

VERTEBRATE DIVERSITY PROFILING (vDNA)



The Australian Water Quality Centre (AWQC) is dedicated to ensuring and responding to the public health requirements relating to the provision of water and wastewater services for communities in Australia and across the world.

Identification of pollution sources and pathways is vitally important to implementing appropriate strategies that minimise risks for the water industry. Producing drinking water from surface water or recycled water from stormwater requires a thorough risk assessment of hazards, such as the presence of enteric pathogens from human or agricultural faecal sources. Next Generation Sequencing (NGS) vDNA provides one method of identifying contaminated waters due to animal interactions and input that require further investigation.

The size of the water body, habitat of the defined species, month and period of collection, water flow and other hydrological factors needs to be considered for the sampling and Vertebrate Diversity Profiling estimations to be effective.

- Specialist water services
- Ensuring public health

Method

The building block of life, Deoxyribonucleic acid (DNA), and its unique sequences known as base pairs provide a way of identifying organisms and species direct from the biological materials they have left behind in the environment in which they have either existed or even passed through.

The 12S ribosomal RNA (or vDNA) gene is the most conserved component of the small subunit of Eukaryotic (Animals) Mitochondria (MTRNR1 gene). Typical animal vDNA has a high mutational rate where the sequence variation and the comparison of vDNA sequence can show evolutionary relatedness among and between vertebrate organisms.

There are several important advantages of the vDNA methodologies. Due to the higher chance of detection, especially for secretive or endangered species or species occurring at low densities, less effort is needed to detect a species using the vDNA method when compared with more traditional sampling techniques. Therefore, for many species the vDNA method is more cost-effective than traditional methods. Traditional techniques generally catch species to detect their presence; the vDNA method is non-invasive and does not damage habitats. Examples of vDNA use are detection of Human, Bovine or even a Platypus vDNA in the water.

The AWQC NGS system consists of 12 rRNA universal primers using semi-conductor-based technology. The sequencing read output is Basic Local Alignment Search Tool (BLAST) against a curated AWQC vertebrate database for a determination of the diversity profile in a 1L sample.

Report Format

Interpretational reporting will allow characterisation of vertebrate populations, taxonomical analysis and species identification in the supplied sample.

A general profile can be given at Family level of the overall constituents of the sample or the presence of target Vertebrate of interest can be reported. An example of this is Platypus vDNA in the water.



Sample Requirements:

- Sterile 1L (x2) DNA free PET bottles, Sodium thiosulphate dosed. Air gap essential.
- 1g of soil/sludge/sewage in sterile container
- Transport and store at 4°C
- Process within 6 hours of collection up to a maximum of 24 hours (AS/NZS 2031)

Call us on 1300 653 366
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