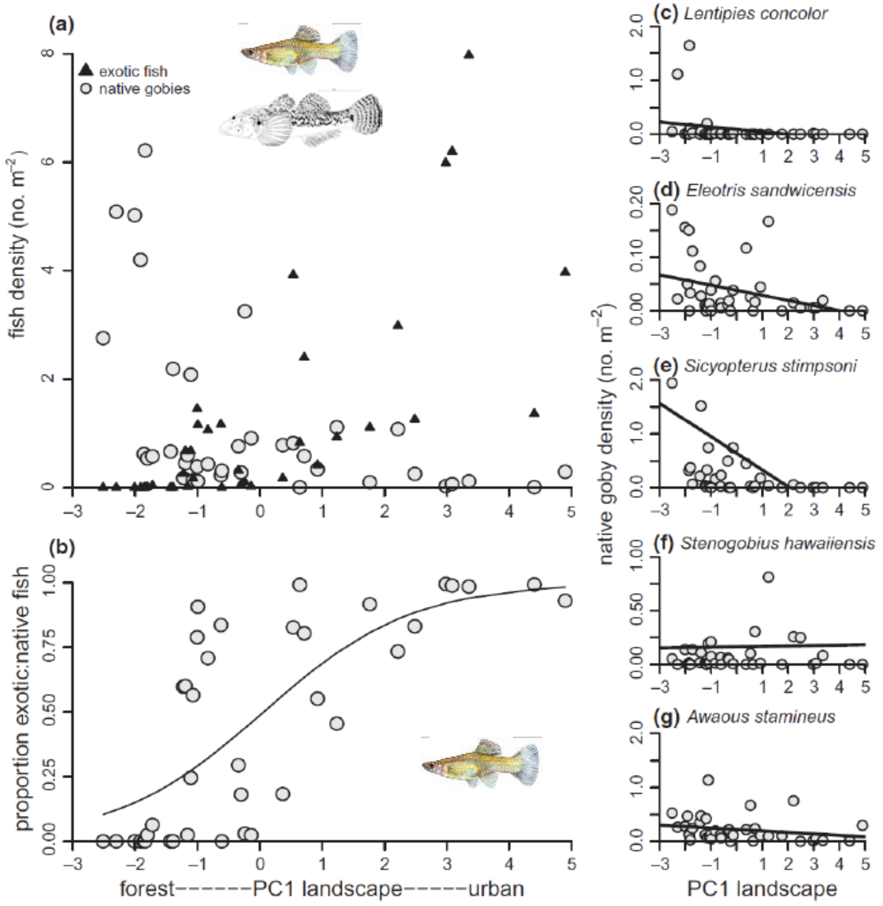
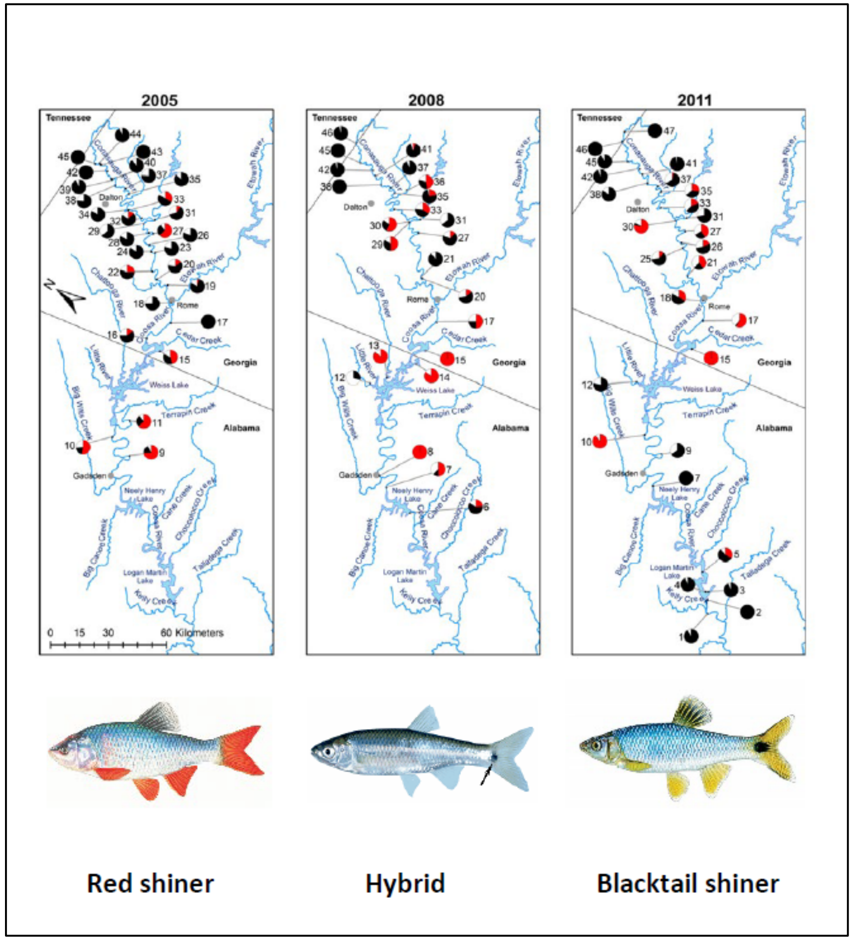
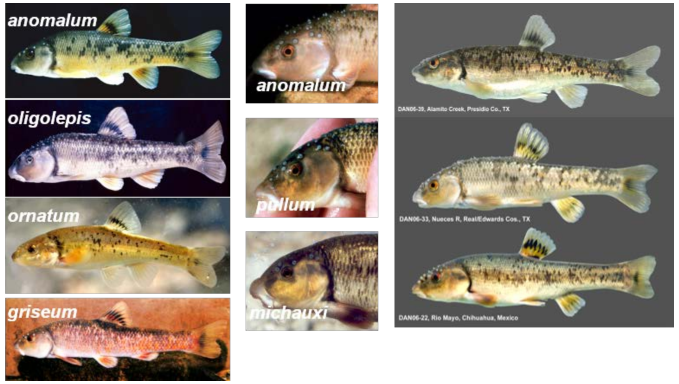
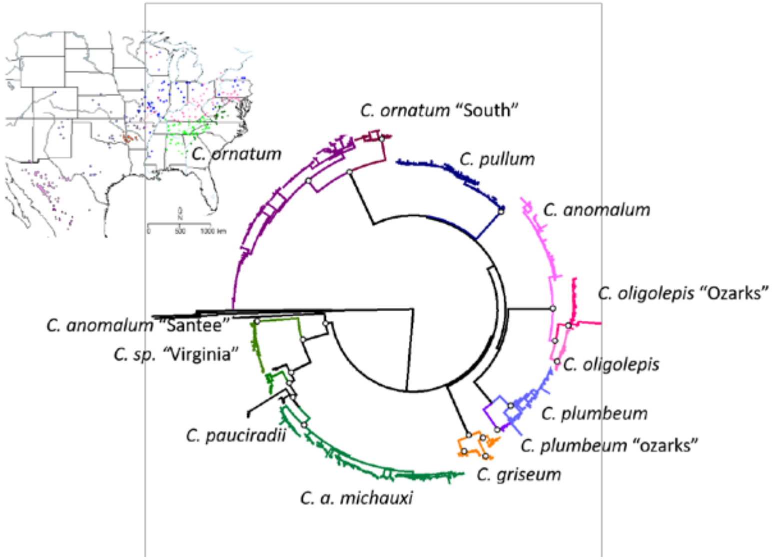
At-risk species management   Aquatic invasive species

Biodiversity discovery









Managing At-Risk Species in Pacific Island Streams:

Benefits of connectivity and invasive species control across Complex Landscapes?

