

# Acoustic Observation Listening and Data Worksheet

Describe the sound, recover its context, and leave uncertainty in the record.

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Generated illustration. No recording, deployment, instrument model, or field activity is represented as real.

## 1. Choose a source, not a sound effect

This worksheet contains no audio, simulated recording, or invented spectrogram. Use it with a legitimately available source that provides context. NOAA Fisheries offers real exemplar clips in [Sounds in the Ocean: Mammals](#) and [Environmental and Anthropogenic Sounds](#). Open the source page rather than treating an isolated audio file as a complete record.

A labelled example can teach a sound category. It cannot establish that the same species or process occurred in another place, or that a short clip represents the whole recording. These collections include sounds from different contexts, not one Arctic experiment.

Begin playback quietly and keep it comfortable. Do not raise volume repeatedly to chase a faint sound. Hearing differences, device response, background noise, and processing can affect what a listener notices. A spectrogram and descriptive notes offer another route into the task; listening is not a test of personal ability.

**First entry:** record the provider, page title, clip label, URL, access date, and any credit or processing note. If the source says playback is sped up, slowed down, amplified, or filtered, copy that fact before describing the sound.

## 2. Recover the observation context

A hydrophone records pressure variations reaching its position, shaped by the source, water, seafloor, surface, distance, instrument, and settings. An attractive sound alone cannot disentangle those influences. Record what is known and mark what the source does not supply. Do not fill a metadata gap with a plausible Arctic location.

### Recording passport

| Context                 | What to record                                                                                    |
|-------------------------|---------------------------------------------------------------------------------------------------|
| Identity                | Provider, dataset or deployment ID, file or clip ID, citation, and access conditions.             |
| Place and time          | Published location precision, depth, date, time reference, and clip position within the original. |
| Recording system        | Hydrophone, sensitivity or calibration information, gain, sample rate, and channels, if supplied. |
| Collection effort       | Continuous or scheduled recording, gaps, recovered duration, and reviewed duration.               |
| Playback and processing | Speed change, filtering, amplification, format conversion, and analysis settings.                 |

[NOAA NCEI's Passive Acoustic Data archive guidance](#) explains the importance of project, deployment, hydrophone, sampling, calibration, and processing metadata. For an actual dataset, use its own README and citation. This worksheet is not a substitute for the archive's submission requirements.

Sample rate limits the frequencies a digital recording can represent. In a fictional teaching example, 48,000 samples per second gives a theoretical Nyquist limit of 24,000 Hz. The usable band also depends on the hydrophone, filters, and recording chain. A file with that sample rate is not evidence of sounds above its representable range.

Similarly, a normalised or amplified clip does not support a calibrated sound-pressure comparison. A loud playback setting is not a measurement of a loud ocean. Sound-level statements need the reference, frequency band, averaging method, and calibration information, not merely a decibel symbol.

**Most important missing context:** \_\_\_\_\_. **Consequence for interpretation:** \_\_\_\_\_.

### 3. Describe before identifying

On a first pass, record a modest description: repeated pulses, a rising tone, a broad rumble, a brief click, overlapping sounds, or no event noticed. Separate what you hear or see from the source's supplied identification and from your own hypothesis. "Unidentified" is a useful category, not an incomplete answer.

On a second pass, use the source's spectrogram where available. NOAA explains its axes as time horizontally and frequency vertically. Read the actual colour scale and caption: colour represents a displayed sound measure, and its meaning depends on the plotting choices. A brighter patch in one image is not automatically louder than a patch in another.

**Annotation sheet: one event or reviewed interval per row**

| Clip offset    | Description                        | Identification status               | Reason / limitation       |
|----------------|------------------------------------|-------------------------------------|---------------------------|
| Start and end  | Shape, timing, repetition, overlap | Source label / hypothesis / unknown | Evidence and uncertainty  |
| Write interval | Record your observation            | Keep categories separate            | Note masking or ambiguity |

A waveform shows signal amplitude through time. A spectrogram represents how energy is distributed through time and frequency. Window length and overlap affect the trade-off between time and frequency detail. Keep software, settings, frequency limits, and colour scale with an exported plot; changing them can change how the same recording looks.

