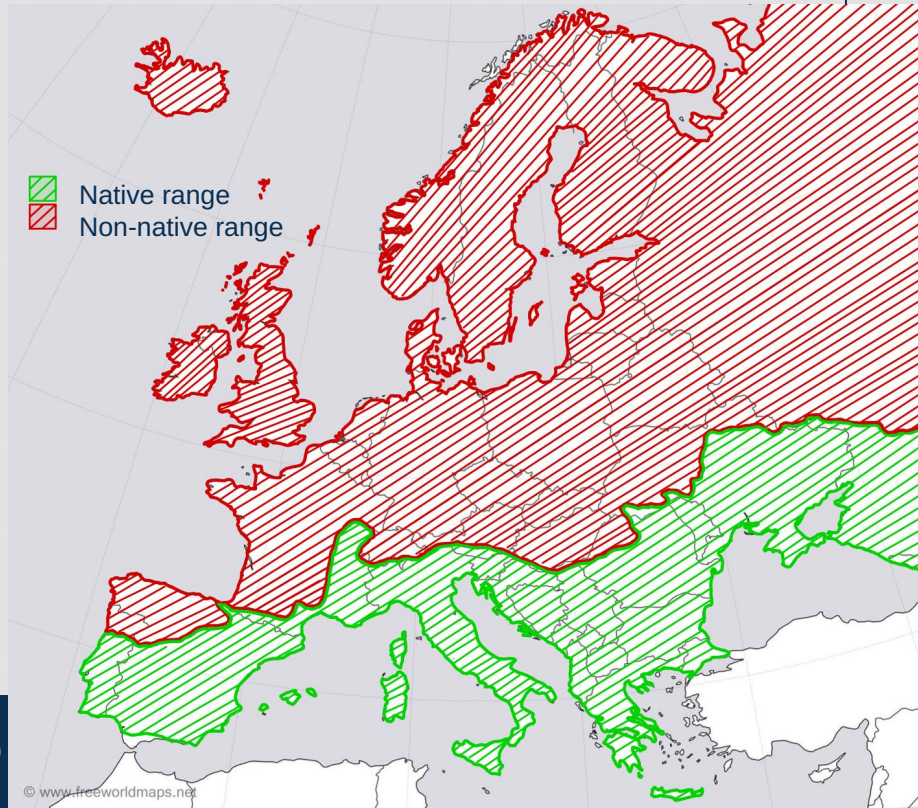
Mitigating *Salmo trutta* Invasions: an Evaluation of Conservation Methods to Protect *Salmo* Populations in Europe

Mara Berzina
04 May, 2026
ENV499: thesis defence presentation
Franklin University Switzerland

Background: Brown trout (*Salmo trutta* L.)

- Salmonid species native to Europe
- Consists of 7 evolutionary lineages
- Stocked as gamefish for recreational angling
- Atlantic lineage *S. trutta* range overlaps with other Salmo species
- Introgressive hybridization occurring in *Salmo* species → loss of unique adaptations

S. trutta range (based on Kottelat and Freyhof (2007)



Justification

- High evolutionary value of *Salmo* populations → urgent need for conservation efforts
- Many *Salmo* populations are already endangered
- Morphologically similar to each other
- Many threats are trade-offs

Research gap: an up-to-date literature review of the efficacy of management methods, both in isolation and combination, to conserve European *Salmo* populations from introgressive hybridization with *Salmo trutta*

