

EcoAcoustics

Over the past several decades, SLR Heggies has developed particular expertise in the assessment of the effects of vibration and noise from blasting, transportation and machinery - including regenerated noise and vibration from trains in tunnels. We have developed an enviable reputation as the consultant of choice in these areas.

In recent years, increased focus of the impact of large infrastructure projects on the natural environment has led to the need for the assessment of the effects of noise and vibration on mammals and other fauna. SLR Heggies has been engaged in relation to several signature projects where the protection of bats, birds, whales, salmon, sea turtles and other sea life has been a high priority.

Investigations of acoustic and vibration effects have also been carried out in regard to dairy cattle, thoroughbred racehorses, laying chickens, aquarium fish and domestic pets.



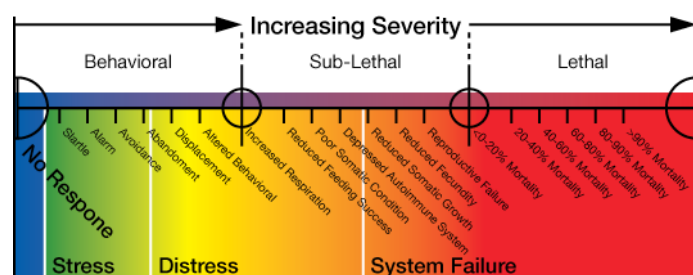
Bats

Echo-locating bats are auditory specialists; their hearing range spans several octaves. In the ultrasonic range, bat audiograms typically show highest sensitivity in the spectral region of their species-specific echolocation calls. Bats also show well developed hearing in the human-audible range. This has been attributed to the need to detect sounds produced by prey. By understanding these physical characteristics, SLR Heggies is able to evaluate and assess noise effects that may disturb bats in their natural environment. A monitoring program can be developed to control noise and vibration emissions below levels of adverse affectation. SLR Heggies has carried out vibration and regenerated noise measurements inside bat caves during nearby blasting programmes at hard rock quarries. These measurements were used to assess the effects of the vibration on the structural integrity of historical cave formations as well as to quantify the effects of the blast emissions on bat colonies resident in the cave systems.

Marine Life

The effects of man-made noise on marine animals can cause short-term behavioural reactions, temporary local displacements of certain species, long term displacements and even fatal responses. These are mainly due to reactions to ships, aircraft, dredging and construction, off-shore drilling, seismic sensing, sonar and blasting. A scale of effects from underwater noise on marine life is presented below. The following three effect groups are of major significance:

- Lethal effects: life threatening physical injuries, including death and severe physical injury. Such extreme effects are usually only associated with underwater blasting or explosive detonation.
- Sub-lethal effects: non-life threatening physical injuries, and in particular auditory damage, which are typically related to the peak pressures of a blast event.
- Behavioural effects: include perceptual, stress and indirect effects of which the most common is avoidance of an area.



Sea Turtles

Several studies have identified the ability of sea turtles to perceive low-frequency sounds. Turtles' hearing range coincides with the predominant frequencies of anthropogenic noise, increasing the likelihood that sea turtles might experience negative effects from man-made noise emissions.

At present, little is known about the extent of noise exposure from anthropogenic sources in their natural habitats, or the potential impacts of increased anthropogenic noise exposure on sea turtle biology. Nevertheless, several studies have shown that sea turtles in experimental tanks respond to signals at pressures well below 110dB and that some of the responses indicate at least a short-term disturbance.

At the very least, underwater noise must be accounted for when devising appropriate management strategies for the protection of marine life. At best, future marine conservation plans should include careful acoustic monitoring to minimise risk of harm or disturbance to marine ecology.

About SLR Heggies

SLR Heggies is a progressive firm of environmental engineers and scientists providing innovative solutions for improving and sustaining our environment. We manage risk and assist clients to realise opportunity. The company has been operating since 1978. With over 140 staff, SLR Heggies is one of Australia's largest specialist consultancies working in all states of Australia, New Zealand, Papua New Guinea, South East Asia and the Middle East.

Field staff are professionally qualified and the company is NATA-Accredited to ISO 17025, air volume measurement, asbestos fibre counting and asbestos identification.

SLR Heggies Technical Expertise

- Acoustics, Noise & Vibration
- Air Quality – Ambient & Indoor
- Water Quality – Surface & Ground Water
- Land Quality – Contamination and Ecology
- Hazardous Materials - Asbestos, PCBs, Lead, Chemicals & Explosivity
- Occupational Health & Safety (OHS)
- Finite Element Analysis & Solid Modelling
- Mechanical and Structural Dynamic Analysis
- CFD – Computational Fluid Dynamics
- Wind Engineering & Fire Propagation
- Solar, Light, Reflectivity and Overshadowing
- ESD Sustainability & Energy Efficiency

SLR Heggies Services

- Mechanical Design
- Advanced Systems Engineering
- Real Time Web Based Air & Noise Monitoring
- Blast Design & Emissions Impact Assessments
- Surveys - Noise & Vibration, EMR, Air & Water Quality
- Dilapidation Surveys, Reporting & Web-based Management
- HAZMAT CRMS – Critical Response Management Service
- Ground Contamination & Site Remediation Services
- Health Risk & Toxicology Management
- OHS & Occupational Hygiene Assessments
- Environmental Management Plans & Sub Plans
- ISO 14001 Environmental Management Systems
- Statements of Environmental Effects
- Ecological Studies & Bush Fire Impact Assessments
- Expert Witness Evidence & Reports
- Corporate Social Responsibility Technical Services
- Green Star, BASIX, ABGR, BCA Section J & Energy Audits
- Web & Video Media Services
- Wind Tunnel Testing
- NATA Laboratory

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