

IntegritE-DNA Environmental Test Protects At-Risk Species And Their Environment

University of Victoria



Biological impact assessments, biodiversity monitoring, and species inventories play an integral role in environmental risk, conducted to discover the impact of a new development on the surrounding ecological area; and remediation assessments, conducted to remove contaminants from a site.

Environmental DNA (eDNA), genetic material isolated from environmental samples without obvious signs of the species of interest, is helpful for identifying species that are very good at hiding and humans may not be aware of their presence. eDNA is commonly used to determine the ecological impact of the proposed development or remediation of a natural area. eDNA tests provide a quick and easy method to identify at-risk and invasive species, such as the sharp-tailed snake (at-risk), American bullfrog, or zebra mussel (at-risk). They offer a less invasive approach to identification when compared to tracking, tagging and trapping. They also provide an early warning system for detecting invasive species.

However, previous variability in results and limited reliability has limited industry and government uptake of eDNA

tests and prevented policy and regulatory acceptance.

“ To provide solutions to these issues, Caren Helbing, Professor of Biochemistry and Microbiology at the University of Victoria, has developed the IntegritE-DNA™ test. The novel IntegritE-DNA™ method only requires a scoop of water from the target area, but can be used on water, soil, and sediment samples and taken back to the lab for analysis.

The test uses plant DNA to determine if the sample has high enough integrity for animal DNA testing. Testing for sample integrity, through qualitative PCR (qPCR), eliminates the inconsistency and lack of reliability found in eDNA tests currently on the market. If the sample passes the integrity test, it can confidently be used for a species-specific test.

Traditional field testing can take weeks. Comparatively, the novel IntegritE-DNA™ method, in combination with species-specific tests, identify the existence of species 10 times faster, within days. This non-invasive test will be used to protect species at risk, particularly those that are more elusive, and their habitats. The test will help guide clear project decisions for environmental risk and remediation assessments.

Helbing collaborated with Hemmera and Bureau Veritas to fine-tune the technology through field and laboratory validation and to bring the test to commercialization.

Commercializing this University of Victoria-created test has been a community effort. The UVic Research Partnerships Office filed US and Canadian patent applications and supported researchers in fostering industry and government relationships to gain required field testing. The project received funding from the Fish and Wildlife Compensation Program, the BC Ministry of Environment and Climate Change Strategy, Innovate BC's Ignite Program and others. The IntegritE-DNA™ is currently non-exclusively licensed, providing industry with an opportunity to enhance their knowledge and collective understanding of species at risk.

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