Literature review: management methods

01

Genetic Refuge Strategy

02

Isolation Management

03

Eradication and Suppression

04

Stocking

05

Translocations

06

Angling Restrictions

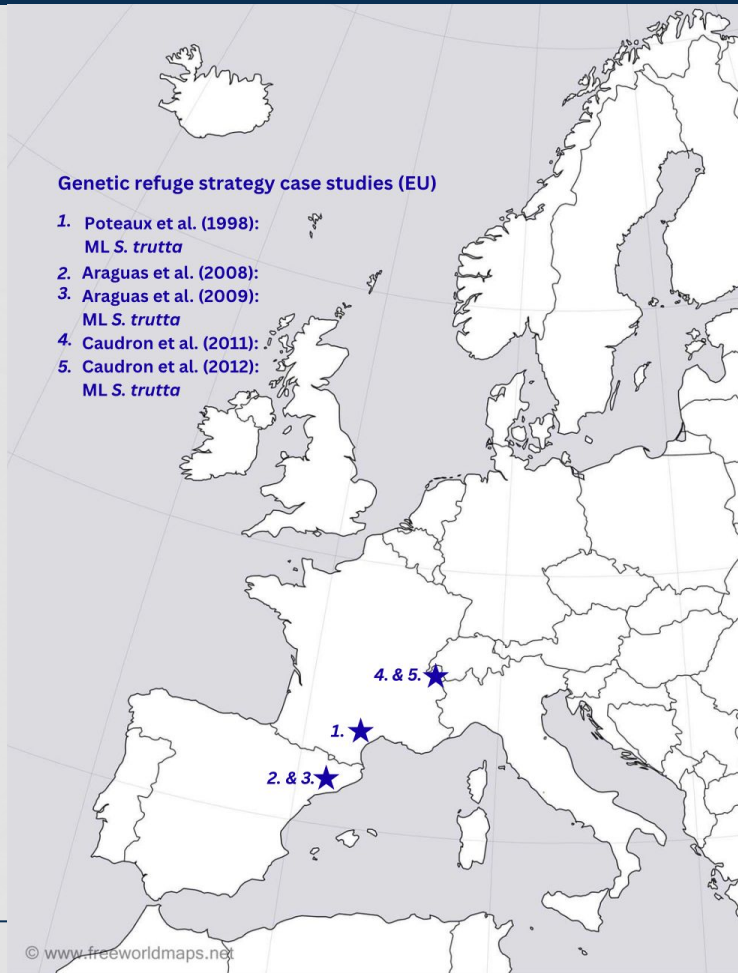
General recommendation: monitor the managed population for at least two reproductive cycles

1. Genetic refuge strategy (GRS)

- Establishing areas with ceased stocking of hatchery *S. trutta*
- Stops the flow of foreign genes into the population

Recommendations:

1. Combine with active management methods
2. Choose sites with existing public support OR create communication plan
3. Utilize barriers to prevent *S. trutta* immigration

