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Session A1: Effects of Sluices on Migrating Elvers and Other Fish in a Dutch Salt Water / Fresh Water Gradient

Bas van den Boogaard
Bureau Waardenburg

Joost Bergsma
Bureau Waardenburg

Bart Schaub
Hoogheemraadschap van Rijnland

Lucienne Vuister
Hoogheemraadschap van Rijnland

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Effects of sluices on migrating elvers and other fish in a Dutch salt water / fresh water gradient



Bas van den Boogaard (Bureau Waardenburg)
Joost Bergsma (Bureau Waardenburg)
Bart Schaub (Hoogheemraadschap van Rijnland)
Lucienne Vuister (Hoogheemraadschap van Rijnland)

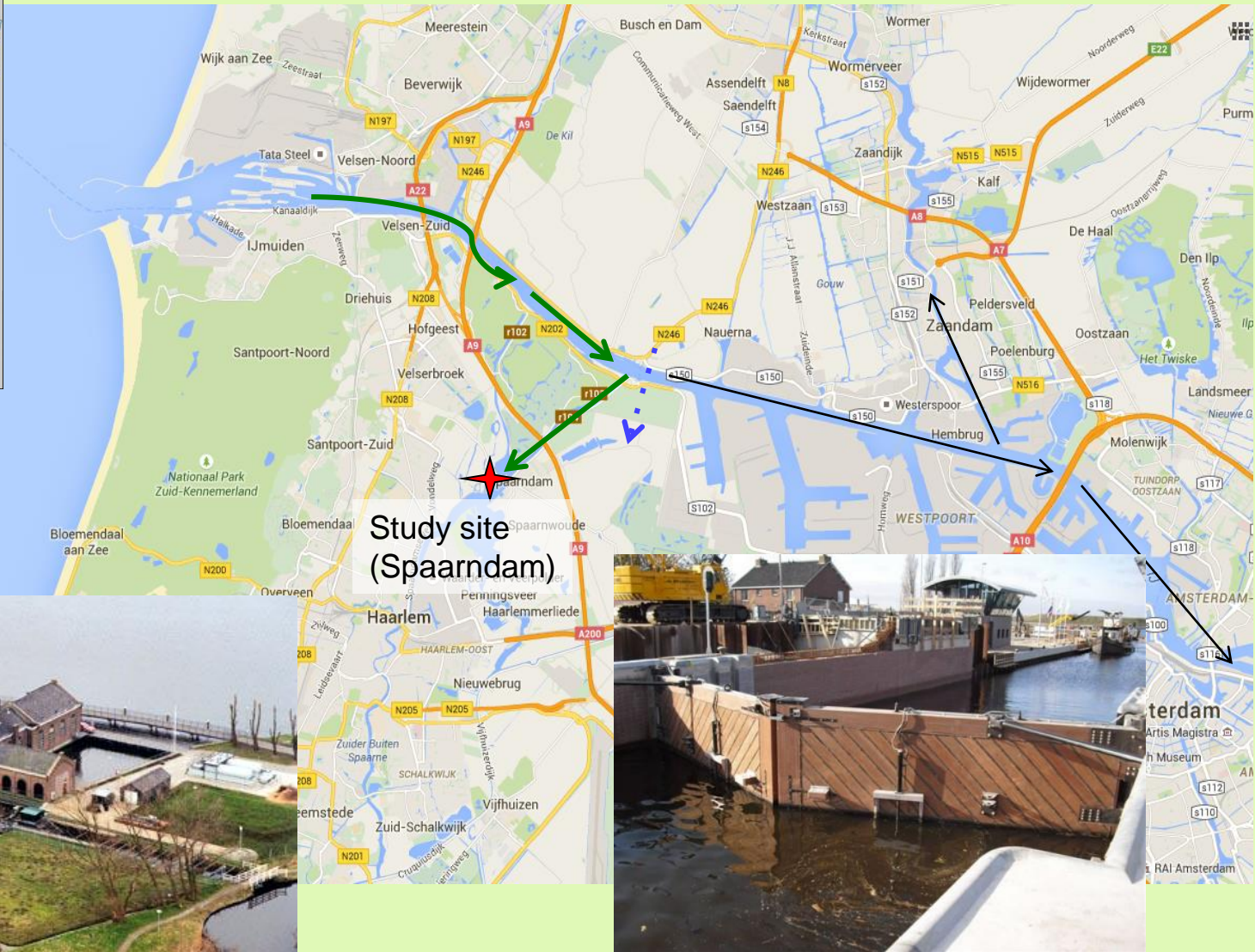


Hoogheemraadschap van
Rijnland



Bureau Waardenburg bv
Adviseurs voor ecologie & milieu

Introduction: challenges for migrating fish

