

Evidence essay · Observation and data

A quiet recording is not an empty sea

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Fictional author and institute · Editorial demonstration, not peer reviewed

ABSTRACT

Acoustic non-detections are traced through the links between animal presence, sound production, propagation, recorder performance, and classification. The essay uses a hypothetical comparison of continuous and intermittent recording to show why deployed days or simple hourly adjustments can misrepresent listening effort when calls occur in bouts. Changing background noise, sensitivity, and detector thresholds can also change detections without a matching change in abundance. Drawing on NOAA's acoustics guidance and data portal, it argues for representative manual review, uncertain classifications, and explicit separation of lost, rejected, unrecorded, and analysed intervals. Visual observations can add evidence but retain their own limits. The defensible conclusion concerns calls detected under a stated method; claims about absence or density require stronger detection assumptions and knowledge of call rates.

Keywords: acoustic non-detection · recording effort · detector thresholds · call rates · missing data

Adapted from the Still North field journal. Original article. A source-based editorial text, not a report of original Still North research. Examples and imagery are illustrative.

A month without detected whale calls can look like an empty square in an occurrence map. But there are several ways to arrive at that square: no animals, silent animals, distant calls, masked calls, an unsuitable recorder, or analysis that missed the signal. A useful acoustic result distinguishes those possibilities instead of giving every non-detection the same ecological meaning.

This is a question about what an instrument could have found, not about an illustrative encounter with a particular species. NOAA Fisheries' [acoustics guide](#) explains that hydrophones have different listening ranges, human-made noise can limit detection, and converting calls to population density requires information about call rates. Each qualification changes how a blank interval should be read.

Separate the links in the detection chain

First, an animal must be within a relevant area. Next, it must produce the kind of sound being monitored. That sound must reach the instrument within its usable frequency range and above the effective detection threshold. Finally, an analyst or detector must recognise it. Failure at any link can produce the same recorded outcome: no confirmed call.

Listening range is not necessarily a permanent circle around the hydrophone. Propagation changes with water structure, depth, bottom and ice conditions, and frequency. Background sound changes too. A nearby faint call and a distant strong call need not have the same probability of detection. A map should not imply a sharp, fixed surveillance boundary unless the method can justify one.

What changing recording effort can do

Take an invented comparison. Recorder A listens continuously for 24 hours. Recorder B listens for ten minutes in each hour, giving four hours of recording across the

same day. If calls occur in short bouts, B may miss a bout entirely. Dividing its detections by four does not necessarily recreate the continuous record, because the timing of the gaps matters.

Now suppose a later deployment uses a detector that recognises weaker calls. More detections could reflect better sensitivity rather than more animals. Conversely, increased vessel noise could reduce detections while the animals remain present. The first comparison should concern recording schedules, usable hours, settings, noise conditions, and detector versions, before interpreting the ecological change.

The example contains no measured call rates or assumed animal abundance. It simply shows why 'days deployed' is not always the relevant denominator. Days powered but not recording, files lost, and intervals rejected for quality should remain separate from periods that were analysed and contained no detected calls. Our [open-observations guide](#) explains the value of keeping those missing-data meanings distinct.

A detector threshold is a choice with consequences

Automated detection can make large archives manageable, but every classifier has errors. A permissive threshold can capture more genuine calls while also admitting more false positives. A stricter one may miss faint or unusual calls. Reporting only the chosen threshold hides whether the result is robust to that choice.

A useful evaluation checks detections and non-detections against manually reviewed material that represents the conditions being analysed. Quiet examples alone cannot show how the detector performs during ice noise or heavy vessel traffic. Review should also preserve an uncertain category where species identity is unresolved,

rather than requiring every sound to become a confident label.

Combining visual and acoustic observations can help establish which sounds belong to which species, as NOAA describes. It does not remove all ambiguity: animals can be out of sight, several species can overlap, and the visual survey has its own detection limits. Independent evidence is most helpful when its limitations differ, not when both methods repeat the same blind spot.

What the result can responsibly say

'No confirmed calls were detected in the usable recordings under this method' is a real finding. 'No whales were present' requires a stronger detection model and supporting assumptions. Similarly, counting calls is not counting individuals: one animal may call repeatedly, while another remains silent. Behavioural context and call-rate knowledge are essential if the question concerns density rather than acoustic occurrence.

NOAA's [passive-acoustics portal](#) provides tools for exploring detection patterns across instruments and projects. When reading such a display, look for effort, methods, and coverage alongside coloured detections. The [wildlife and food-web overview](#) places sound within the wider habitat. A well-described silence can be valuable evidence. It becomes misleading only when we make it say more than the listening system could establish.

References

1. NOAA Fisheries' acoustics guide (fisheries.noaa.gov)
2. NOAA's [passive-acoustics portal](#) (passiveacoustics.fisheries.noaa.gov)