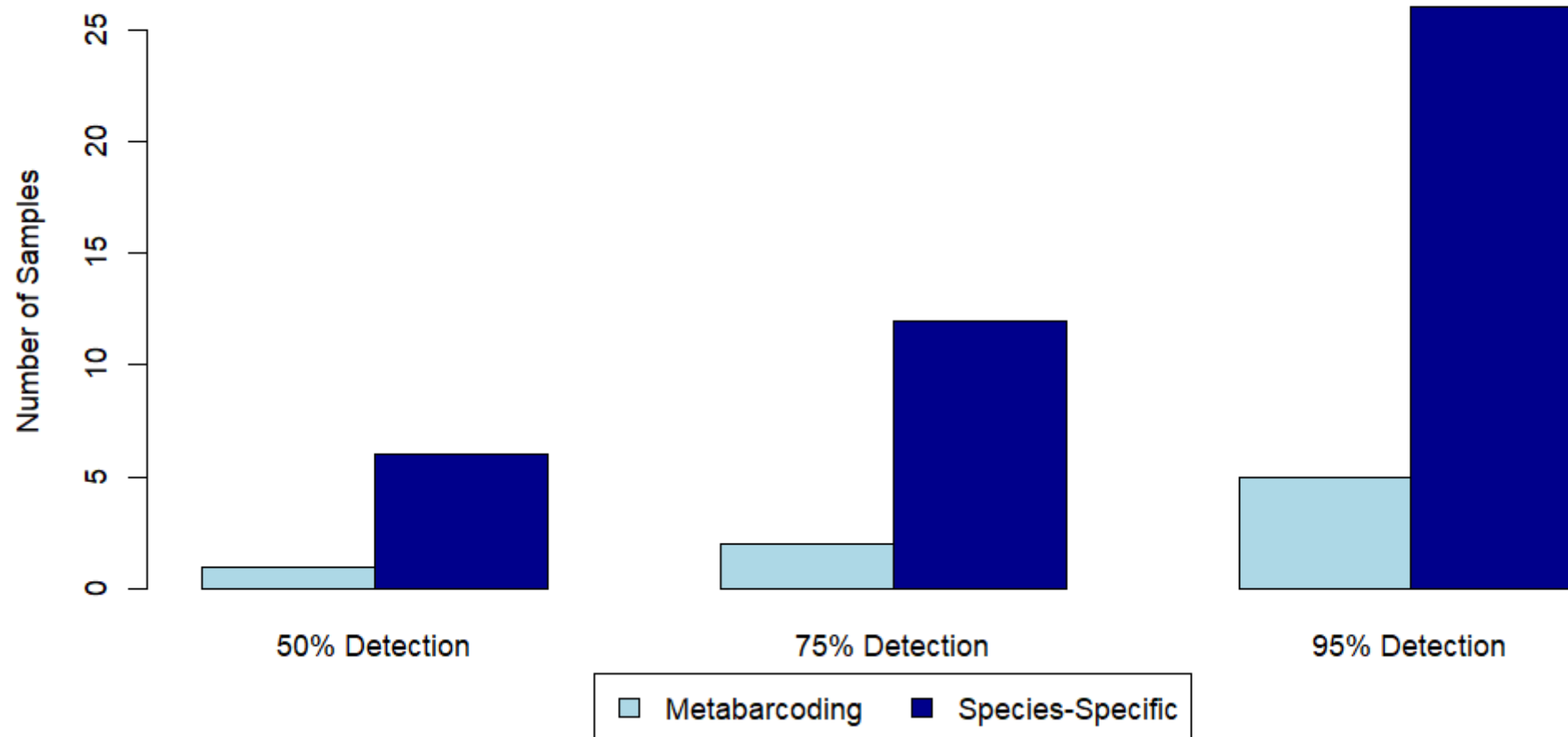
Optimal Volume for 95% Detection Probability (Species-Specific)



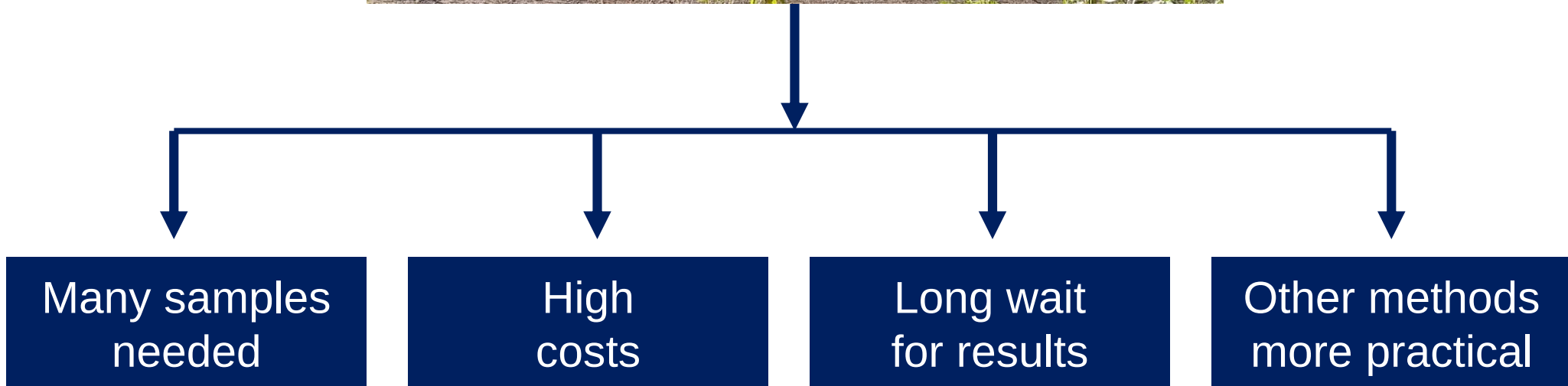
Optimal Volume for 95% Detection Probability (Metabarcoding)



- Number of samples needed for 95% detection probability at mean volume filtered (1.10 L)



Practical considerations



Take-home messages

In this context:

- eDNA not yet practical for pig monitoring
- Camera traps best for presence/activity
- Detectability limits eDNA host use but could suit pathogen detections
- Costs need to be reduced
- Future technology may improve eDNA utility and affordability