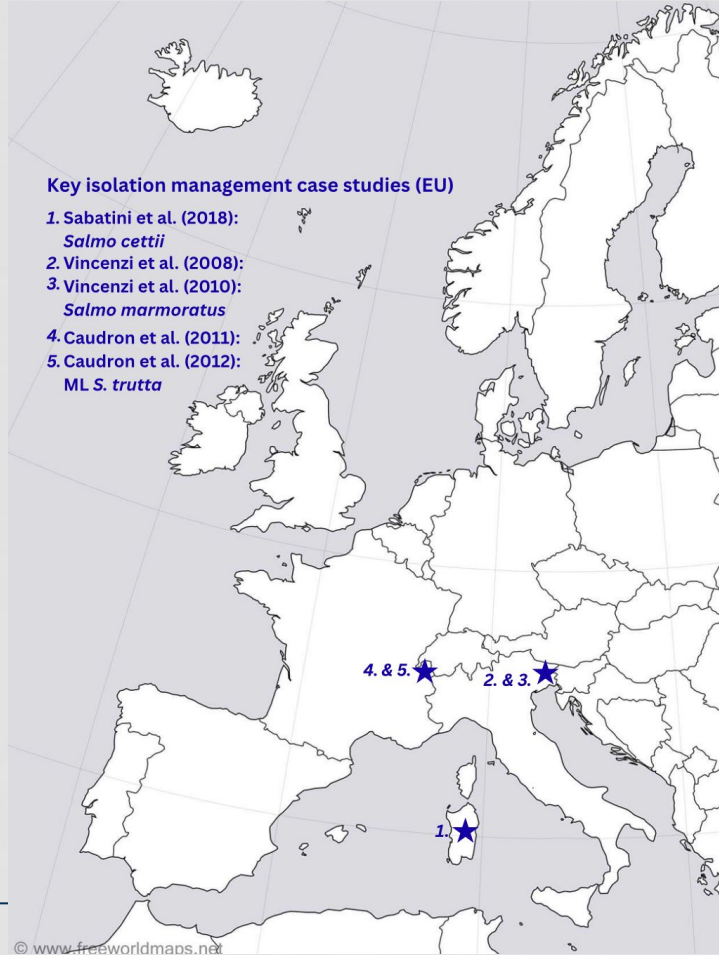


2. Isolation management

- Use of barriers to isolate a native population
- Prevents flow of foreign genes into the population

Recommendations:

1. Choose sites with maximum possible length
2. Implement habitat improvement to support natural recruitment
3. Consider: supplementary stocking

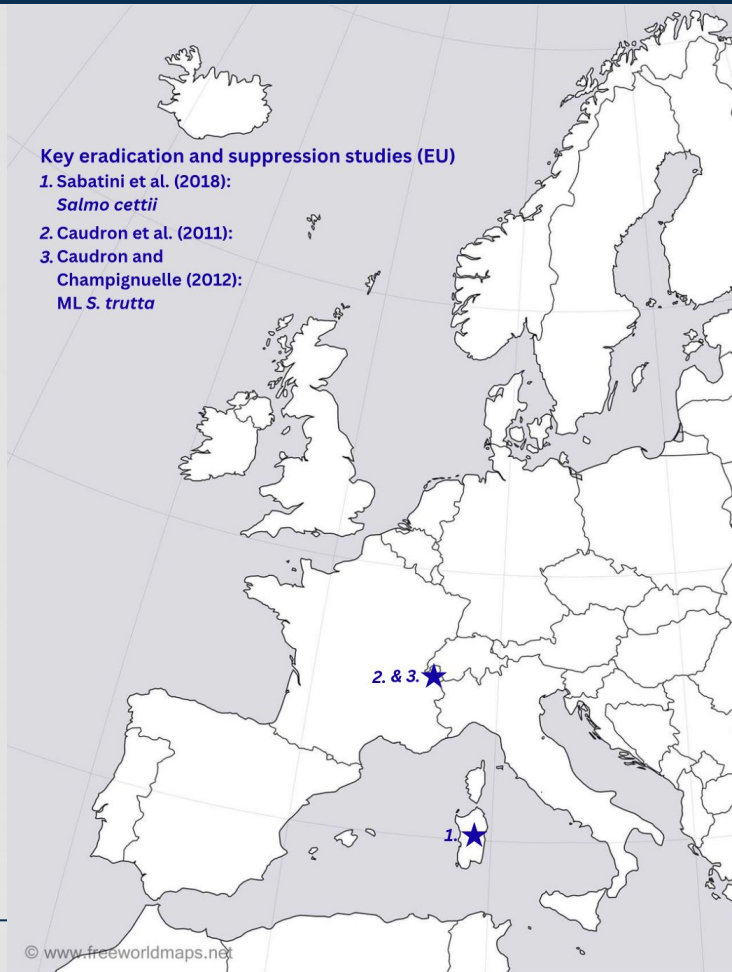


3. Eradication and Suppression

- Removing or suppressing a non-native population via electrofishing
- Used for severely introgressed populations
- Precursor to reintroduction campaigns

Recommendation:

