



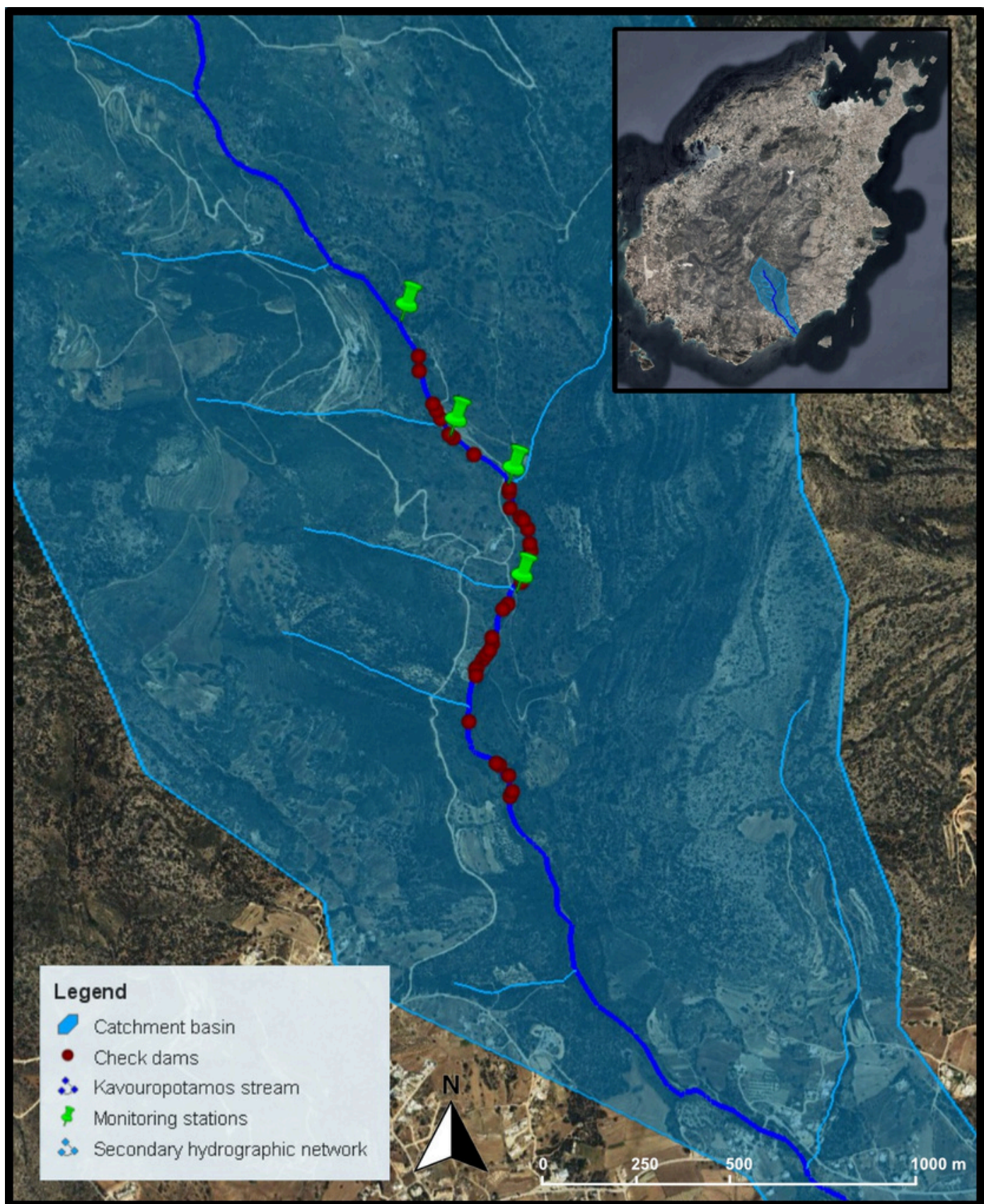
# Reviving a traditional practice: *stone check dams* boost biodiversity on *Paros Island*