Michael J. Blum

University of Tennessee - Knoxville

J. Derek Hogan

Texas A&M Corpus Christi

Peter B. McIntyre

Cornell University

Complex landscapes: managing through connectivity

Complex landscapes: managing through connectivity

Complex landscapes: managing through connectivity

Managing through connectivity

Amphidromous native stream fauna are subject to migratory gauntlets

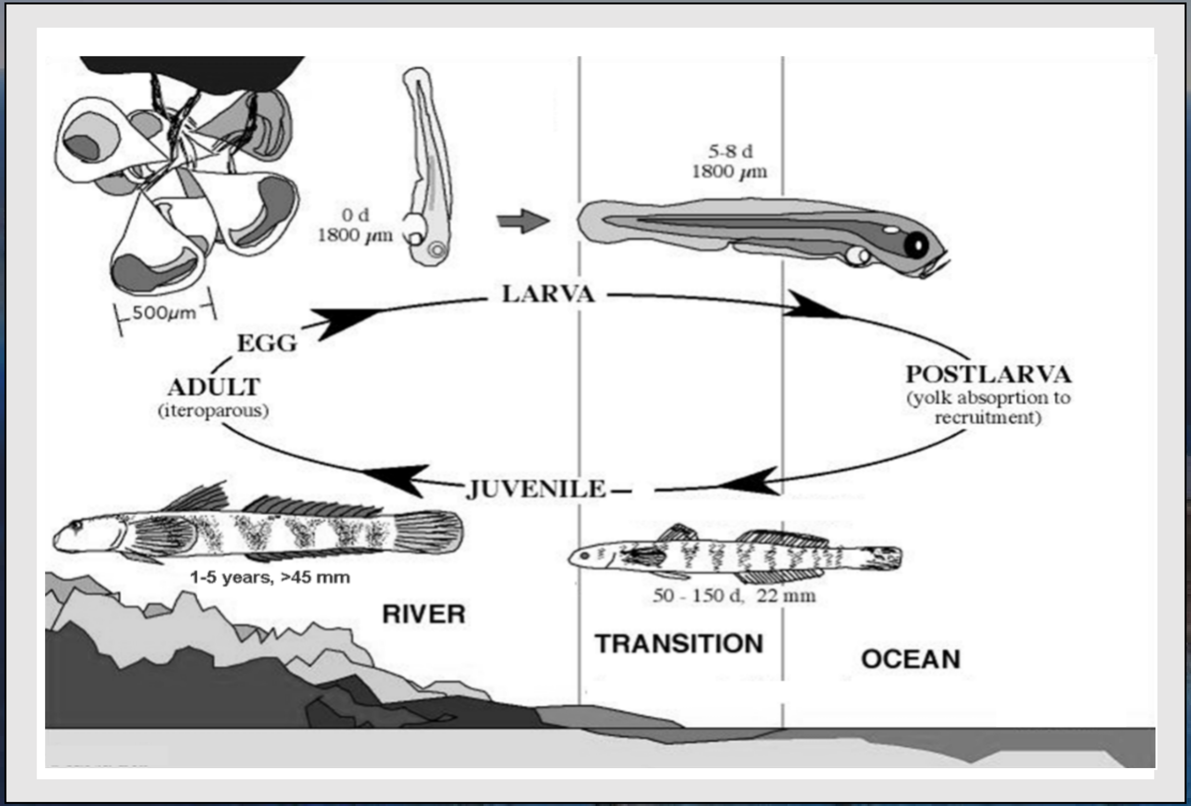
Awaous stamineus

Lentipes concolor

Eleotris sandwicensis

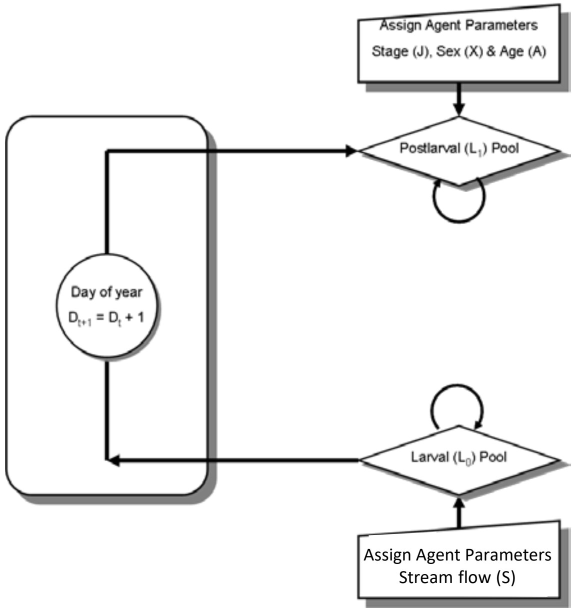
Sicyopterus stimpsoni

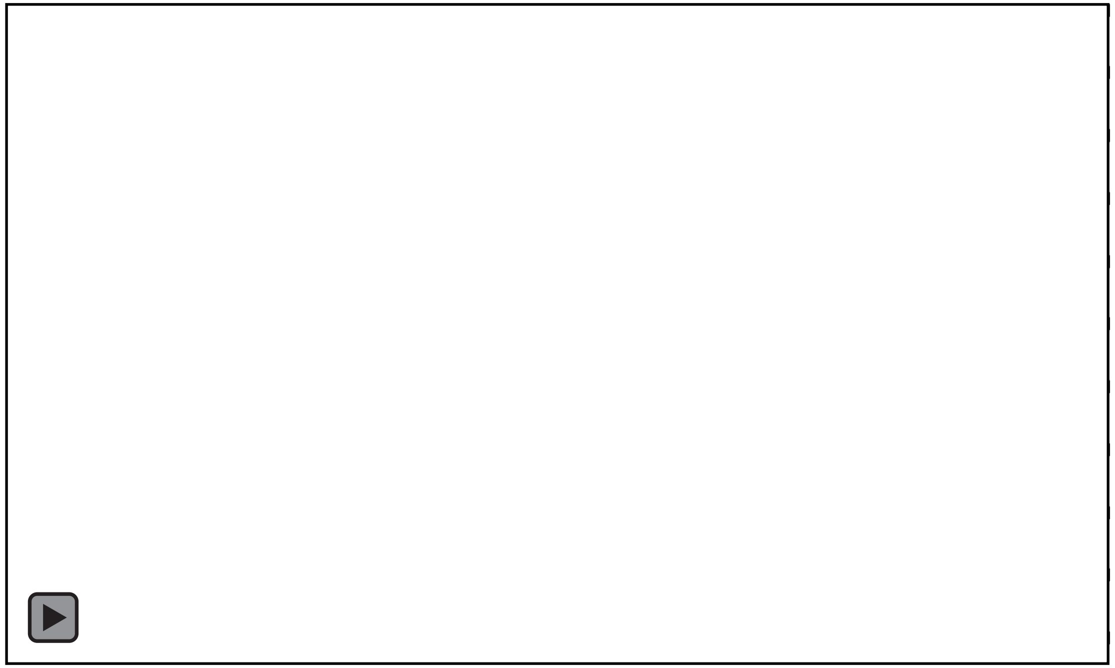
Stenogobius hawaiiensis

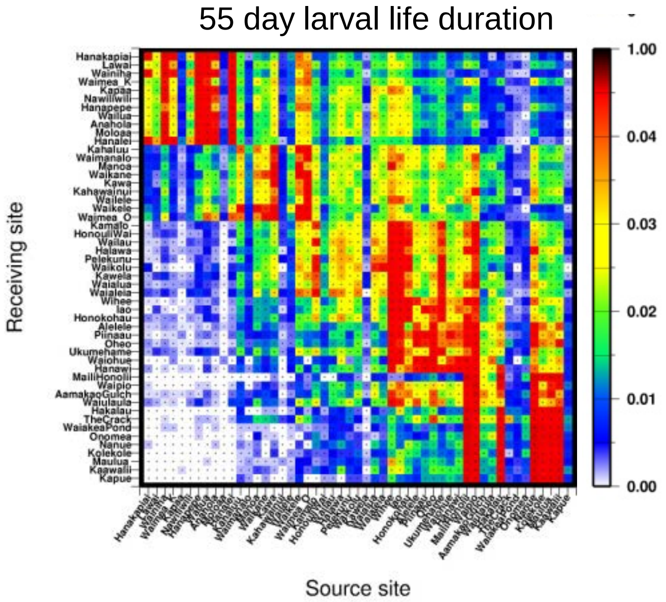


Managing through connectivity

Can compromised populations be rescued through dispersal?