**Fictional paper-only reasoning example:** suppose an annotation says "three brief pulses, source unknown". A second person proposes a vessel, and a third proposes an animal. Do not turn majority preference into a species label. Ask what distinguishing features, reference material, or expert review could separate those explanations.

This example supplies no sound and makes no detection claim. Its purpose is to practise preserving the original description while an identification is examined. Never draw an invented spectrogram and present it as evidence that one interpretation is correct.

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## 4. Count reviewed effort before detections

“No detection” means no target was detected under stated recording and analysis conditions. It does not prove no animal was present. An animal may be silent, distant, outside the usable band, masked by other sound, or missed by the method. Conversely, an automatic detector can flag a non-target sound.

Define the unit before counting: individual events, clips containing at least one event, minutes with a detection, or hours with a detection. These summaries are different. A long calling bout can produce many event marks without representing many animals.

### Fictional effort exercise, not a deployment record

| Imaginary schedule                       | Recorded time | Important difference          |
|------------------------------------------|---------------|-------------------------------|
| A: 5 minutes in every hour for 24 hours  | 120 minutes   | Samples across a full day     |
| B: 10 minutes in every hour for 12 hours | 120 minutes   | Leaves half the day unsampled |

Equal recording duration does not make these schedules equivalent. The timing of sound production and background conditions matters. The calculation also assumes every scheduled interval was recovered and usable. Reviewed time may be smaller still. Keep planned, recorded, recovered, usable, and reviewed effort distinct.

If a detector is used, retain its name, version, target, threshold, input preparation, and review procedure. Examine both apparent detections and a suitable sample of unflagged material when evaluating performance. Reviewing only positive flags cannot reveal all missed events.

For a comparison, ask whether sites or periods used comparable instruments, frequency bands, effort, noise conditions, and analysis. If not, describe the limitation rather than converting raw counts into a population trend. Estimating abundance requires additional assumptions and methods beyond this worksheet.

**Effort sentence:** We reviewed \_\_\_\_\_ of \_\_\_\_\_ usable material, looking for \_\_\_\_\_ with \_\_\_\_\_. Unreviewed intervals remain \_\_\_\_\_.

## 5. Make a cautious listening note

Write a short account that another reader can check without hearing the same sound on the same device. Include the source, clip or interval, playback modifications, observation method, description, identification status, reviewed effort where relevant, and the main unresolved question.

### A useful note has four layers

1. **Provenance:** this material came from a named provider and a traceable source record.
2. **Description:** these features were noticed during this stated review.
3. **Interpretation:** this identification was supplied by the source, remains a hypothesis, or is unknown.
4. **Limit:** this review does not establish abundance, behaviour, a local disturbance, or an Arctic-wide change.

Keep a disagreement log when reviewers differ. Record the competing annotations and the evidence needed to resolve them. If an annotation is revised, retain the earlier version and the reason. A confident label without a review trail is less useful than an honest unresolved event.

Respect the source's citation and reuse terms. A public player is not necessarily permission to republish its file. The NCEI archive provides dataset-specific citation information; preserve it with any permitted analysis. Do not assume a linked example is free of third-party credits.

For real projects, recordings and metadata can reveal sensitive places, activity, or incidental speech. Determine access and release authority before sharing files or annotations, and avoid adding personal details to a classroom worksheet. This pack does not authorise recording people, approaching animals, placing equipment, or conducting fieldwork.

End with one next question that the record could realistically address. "What was the original playback speed?" may be more useful than "What is happening to all narwhals?" The best listening note keeps attention open while making its claims smaller than its curiosity.

**Demonstration disclosure.** Still North and its staff are fictional. This document includes no fabricated recordings or claimed acoustic observations. Generated imagery, the paper-only reasoning example, and effort arithmetic are illustrative. External NOAA material retains its original context and credits.