Giannis Alexiou<sup>1\*</sup>, Thanos Giannakakis<sup>1</sup>, Nicholas Georgiadis<sup>1</sup>, Vassia Spaneli<sup>2</sup>, Anastasia Lampou<sup>3,4</sup>, Ioannis Nikoloudakis<sup>5</sup>, Kaloust Paragkamanian<sup>5</sup>

<sup>1</sup>WWF Greece, Char. Trikoupi 119-121, Athens 114 73, Greece (\*g.alexiou@wwf.gr)  
<sup>2</sup>Societas Hellenica Herpetologica, Knossou Ave. 157, Iraklio 71409, Greece  
<sup>3</sup>Institute of Marine Biological Resources & Inland Waters, Hellenic Center for Marine Research, 46.7 km Athens-Sounio avenue, Anavyssos 19013, Greece  
<sup>4</sup>Department of Evolutionary Biology, Ecology and Environmental Sciences, Faculty of Biology, Biodiversity Research Institute (IRBio), University of Barcelona (UB), Av. Diagonal 643, Barcelona 08028, Spain  
<sup>5</sup>Hellenic Institute of Speleological Research, Meg. Alexandrou 179, Iraklio 713 06, Greece

## INTRODUCTION

Droughts are a major climate threat in the Aegean islands, putting pressure on ecosystems and local communities. To address drought risk on Paros island, WWF Greece, MedINA, the Hellenic Institute of Speleological Research, Paros Water Supply & Sewerage Company and the Municipality of Paros launched a project in June 2022 to construct 34 traditional stone check dams in Kavouropotamos stream to boost groundwater recharge and support biodiversity. Since then, biodiversity monitoring has been ongoing to evaluate the impact of this nature-based solution on biodiversity.