1. Prevent re-invasions with barriers where relevant
2. Pre-empt with genetic refuge strategy

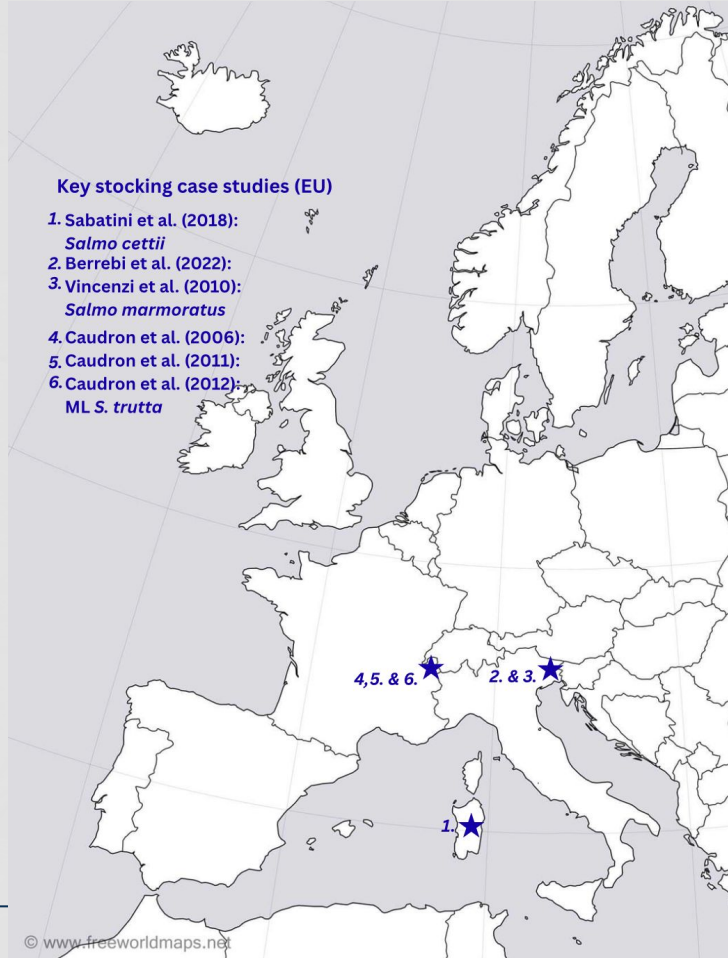


4. Stocking

- Release of native *Salmo* species in the wild
- Used for:
  - Reintroduction campaigns
  - Lowering introgression rates

Recommendations:

1. Use minimally domesticated stocks
2. Tailor age of stocked individuals to the campaign goals
3. Stock 10-100% of the carrying capacity of the site