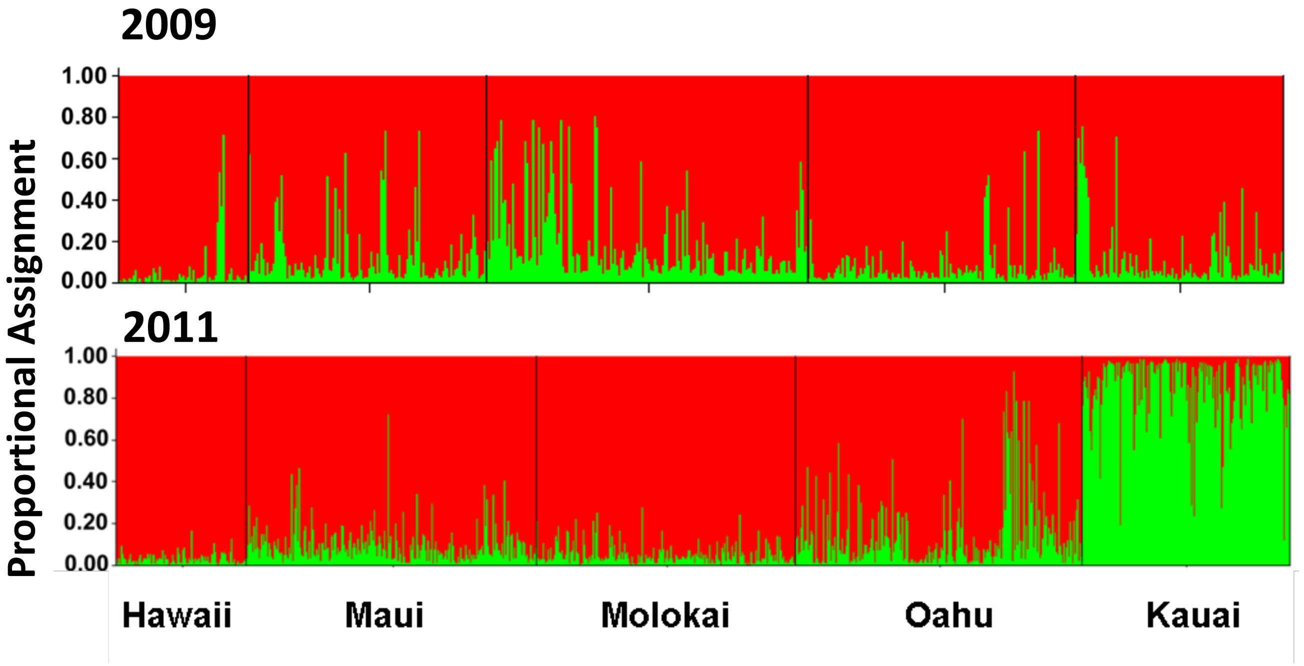


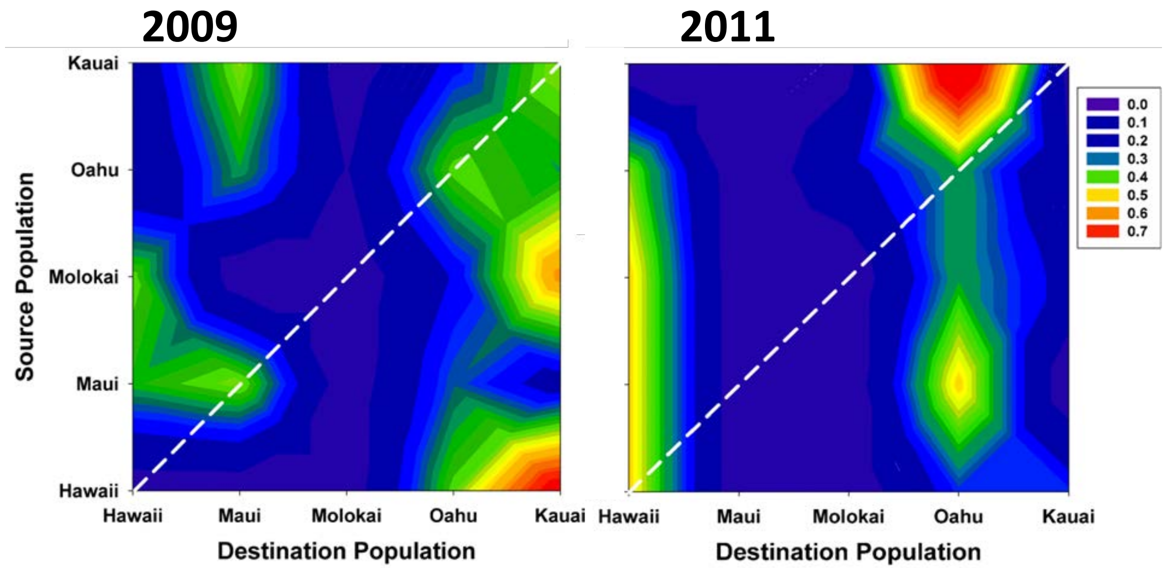


Hawaii HYCOM 0.040 (~4km) advection-diffusion circulation model with particular tracking model suggests that there is directional bias and that local retention is likelier than expected

Can compromised populations be rescued through dispersal?

Evidence of strong, but unstable connectivity from population genetic surveys

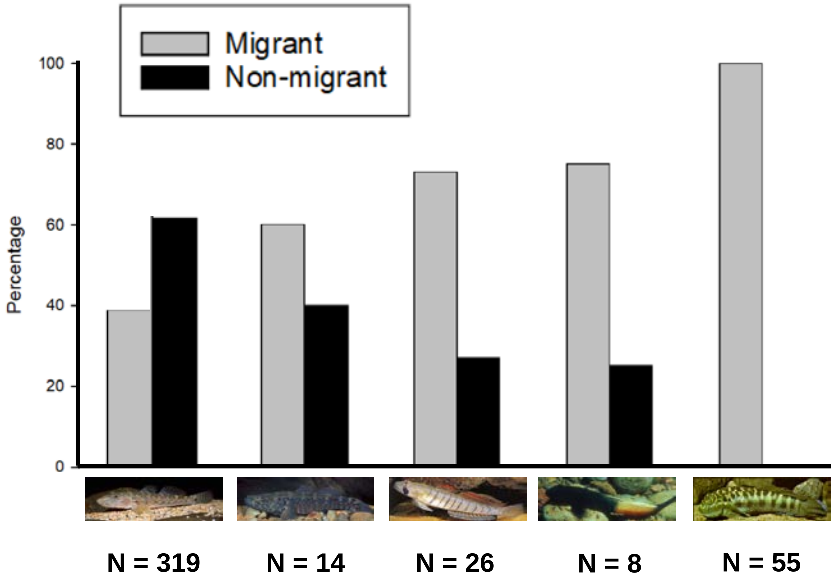




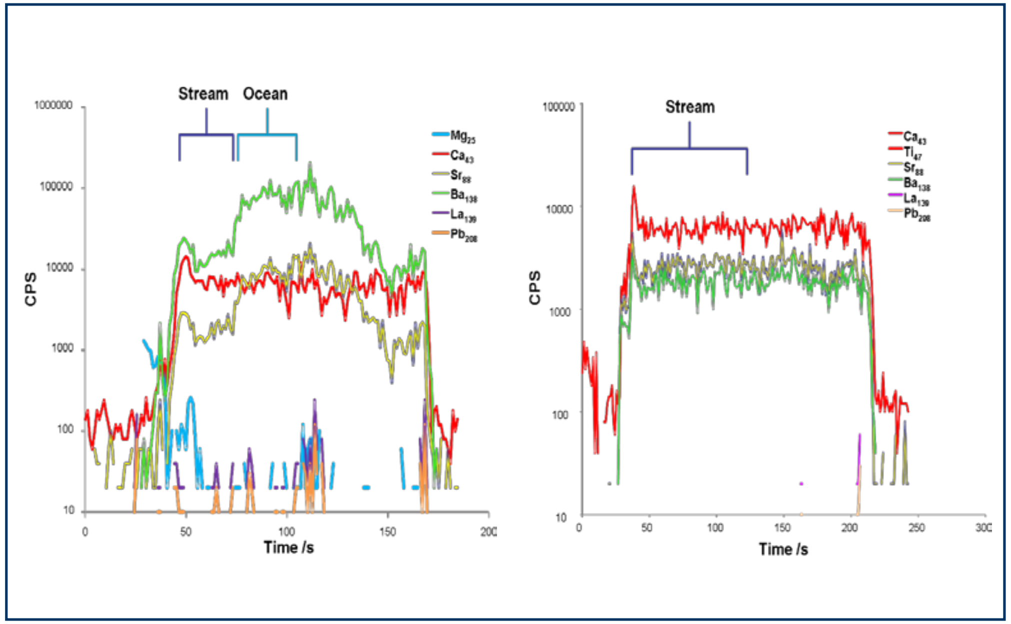
Awaous stamineus

Can compromised populations be rescued through dispersal?

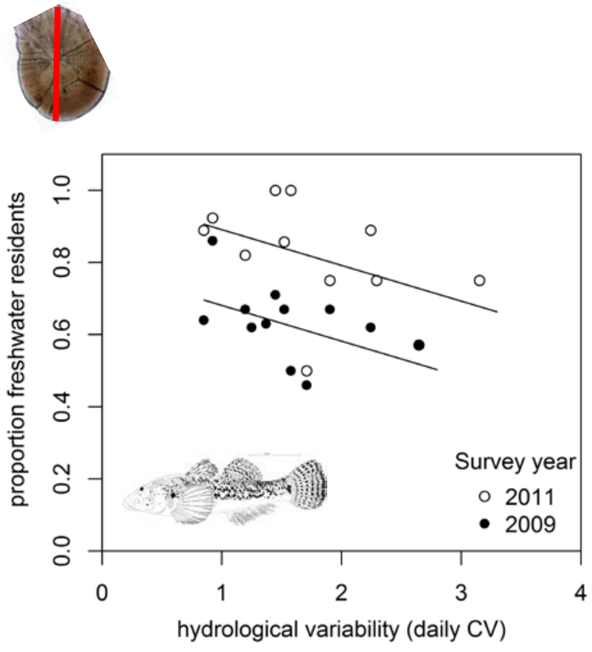
Evidence to the contrary from otolith-based life history studies