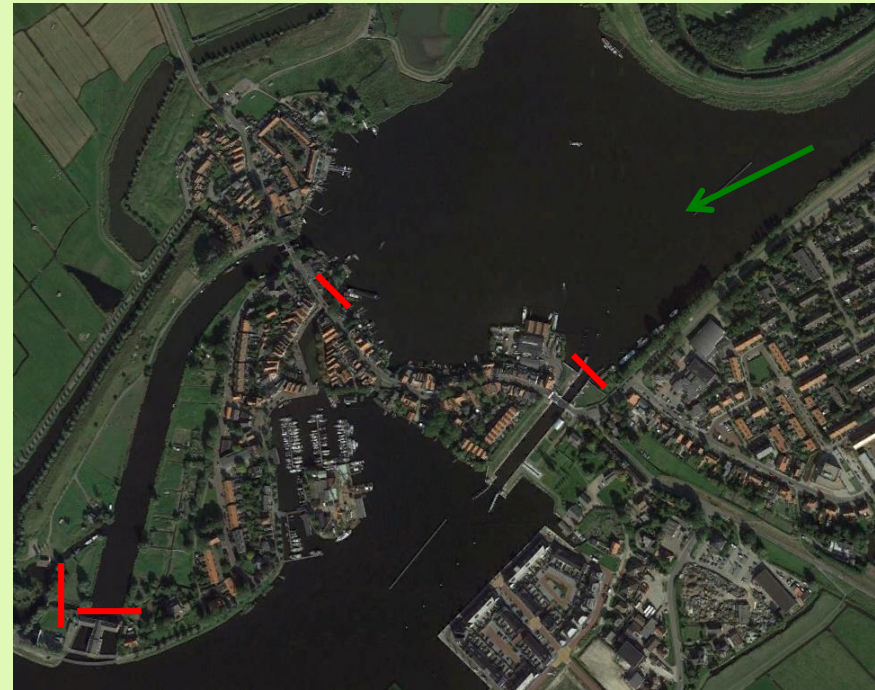


Introduction: research questions

- Do fish use the Spaarndam sluice to bridge this barrier?
- Can we use this sluice to improve fish migration?

Priority species:

- **Elver** (*Anguila anguila*)



Other species of interest:

- **Three-spined stickleback** (*Gasterosteus aculeatus*)
- **Smelt** (*Osmerus eperlanus*)
- **Flounder** (*Platichthys flesus*)
- **Herring** (*Clupea harrengus*)
- **Common goby** (*Pomatoschistus microps*)

Methods: study design



Methods: sampling

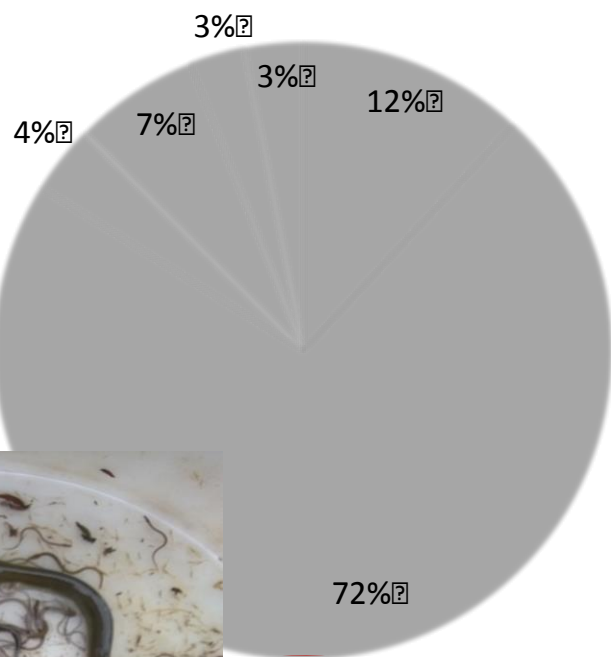
- Sampling in April and May 2014
- Simultaneous sampling of the four barriers
- Sampling both outside and within the barriers
- Mesh-trapnet, standard fyke and fine-mesh fyke
- Data on fish
- Data on abiotic variables



Results: species composition (individuals)