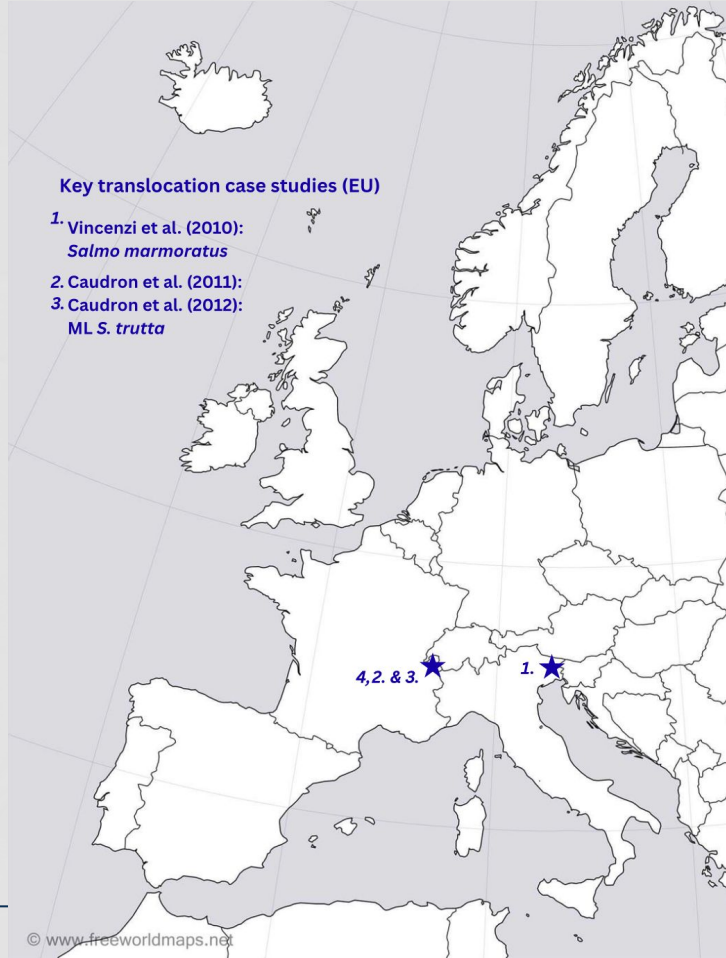


5. Translocations

- Moving individuals from one water body to another

Recommendations:

1. Spread efforts across the entire site
2. Translocate 10-100% of the carrying capacity of the site
3. Source individuals from only one population

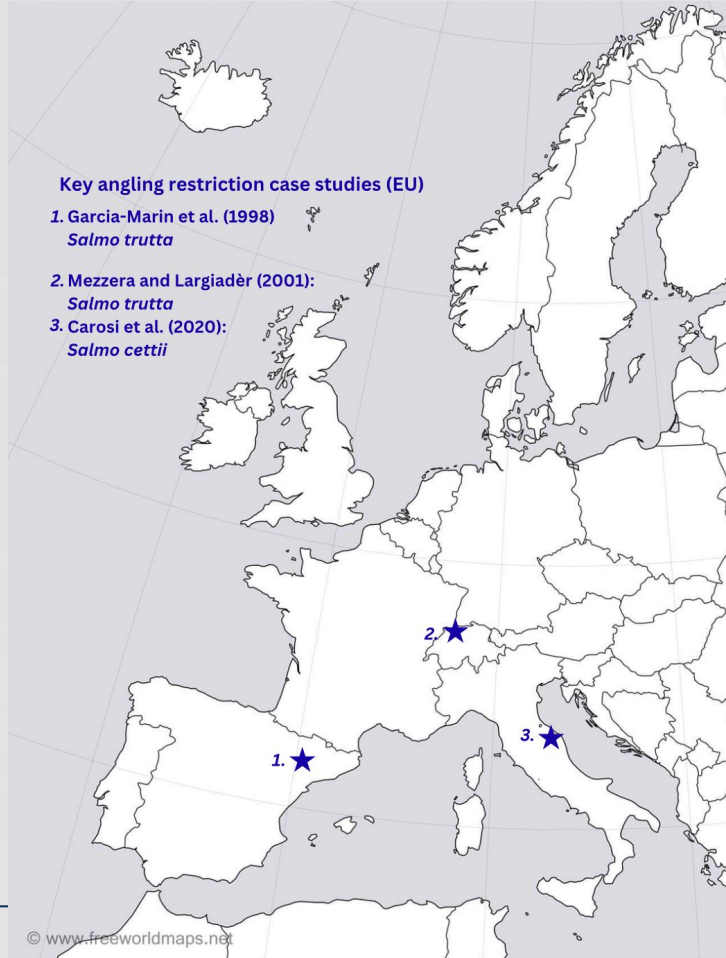


6. Angling Restrictions

- Fishing related regulations

Recommendations:

1. Early stage management:
    a. establish no-harvest zones
2. Late stage management:
    a. Implement slot-length restrictions
    b. Establish catch-and-release zones