In some species, >60% remain in natal stream



Evidence of facultative migration in 4 of 5 native fish species



Proportion of migrants varies with hydrology

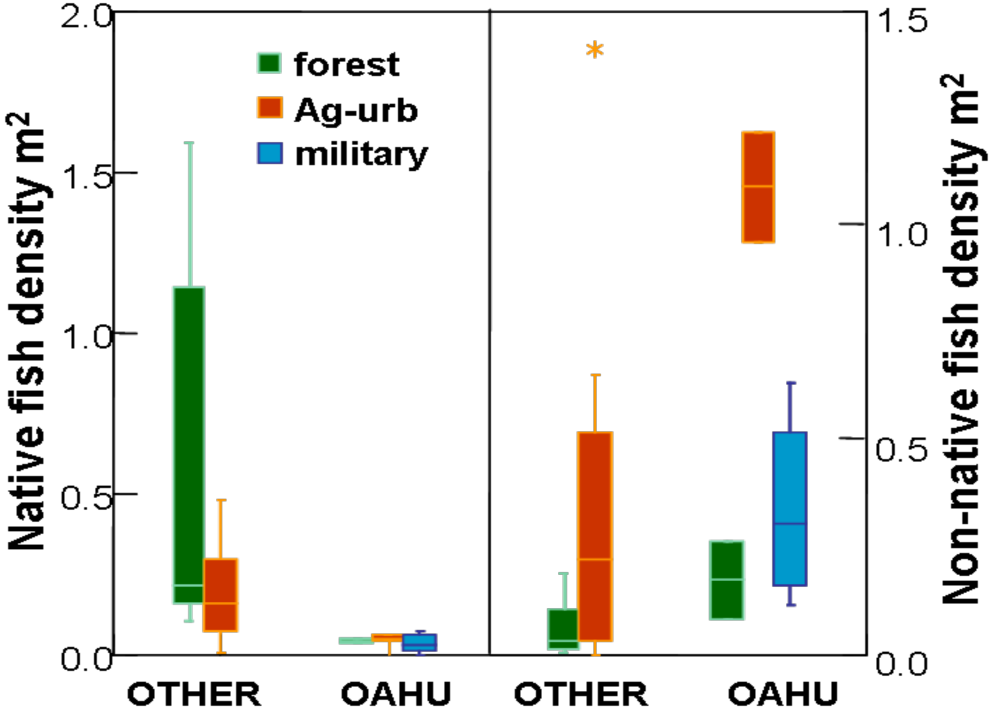
TEXAS A&M UNIVERSITY CORPUS CHRISTI

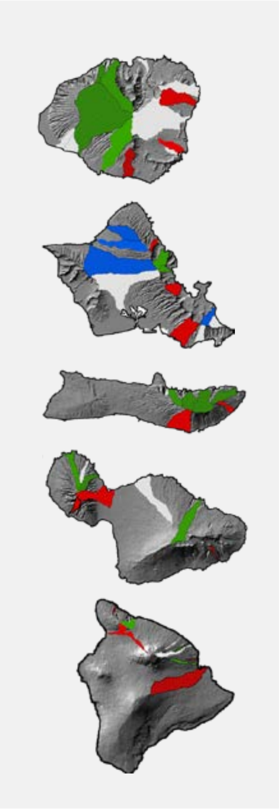
THE UNIVERSITY OF TENNESSEE KNOXVILLE

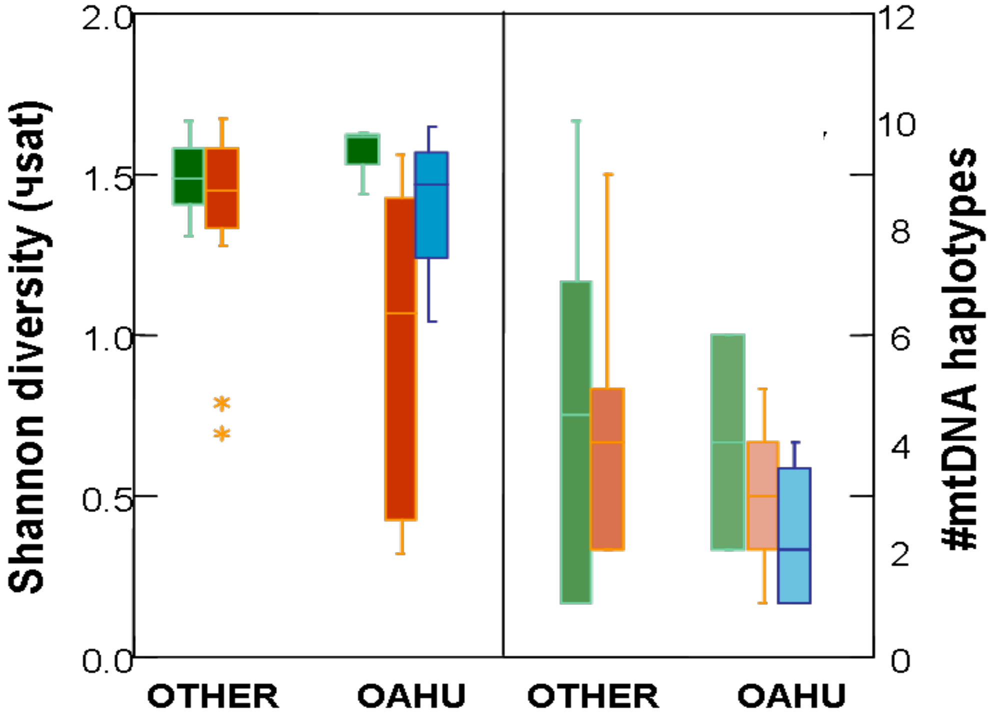
CORNELL UNIVERSITY FOUNDED A.D. 1865

Can compromised populations be rescued through dispersal?

Evidence to the contrary from archipelago-wide stream surveys







‘Oahu effect’ – populations are depressed across the island, regardless of land cover and stewardship (lower genetic diversity in agricultural-urban dominated watersheds on Oahu)

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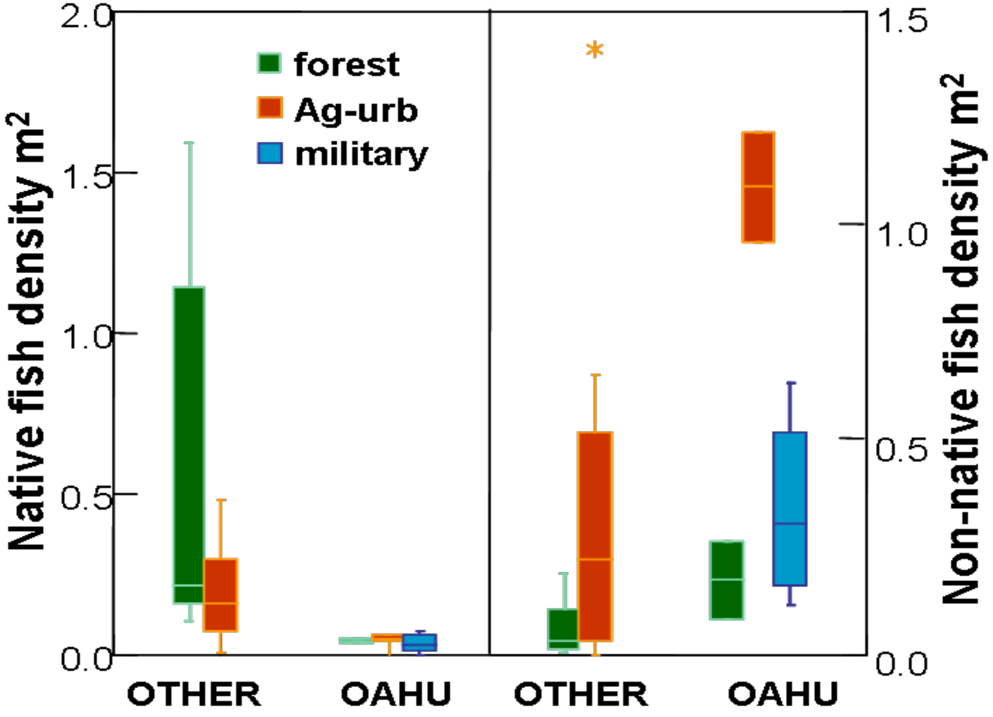
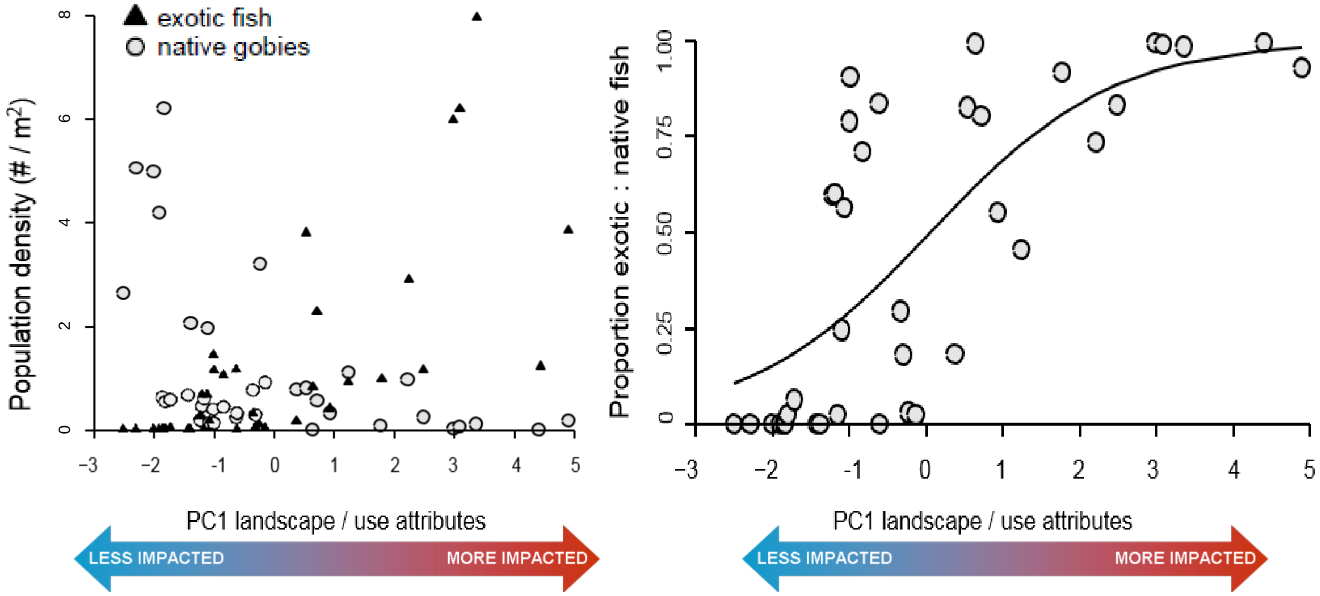




Loss of native species and rise of invasive species with land use intensification, especially on Oahu

Does aquatic invasive species control benefit native species?

