ROOST LOGGER SPATIAL DEPLOYMENT GUIDELINES

In caves or mines, positioning of the roost logger (RL) has a major impact on the success of the deployment. External factors such as dripping water, ice formation, rodents, humans, temperature and proximity to temperature loggers can all influence the collection of data. The orientation of the logger itself plays a large role in the ability to collect bat calls.

Photos of roost logger deployments

PLACEMENT OF LOGGER

- The range of an RL microphone is effective to only 10 metres. The microphone is the metal disk on the front (top) of the case. The microphone should be protected by bubble wrap or closed-cell foam until activated, to avoid damaging it in transit. Placing in a bag or stuff sack will help prevent knocking the protective cover off.
- Ideal placement in a mine or cave is at a location where all bats must pass (if possible).
- Constrictions in the passage are good locations; placement closer to the ceiling than floor is better, unless the bats would be descending into a passage or pit at floor level to go deeper into the cave.
- Place logger at a bend or corner in the passage. The reason for this is that bats don't always call as they navigate roomy, straight passage, but will as they approach an obstruction.
- If a large passage is the only option, aim microphone across the narrowest point available.
- Persistent water dripping will trigger the unit and while easy to differentiate from bat calls, will use more power and limit the lifespan of the batteries.
- Ice formation in the winter can encase the RL or obstruct its range. Generally, the deeper in you go, the less this is a factor as caves and mines of sufficient extent will mostly approach ambient

seasonal temperature, which is above freezing. The exception is 'cold trap' mines or caves. These will have entrance(s) at the highest point, with little draft and probably contain ice year-round. These are generally unsuitable for bats but may have higher passages that remain at ambient.

HUMAN FACTORS

- In caves where the probability of non-caver traffic is high, hidden placement is preferable to avoid disturbance. This is particularly important where youths use the cave.
- Always leave the laminated card identifying what the logger is and why it is there. This might be placed on the side or bottom of the unit so as not to make the unit more noticeable, but provide info to those who curiously examine it. People are often paranoid about monitoring and will be more compliant with the research if they know they aren't being targeted for surveillance.
- A chain and lock can also be used as a minor deterrent.
- If necessary, place the logger deeper in the cave or beyond a pit, ideally before passages fork which gives the bats different flight options.

RODENTS

- Rodents will chew on the box and will also trigger the unit, shortening its battery life. Packrats are by far the worst but they are not found on coastal islands including Vancouver Island, where gnawing rarely occurs. They are a significant factor in the Rockies and adjacent ranges.
- Rodent avoidance strategies include placing the loggers deeper into the cave. When this placement is not preferable, suspend the RL from baling wire ideally strung between rocks, which they cannot chew through and are unlikely to walk along very far. Strategic use of rocks may also prevent packrats from being able to sit at or near the RL and continuously chew; be sure not to obstruct the microphone. At minimum, in heavy packrat zones, hang the RL from the ceiling or a ledge using baling wire; cloth cord or twist-tie on rolls should be avoided in high risk areas for this reason. Keep in mind that you want to maintain the correct angle for bat detection once it is hanging.

TEMPERATURE

- Lower temperatures will shorten battery life, particularly if you are using alkaline cells as opposed to lithium. Alkaline cells have a much shorter life than lithiums and will require service in mid-winter if you are placing the unit in fall. If the detector is going to be exposed to temperatures below freezing, then lithium batteries should be used. Consider placing the RL deeper in, beyond the freezing zone, to extend battery life.

TEMPERATURE LOGGERS

- Do not place temperature loggers within 1 m of the RL as they can emit ultrasonic frequencies which will trigger it. Placement to the side of the RL, away from the microphone is preferable. Try not to place it too far away where it is often forgotten during retrieval.

REDUNDANT PLACEMENTS

- If you are placing more than one RL, consider placing them at different possible entrances, constrictions, or directions to maximize data acquisition. With a continuous large passage, one on each side can be useful.

RETRIEVAL

- Turn off logger internally or remove batteries; do not leave loose inside.

PRIOR TO REDEPLOYMENT

- Ensure that the outside of the logger has been thoroughly scrubbed, using a degreaser soap. Use a toothbrush and toothpicks to remove all dirt from nooks in the box including the buckle snaps. Immerse in 60^{o}C water for 20 minutes, not longer, as cooling water may be drawn into the box through a vent. Dry in full sun or a warm place.