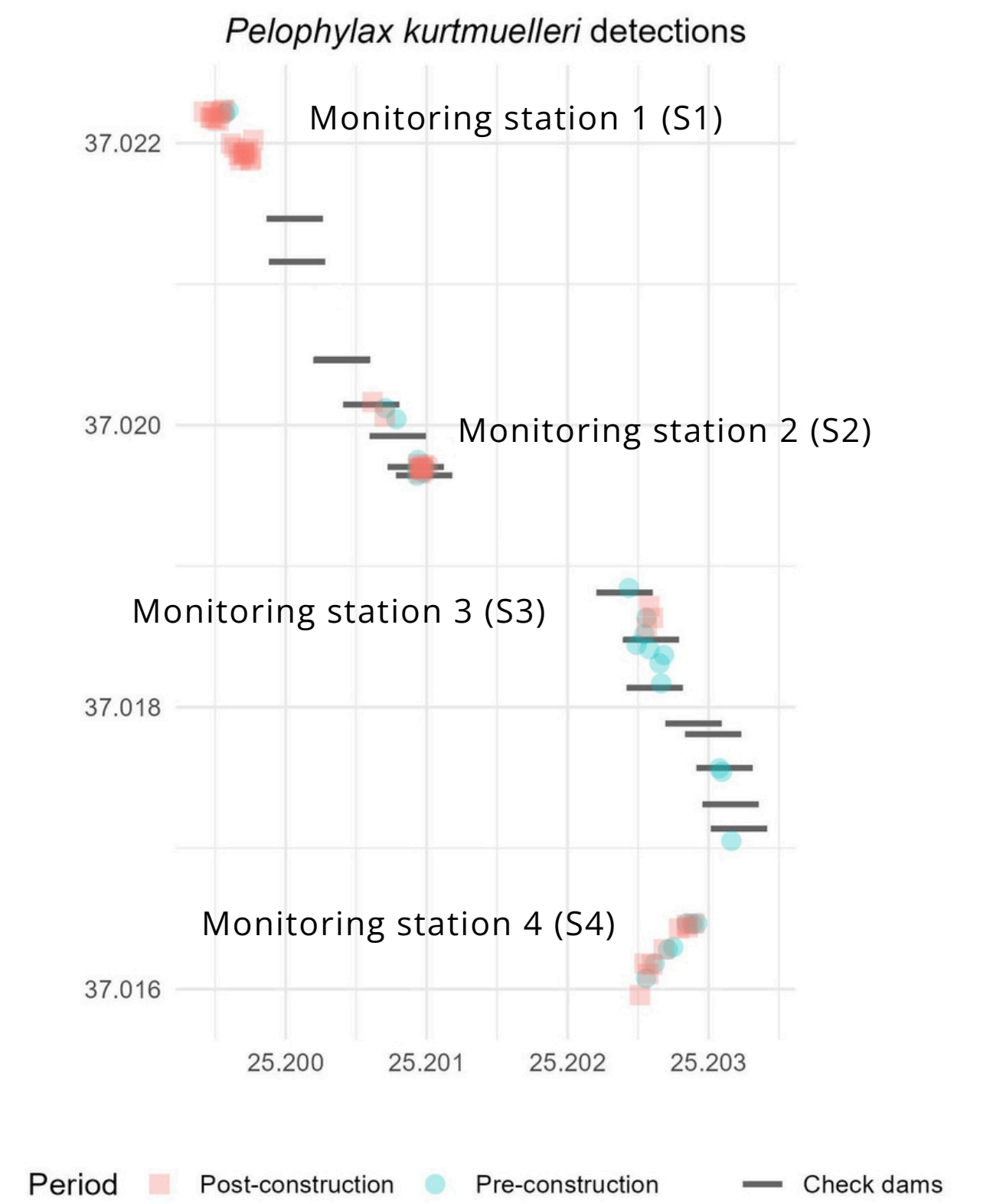
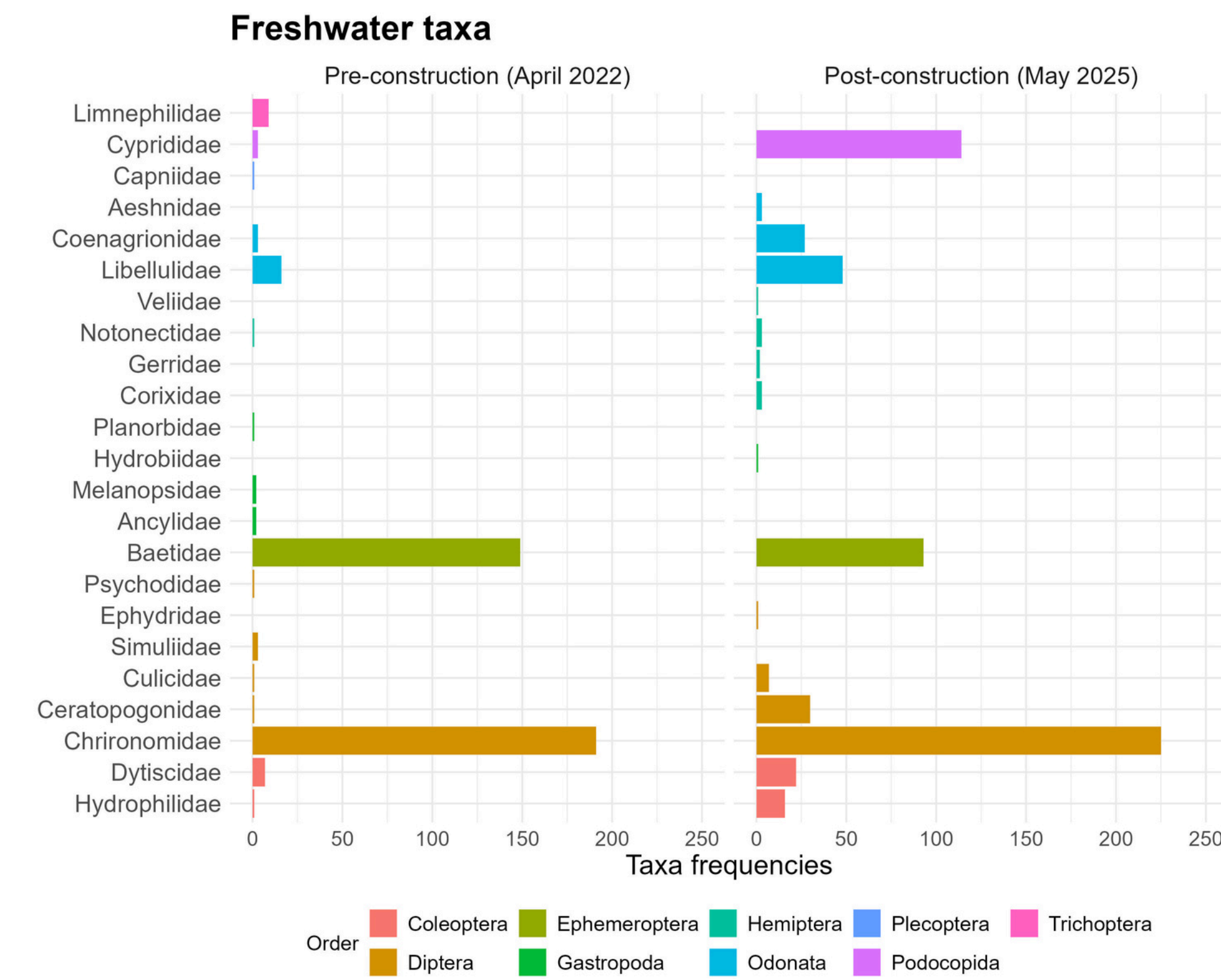