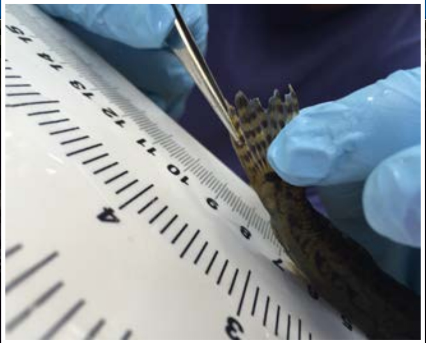
BACI study of AIS control in 13 watersheds across a hydrological gradient on Oahu

Depending on surface flow, AIS control might favor native species by reducing competition, predation, nutrient loading and nutrient availability

Does aquatic invasive species control benefit native species?



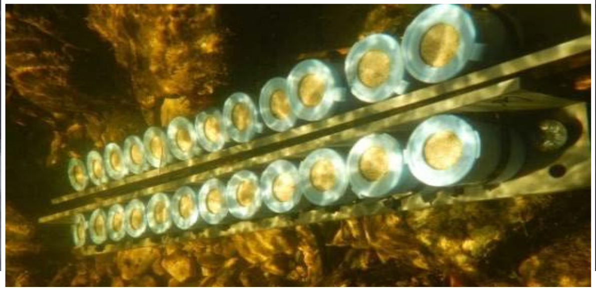


Genomic analysis – Life history analysis – Demographic analysis – Community analysis- Ecosystem analysis







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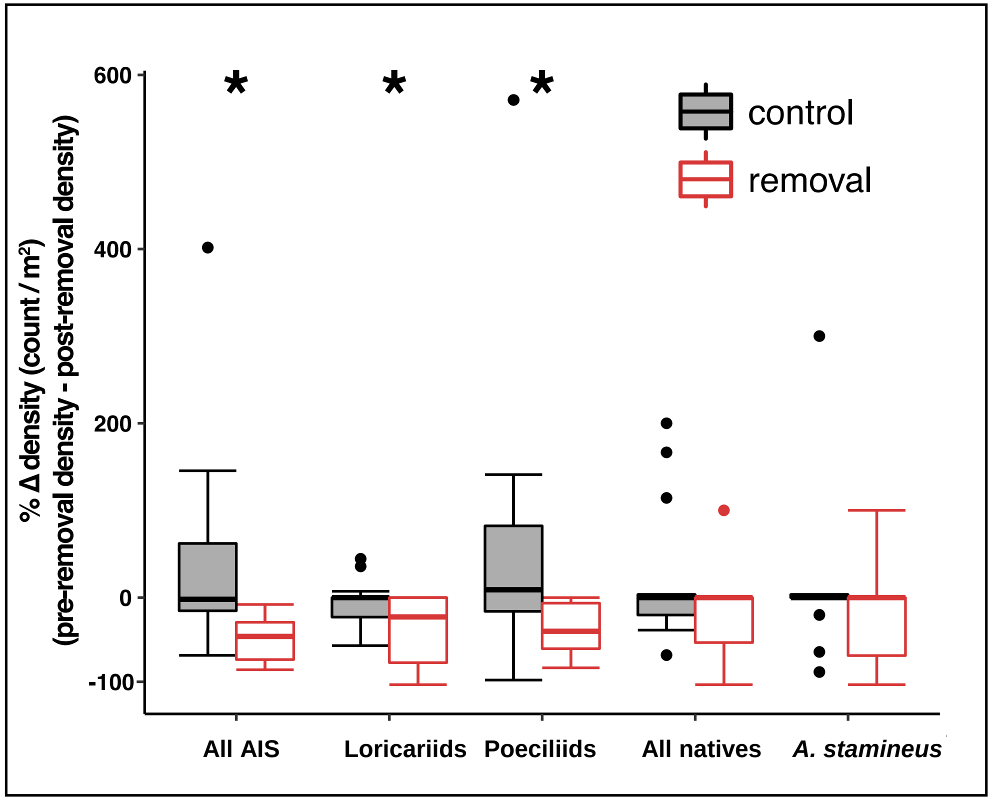
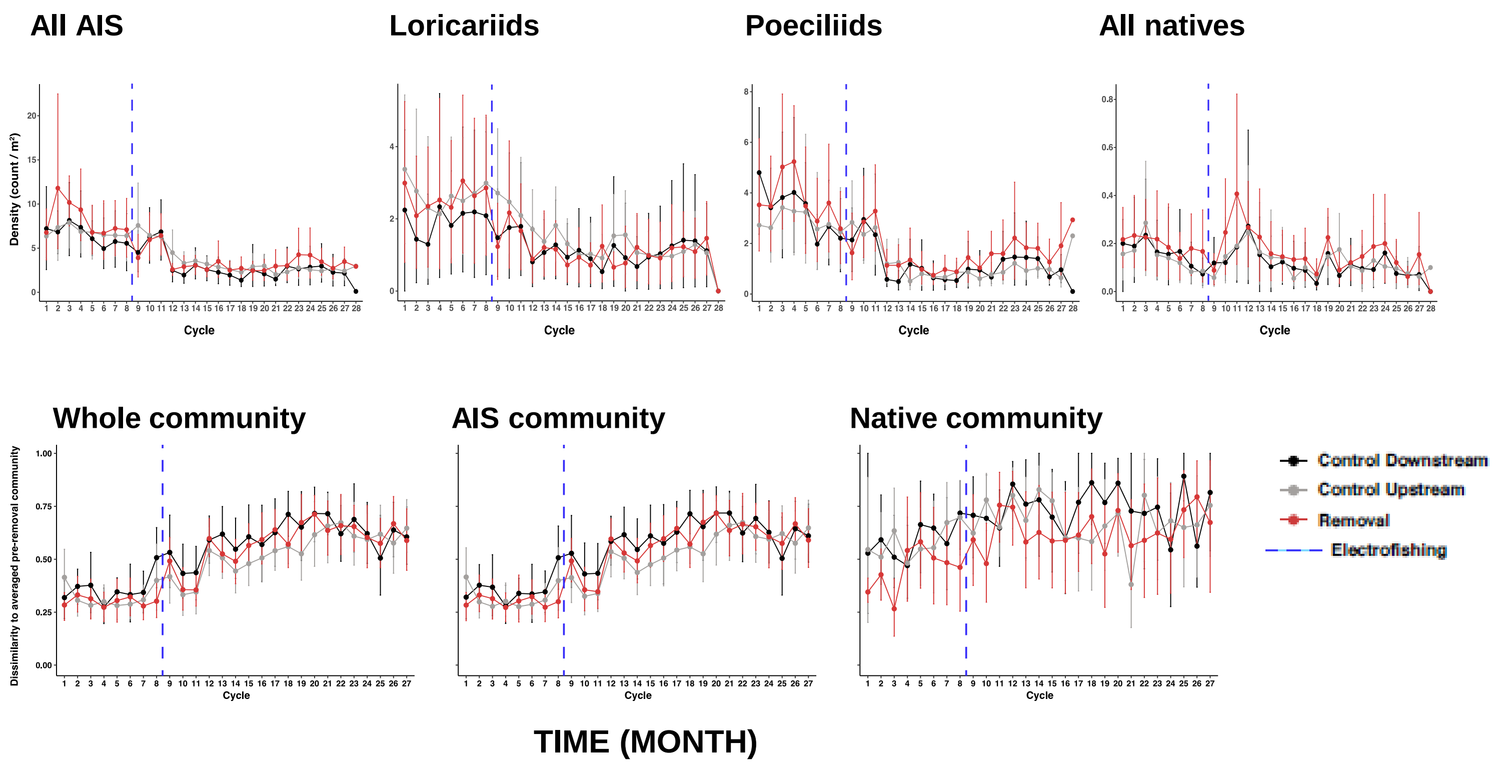
Does aquatic invasive species control benefit native species?

