ARPHA Conference Abstracts 9: e203537
doi: 10.3897/aca.9.e203537

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Conference Abstract

Improving early response capacity for aquatic IAS through eDNA methods and coordinated management frameworks

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Received: 10 Jun 2026 | Published: 10 Jun 2026

Citation: Kuningas S, Jauni M, Huusela E, Blom H (2026) Improving early response capacity for aquatic IAS through eDNA methods and coordinated management frameworks. ARPHA Conference Abstracts 9: e203537. https://doi.org/10.3897/aca.9.e203537

Abstract

Invasive alien fish species pose a growing threat to the biodiversity and ecological stability of freshwater ecosystems in Finland. In recent years, new occurrences of alien fish have been detected in natural waters at an accelerating pace, raising concerns about the long-term impacts on native species and aquatic habitats. Once invasive alien fish species become established in large lake systems or interconnected waterways, their eradication becomes virtually impossible due to the scale and openness of these environments. Effective removal measures are generally feasible only in small, closed water bodies, and even in such cases the operations are technically demanding and financially burdensome. Consequently, early detection, prevention, and rapid response are essential for mitigating the ecological risks associated with invasive alien fish species. Despite this urgency, current knowledge on the distribution of invasive alien fish species in Finland relies on citizen observations, which are often spatially uneven and lack systematic coverage.

A European Maritime, Fisheries and Aquaculture Fund (EMFAF) funded project (VIKSU) running during 2026-2027, addresses these challenges by piloting the use of environmental DNA (eDNA) sampling in small water bodies across southern Finland. The aim is to evaluate, develop, and operationalize eDNA-based monitoring as a practical

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tool for mapping the distribution of invasive fish species more comprehensively and reliably than traditional observation-based methods. The project focuses specifically on two species listed as invasive alien species under the EU regulation: the pumpkinseed (*Lepomis gibbosus*) and Chinese sleeper (*Perccottus glenii*). Both species are already present in Finland and have demonstrated the capacity to establish themselves in the wild. Pumpkinseed occurs already in at least 50 locations, and Chinese sleeper have been detected in two ponds.

By applying eDNA techniques, the project seeks to fill critical knowledge gaps regarding the current distribution and spread of these species in southern Finland. The updated distribution data will enable authorities to identify and prioritize high-risk sites where removal actions should be targeted most urgently, thereby reducing the likelihood of these species expanding into larger lakes and river systems where management would no longer be feasible.

In addition to improving species detection, the project establishes a functional data pipeline and a collaborative operational model between the Natural Resources Institute Finland (Luke) and the Economic Development Centres and the Finnish Supervisory Agency. This cooperation framework is essential to ensure that expert-verified information on invasive species is transmitted efficiently to the authorities responsible for implementing eradication and control measures. As part of the project, the Economic Development Centres will also develop standardized guidelines for conducting removal operations. Although the model is piloted specifically for harmful invasive aquatic species, it is designed to be adaptable for managing other aquatic and terrestrial invasive species in the future.

The project's communication efforts target a broad audience ranging from the general public to policymakers. By increasing awareness of the ecological and socio-economic impacts of invasive species, the project aims to foster a more informed and proactive approach to preventing their spread. Ultimately, the project contributes to strengthening Finland's capacity to detect, monitor, and manage harmful invasive species, thereby supporting the protection of native biodiversity and the resilience of freshwater ecosystems.

Keywords

aquatic IAS, *Lepomis gibbosus*, *Perccottus glenii*, eDNA, response, management

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Presented at

Neobiota 2026, the 14th International Conference on Biological Invasions

Funding program

EMFAF

Conflicts of interest

The authors have declared that no competing interests exist.