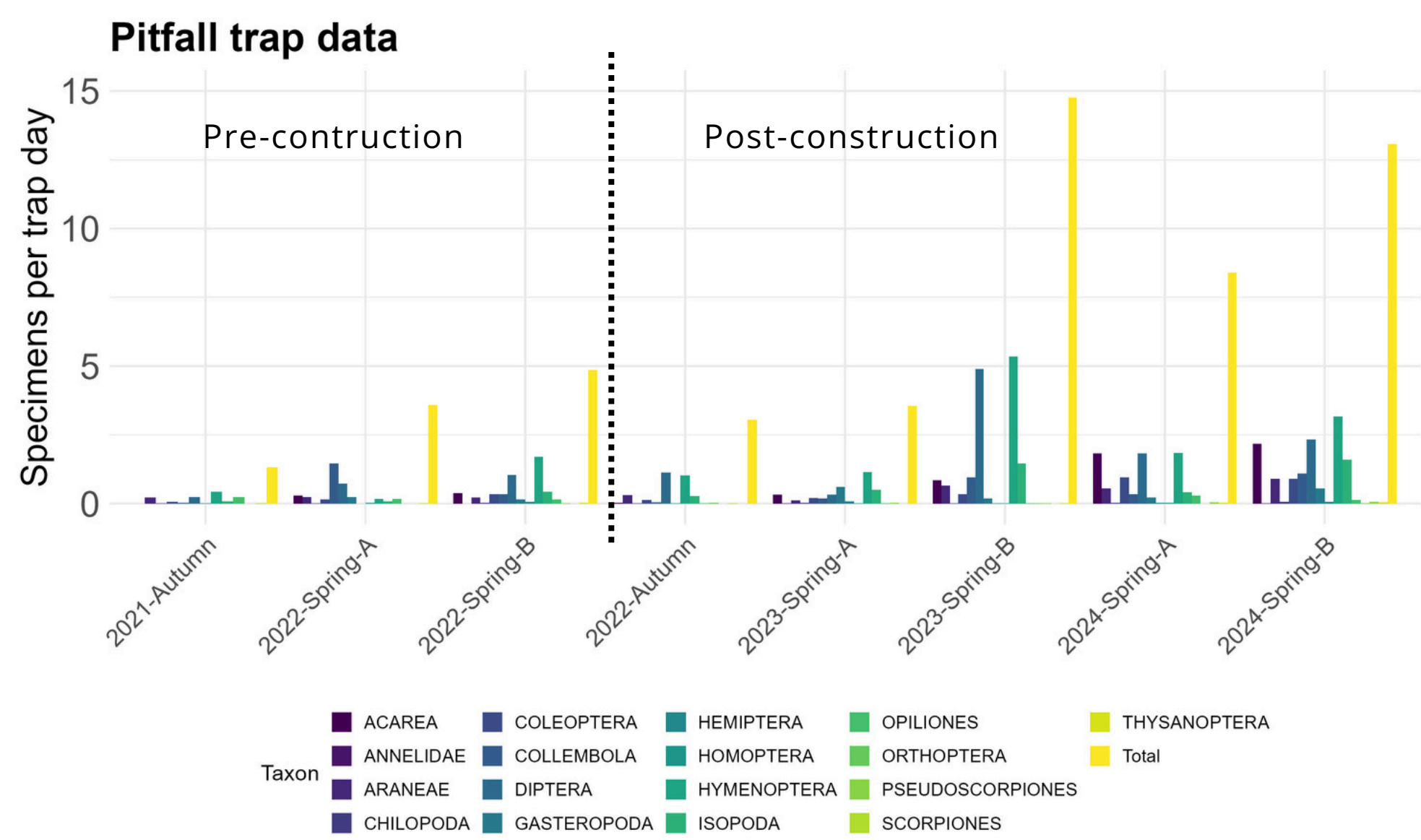


