



AFRESH

# AFRESH and its “genealogy”

Eleni Kalogianni



**UWE  
Bristol**

University  
of the  
West of  
England



THE A. G. LEVENTIS  
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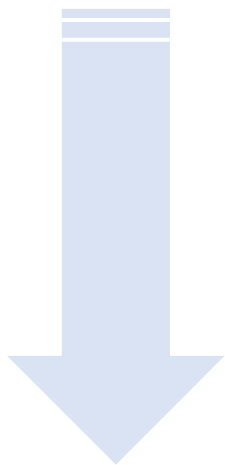
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e-Workshop

November 25<sup>th</sup>, 2022



## WHAT LED TO AFRESH



2005	“GREEK KILLIFISH”
2012-	“FISH-NET GREECE”
2018-2019	“RESILIENT”
2018-2020	“DECAGON”
2019-2020	“PACIM”
<b>2020-2022</b>	<b>“AFRESH”</b>

## THE FIRST STEPS

Nation-wide population survey of a threatened freshwater fish species (*Valencia letourneuxi*, later split to *V. letourneuxi* and *V. robertae*)

Fieldwork by joint HCMR-ZSL team in 14 basins (95 sampling locations)

The experience of ZSL & veteran HCMR colleagues was invaluable

## GREEK KILLIFISH

### CHALLENGES

Various fish sampling methods applied (seine netting, scoop netting, electrofishing)

Thus, the new challenge of quantification and comparability



*Valencia robertae*

Photo: Joel Sartore

## WIDENING THE SCOPE OF CONSERVATION ACTIONS

Long-term monitoring of Corfu killifish populations

Pilot trial freshwater fish translocation in the wild

Basic research (ecology, diet, parasites, etc) & Public awareness activities

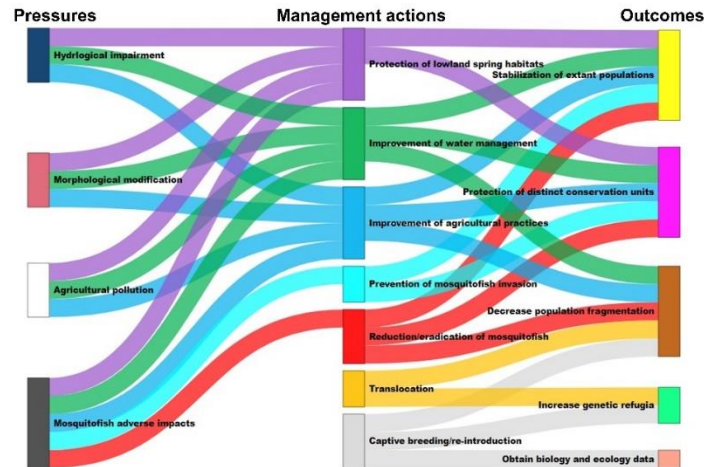
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## FISH-NET GREECE

### STEPS FORWARD

*Long-term monitoring of Corfu killifish populations* permitted discerning long-term trends & Provided crucial information for proper conservation management



## STEPS FORWARD

Pilot translocation in the wild in Louros river basin (2015-2017) offered significant **know-how on planning, implementation and monitoring**



A photograph showing a person from the chest up, holding a fishing net in a river. The person is wearing a blue shirt and a backpack. The river is filled with green algae and some reeds are visible on the left side.

FISH-NET GREECE

## STEPS FORWARD

**Long-term** and rigorous post-release monitoring with **multiple** monitoring methods is required







RESILIENT

2018-2019

## PILOT E-DNA MONITORING IN GREEK FRESHWATERS

Pilot application of the environmental DNA method to monitor  
native threatened freshwater fish species & alien invasive freshwater fish species



## ACHIEVEMENTS AND SETBACKS

The high sensitivity of the eDNA method is confirmed

First encounter, however, with “pseudo-negatives”





DECAGON

2018-2020

## FIRST ETHOLOGY EXPERIMENTS AND FISH REARING ATTEMPTS

Behavioural experiments using native and alien, invasive species

Breeding of *V. letourneuxi* and *V. robertae* in aquaria





## CHALLENGES

**Behavioural experiments** require detailed experimental planning, often custom-made equipment and hours of solitary experimentation





A close-up photograph of a fish, likely a species of killifish, showing its body with vertical stripes and a yellowish tint. The word "DECAGON" is overlaid in white text on the right side of the fish's body.

DECAGON

## CHALLENGES

**Freshwater fish breeding** in close circuit conditions requires continuous monitoring, a trial and error attitude and a lot of background experience and knowledge...





DECAGON

as collecting the fish, however hard, is just the beginning (mainly issues of transfer, disease and acclimatization)







2019-2020

## EXPANDING THE SCOPE OF THE eDNA SURVEYS

Assessment of two other threatened, range restricted species

Nation-wide range assessment of two top fish invaders

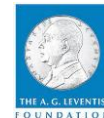
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PACIM

## CHALLENGES AND STEPS FORWARD

The eDNA is a useful tool for resolving geographic range issues, new questions may arise

The eDNA is a powerful tool for detecting *alien* species, though with limitations







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2021-2022

## WHERE ALL CONVERGE

Multi-species, nationwide eDNA survey targeting native threatened species

Multi-species, nation-wide eDNA survey of top alien invaders

Conservation translocation of threatened fishes (creating refugia population in situ)

Conservation behaviour experiments

Creation of safety stocks of two more threatened species

funding



## CHALLENGES AND STEPS FORWARD

The eDNA survey **can resolve** threatened, native species range issues (e.g. *Alburnus vistoncus*)

**Alien invaders' detection through DNA** can function an early warning for intervention (e.g. *Lepomis gibbosus*?)



## CHALLENGES AND STEPS FORWARD

**Conservation behaviour** experiments is a purely laboratory endeavour, with significant implications however for species' conservation (e.g. turbidity exposure experiments)

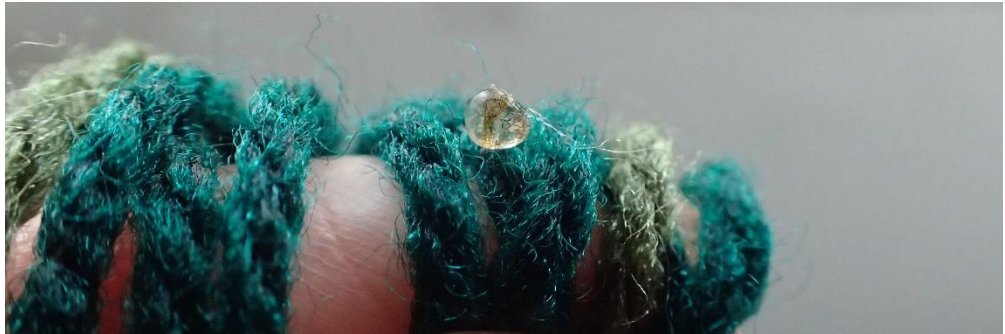




## CHALLENGES AND STEPS FORWARD

Creation of safety stock populations of threatened species is a difficult path due to species' peculiarities (e.g. *E. trichonis* and *P. hellenicus*)

Should be conducted with caution and often requires protocol modifications







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AND BEYOND

## FUTURE PERSPECTIVES

Expanding freshwater fish research (including the eDNA method) in other species and systems

Standardization of tools and methodologies for fish fauna restoration through freshwater fish translocations

Freshwater ethology research (climate change fish behavioural research, fish swimming performance experiments. *In situ* and *ex situ* experimentation)

Targeted fish aquaria breeding for future conservation translocation actions



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AND BEYOND

THANK YOU FOR YOUR ATTENTION