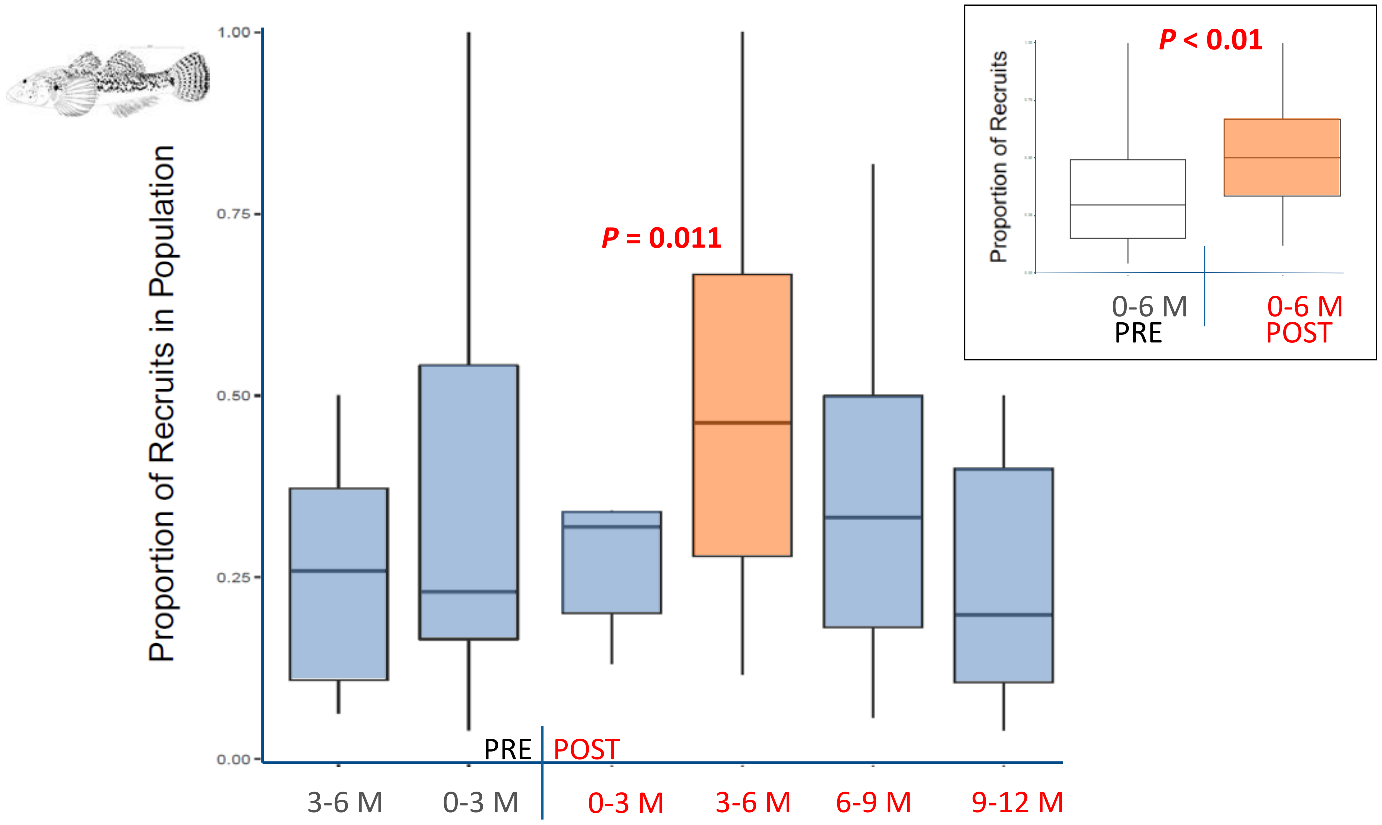
Acute and sustained reduction of AIS densities and community Δ following removals

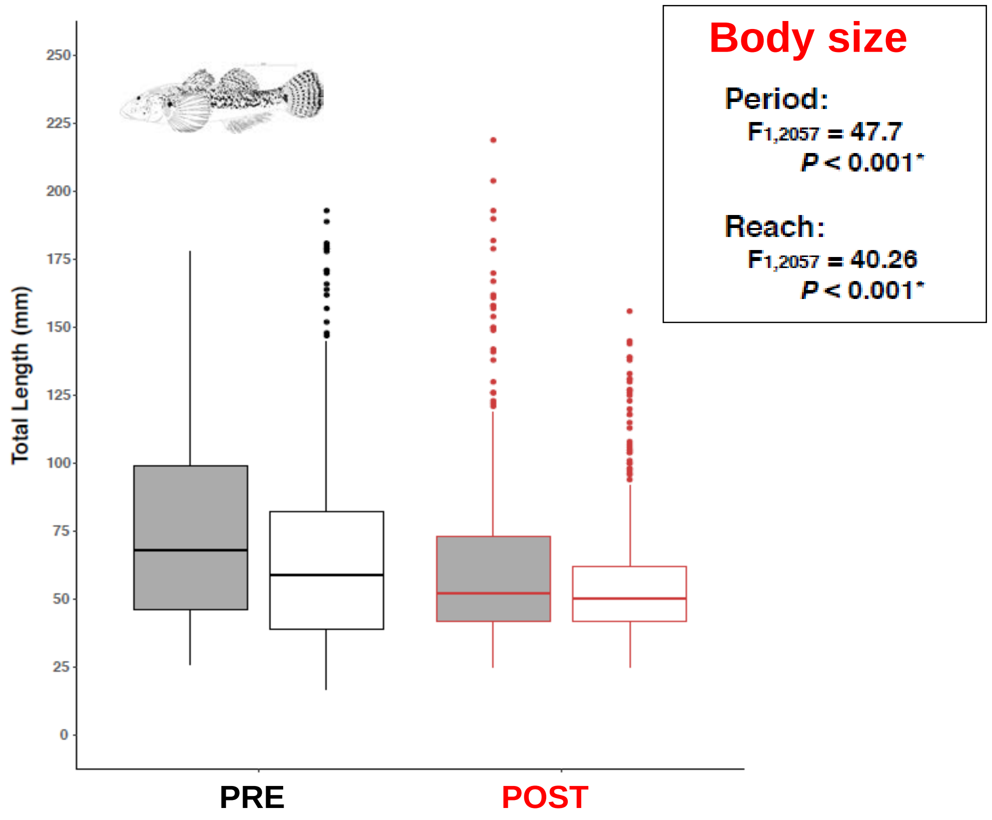




Does aquatic invasive species control benefit native species?

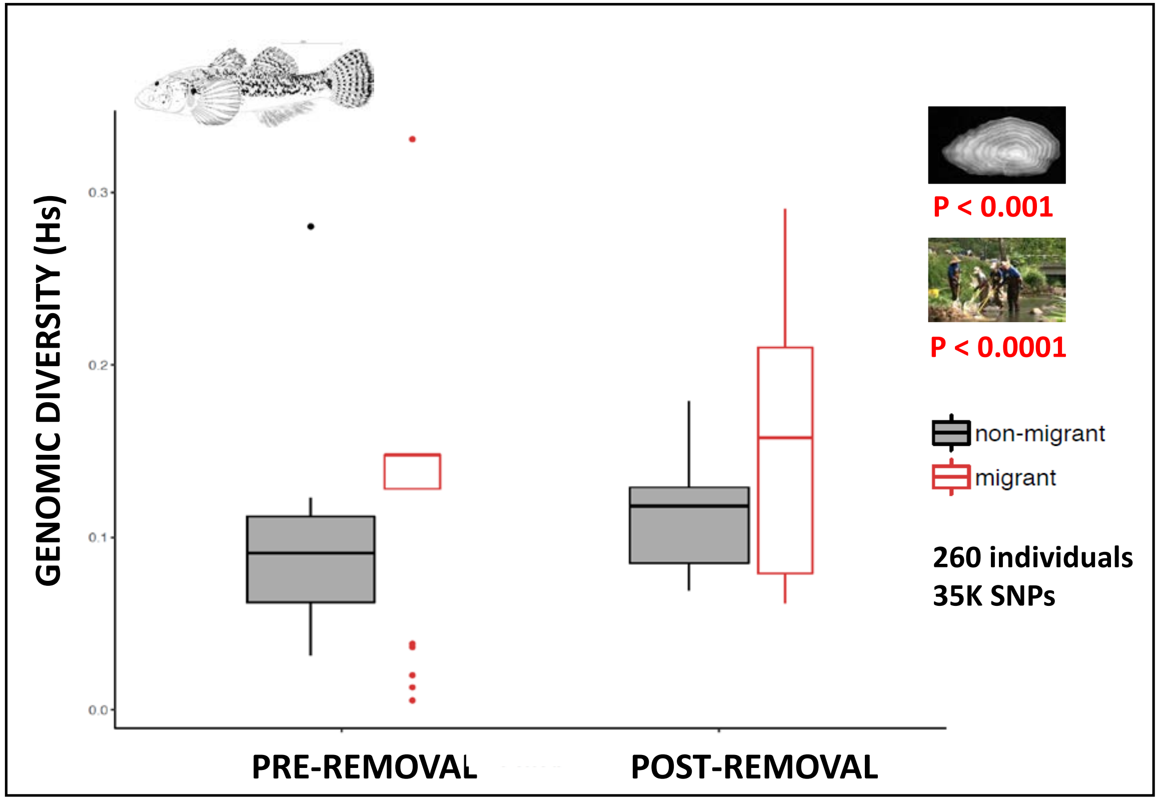
Evidence of recruitment pulse following AIS removals