## MATERIALS & METHODS

To assess the impact of check dams on biodiversity, we selected terrestrial and freshwater invertebrates, along with amphibians, as biotic indicators. Monitoring launched in autumn 2021 and is still in progress. Terrestrial invertebrates were collected using 3 pitfall traps per four stations during September, March, and April. Freshwater invertebrates were collected with nets from selected ponds. All invertebrate specimens were identified in the lab to the highest possible taxonomic level. Amphibian presence was recorded through visual and auditory surveys conducted in April and May.



## PRELIMINARY RESULTS



## DISCUSSION

### Terrestrial invertebrates

Populations appear to be increasing after check dam construction. No significant changes were noted in the first year, likely due to construction disturbance or low rainfall. A clear abundance increase began in spring 2023. Monitoring will continue until October 2026, with results to be compared against 2021–2026 climate data.

### Freshwater invertebrates

Abundance has increased, particularly in families Cyprididae (Podocopa), Coenagrionidae and Libellulidae (Odonata), Ceratopogonidae (Diptera), and Dytiscidae and Hydrophilidae (Coleoptera). In April 2022, a species belonging to family Capniidae (Plecoptera) was recorded for the first time in Paros.

### Amphibians

Observations of *Pelophylax kurtmuelleri* specimens were more prevalent pre-construction, particularly between stations S3 and S4, compared to post-construction. This may be due to:

- The high precipitation during 2021-2022 did not recur in the subsequent years.
- During the first post-construction year (2023), significant disturbances were observed in the area (burning and cutting of riparian vegetation, extensive agriculture). The most critical incident was the discharge of petroleum-based substances into the pond at Station S2, which affected all areas downstream. An oily film was found in 2023 and 2024 and likely had negative impacts on frog appearance in the small ponds between S3 and S4.

### Other observations

- Grass snakes (*Natrix natrix*) were only detected 5 times in Kavouropotamos after the construction of the check dams.
- Freshwater crabs (*Potamon fluviatile*) were found in small populations, with no clear link to the dams.
- Vegetation appears to have increased significantly following the dam constructions, as indicated by preliminary NDVI analysis. Dominant hygrophilous species include oleander (*Nerium oleander*) and giant reed (*Arundo donax*), while cattails (*Typha sp.*) and rushes (*Juncus sp.*) also grow in certain locations. Mastic shrubs (*Pistacia lentiscus*) are also prominently present in the area.

## REFERENCES

Giannakakis, T., Georgiadis, N., Paragkamanian, K., Nikoloudakis, I., Karamanes, N. & Sakellarakis, F. (2022). Traditional stone weirs: a green infrastructure to tackle water scarcity in small and islands. 7<sup>th</sup> IAHR Europe Congress, September 7<sup>th</sup> – 9<sup>th</sup>, 2022, Athens, Greece.  
Sakellarakis, F., Georgiadis, N., Paragkamanian, K., Giannakakis, T., Nikoloudakis, I., Spaneli, V., Koutropoulos, G., Kostoulas, P., & Zafiriou, R. (2023). Stone weirs in ephemeral streams: A nature-based green infrastructure for adapting and ecosystems to the climate crisis. In HELECOS11 abstracts (p. 119). Hellenic Ecological Society.

The study was funded by **MAVA Foundation** (within the Mediterranean Islands Collective Initiative) and by Horizon **SpongeScapes** ([www.spongescapes.eu](http://www.spongescapes.eu))