Conclusion

Trade-offs between management strategies

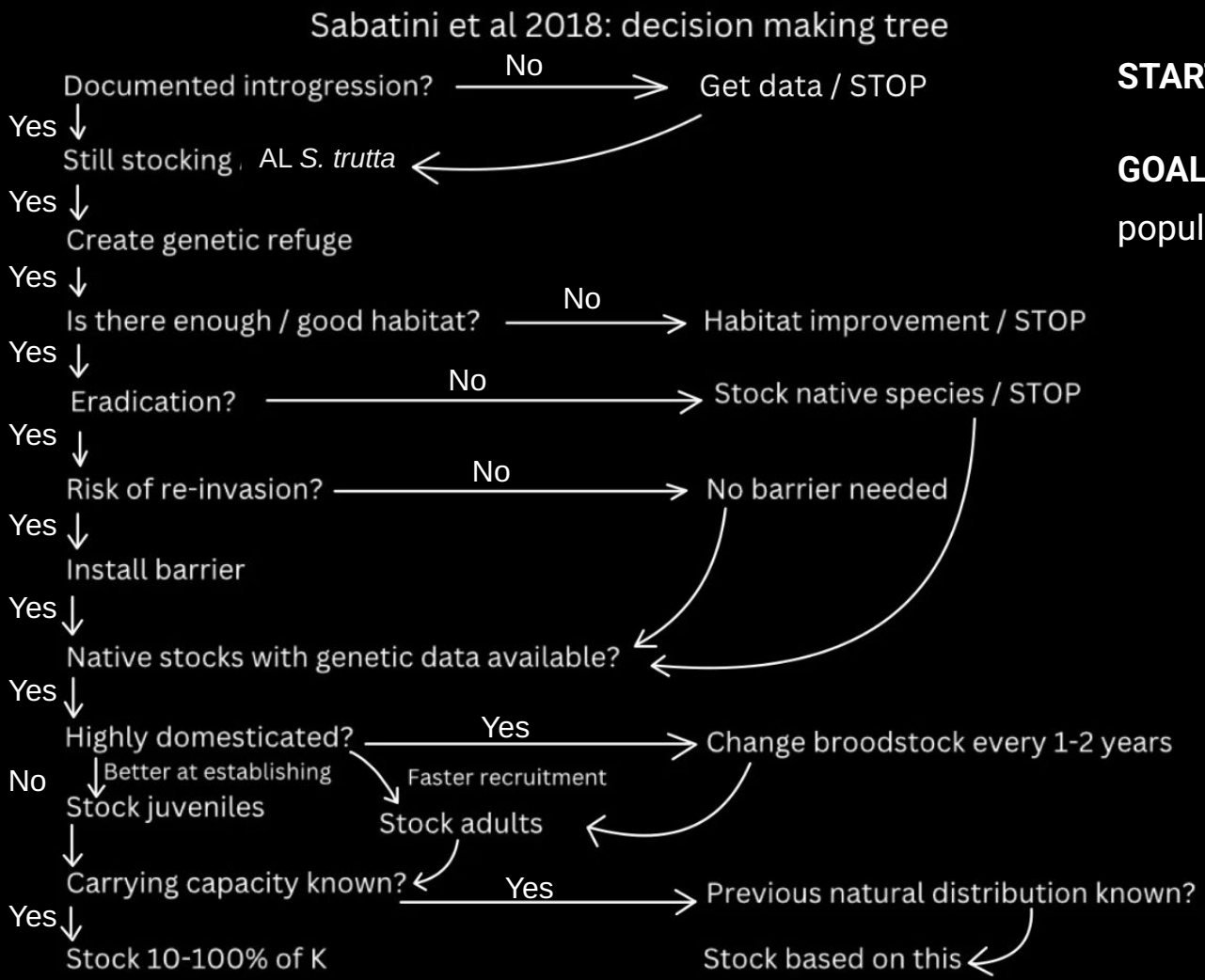
Strategies depend on the goals and starting point of the campaign

Conclusion

Trade-offs between management strategies

Strategies depend on the goals and starting point of the campaign

Management protocol based on the goals and pre-management status of the population including extent of introgression, habitat size and quality, angling culture etc.



START: severely introgressed population

GOAL: self-sustaining, genetically pure population

Monitoring: CPUE estimates

Thank you!

Questions?