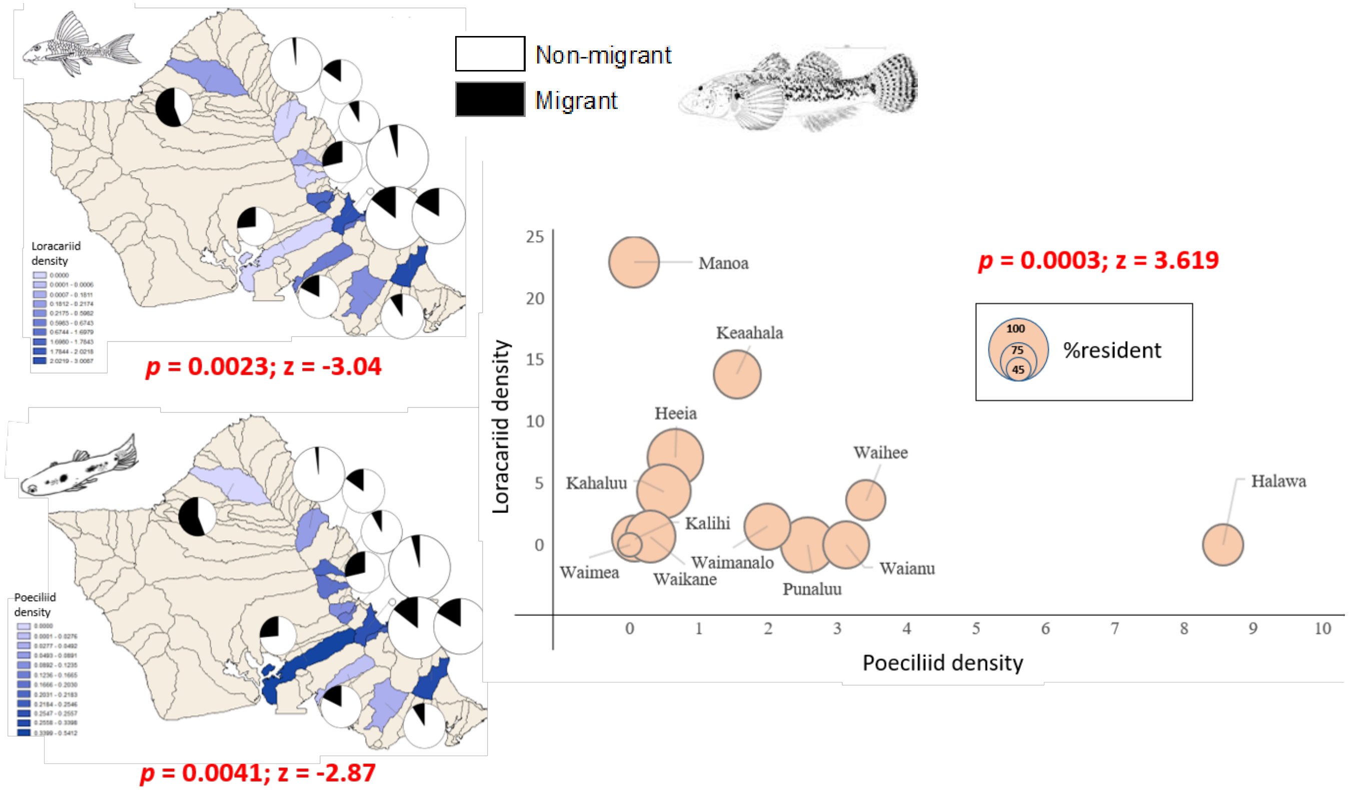




Does aquatic invasive species control benefit native species?

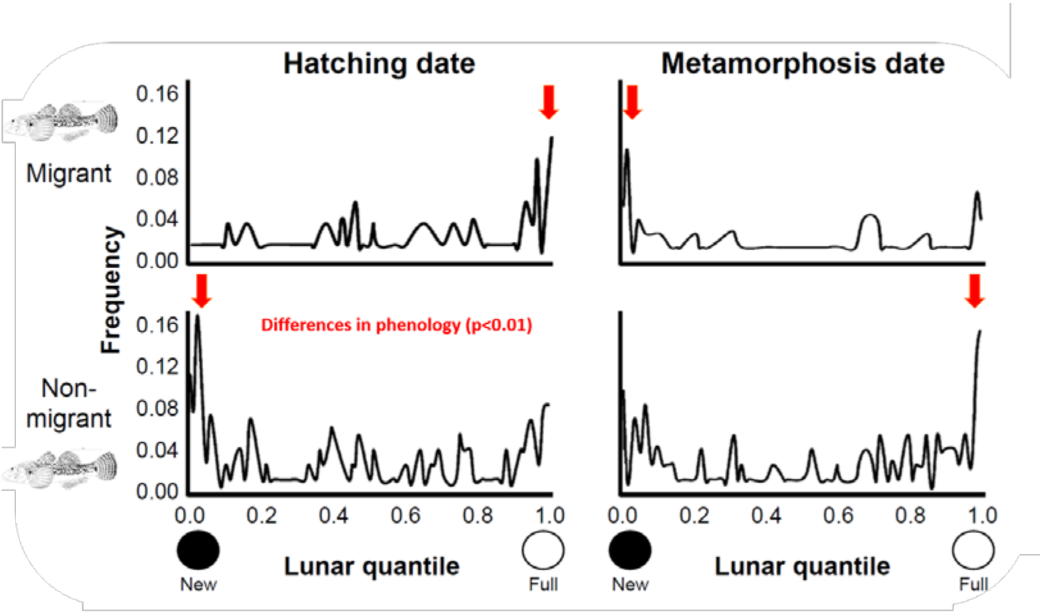
Evidence of life history mediated increase in genomic diversity following AIS removals

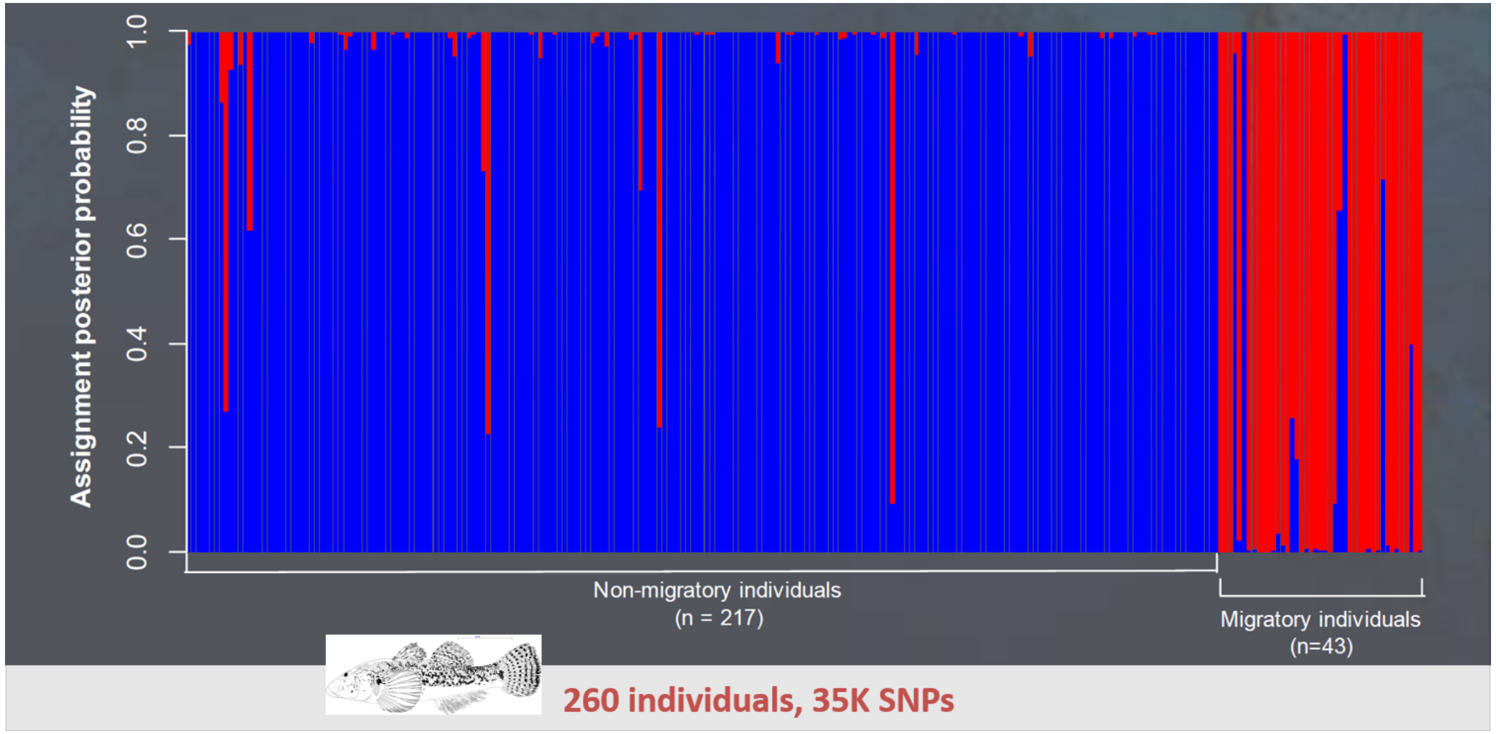




Eco-evolutionary implications of aquatic invasive species control?

