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Nucleic Sensing Systems

Case Study: Genetic Quantitative Mapping

The Problem:

Invasive species, and Quagga/Zebra mussels, in particular, have the potential to cause hundreds of billions of dollars in economic damage to infrastructure and the environment. In order to effectively manage these organisms, state and federal agencies must first be able to detect these organisms early. Secondly, they must be able to identify where these organisms are present to optimize a management plan and save on deployment costs.

However, current methods for detecting Quagga/Zebra mussels either require visual verification in the field or monitoring via environmental DNA. This combined field process uses divers to confirm mussel presence. Furthermore, current technologies for eDNA detection require sample collection, stabilization, and off-site analysis. As a result, scheduling a service provider for execution and deployment across a large waterbody amounts to unsustainable costs and loss of management efficiencies.

The delay in mitigative actions by a management agency enables species proliferation beyond a point where eradication is fiscally or biologically attainable.

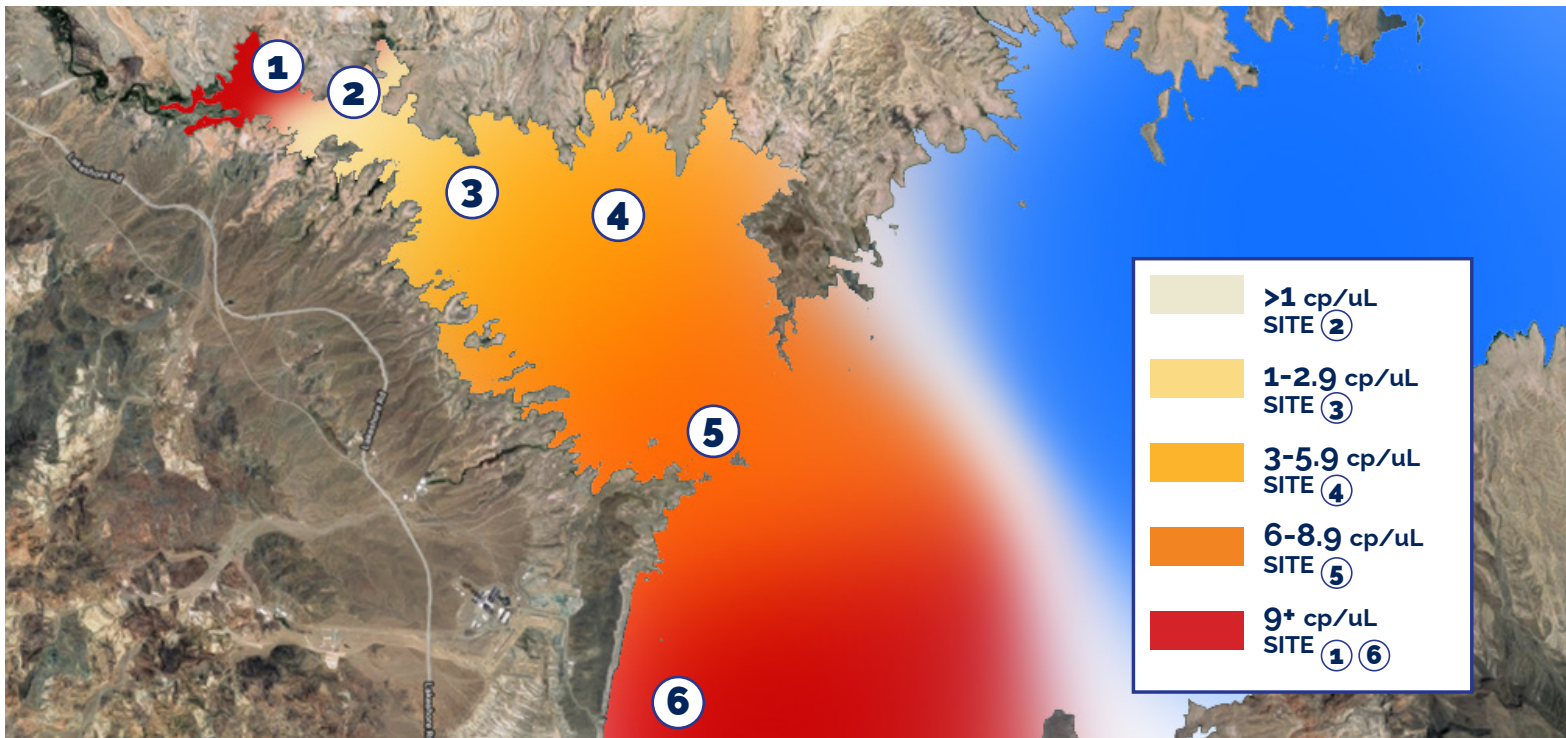


The Solution:

The solution to early detection, eradication, and efficient management is precise data on not only the presence or absence of species of concern but also its location.

The Tracker's capabilities allow for continuous sample collection that can be deployed not only from a simple one-point collection source but allows for transects resulting in geospatially specific data. When combined with real-time results and geospatial data, resource managers can quantitatively collect genetic abundance data from multiple points across a waterbody.





The Results:

The ability to add geospatial data to the presence and abundance of a species targeted allows for resource managers to have a "heat map" to prioritize management actions in areas of greatest need. The early detection of and rate of infestation of a species informs strategic planning, management regimes, and budget decisions.



Management agencies can make informed decisions on where to act and have greater insights into if actions taken are biologically effective and economically prudent.

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