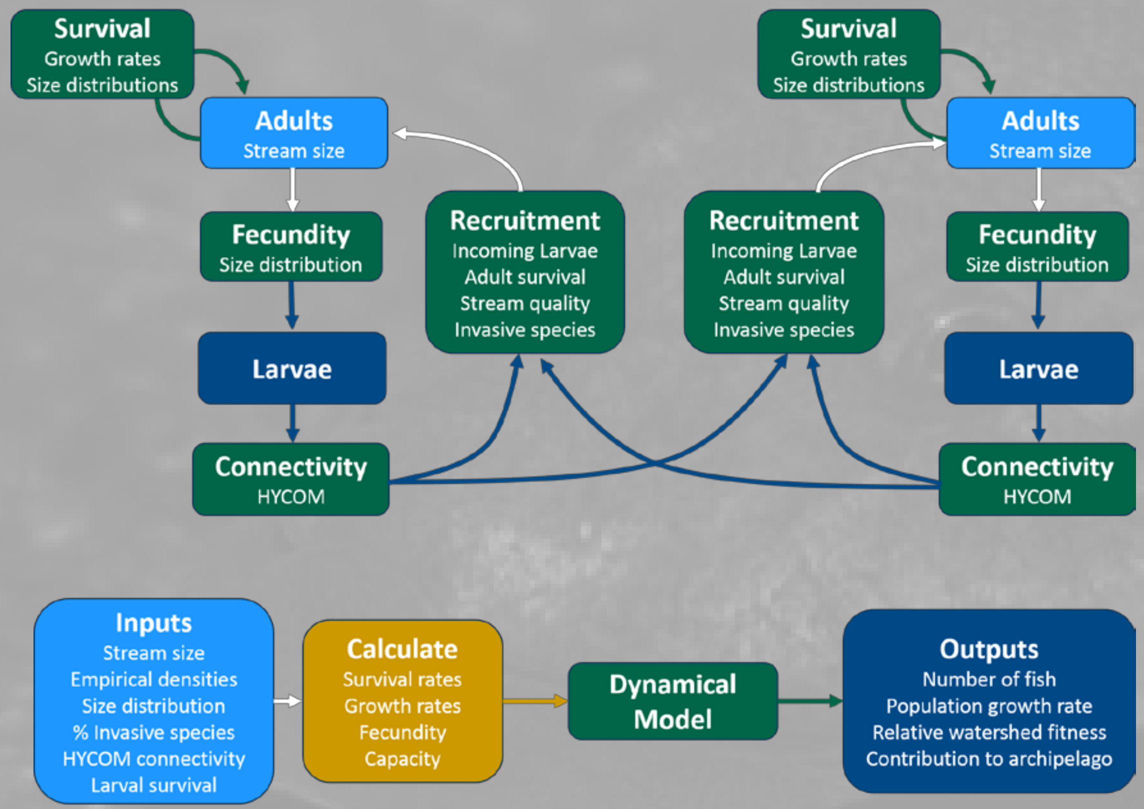
Evidence of genomic differentiation and temporal reproductive isolation by life history

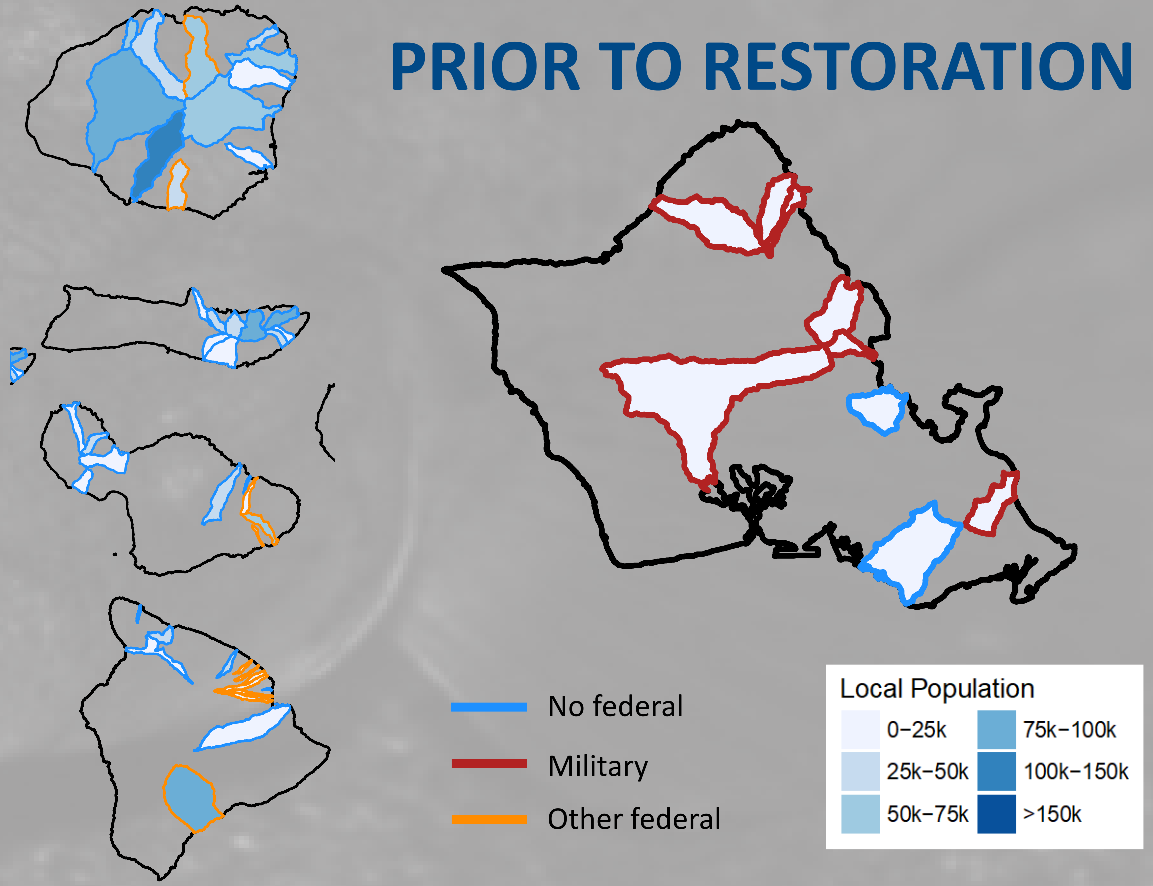




Eco-evolutionary implications of aquatic invasive species control?

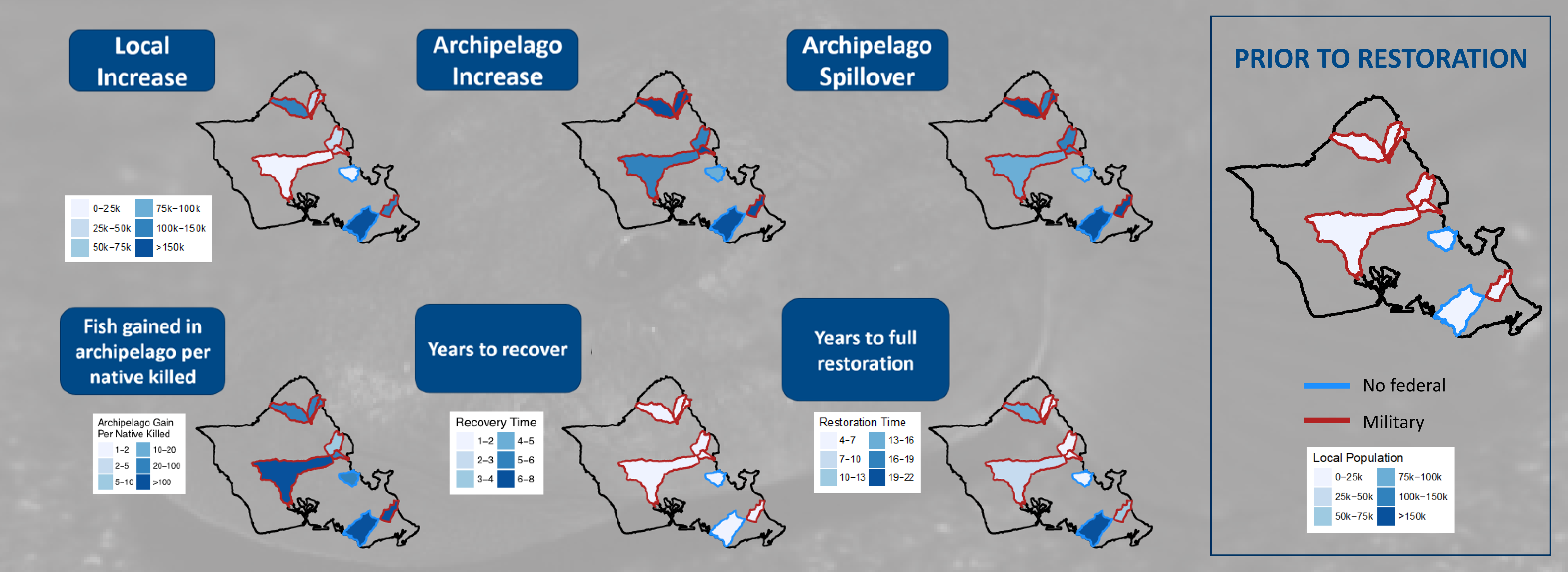
Accounting for connectivity to predict local and global outcomes of AIS control





Eco-evolutionary implications of aquatic invasive species control?

Predicting local and global implications of watershed-scale AIS control



Questions?