Mesh trapnet; outside the barriers

all four locations combined



three-spined stickleback

elver

smelt

fish larvae

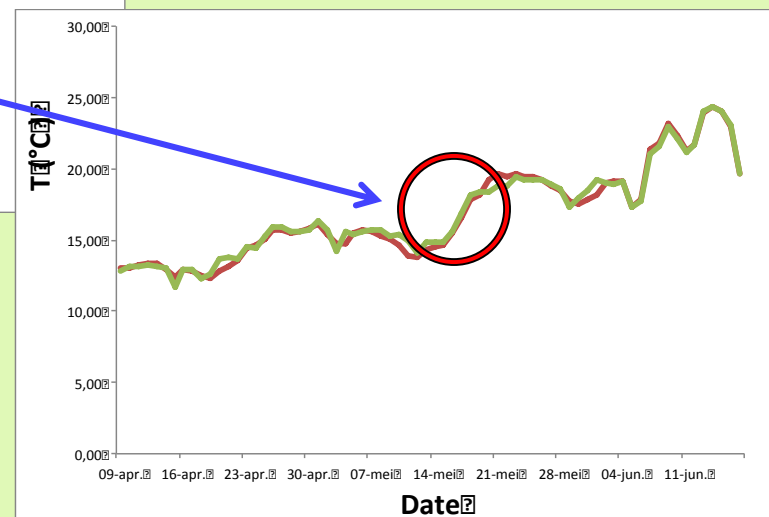
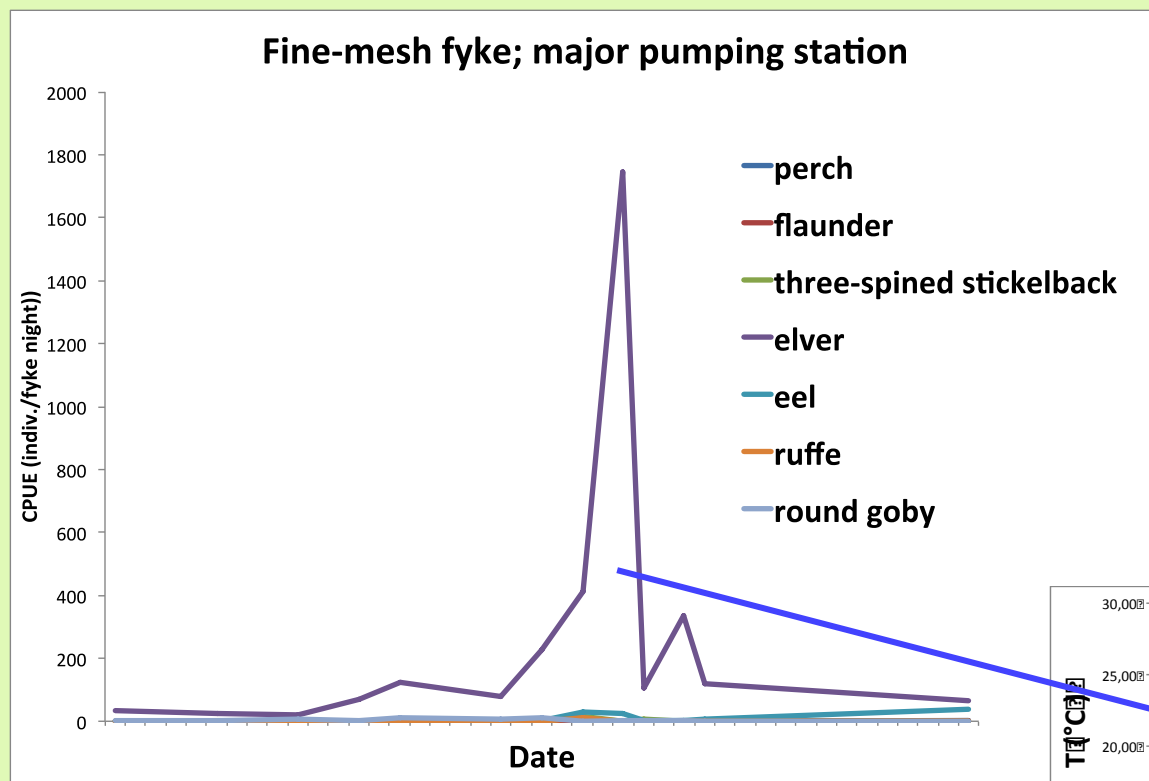
round goby

other

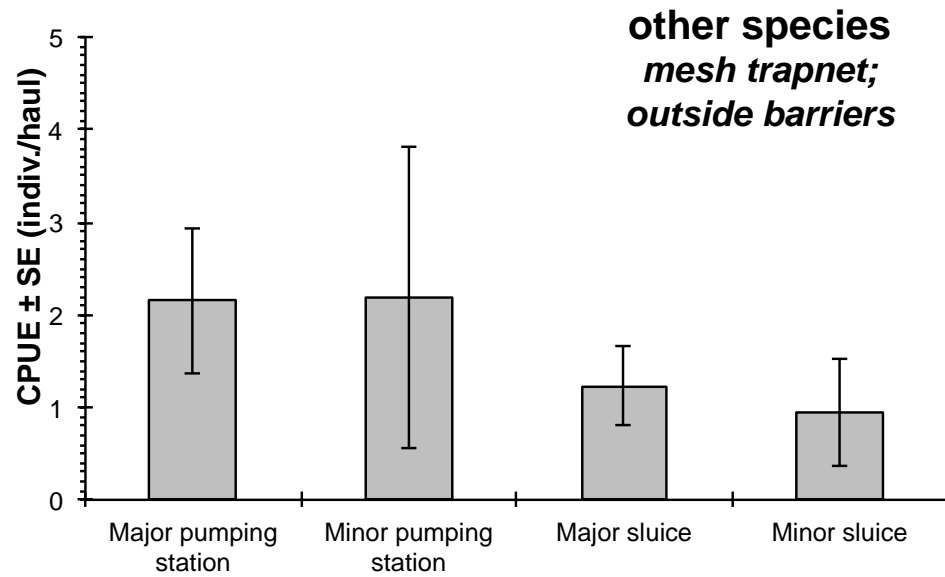
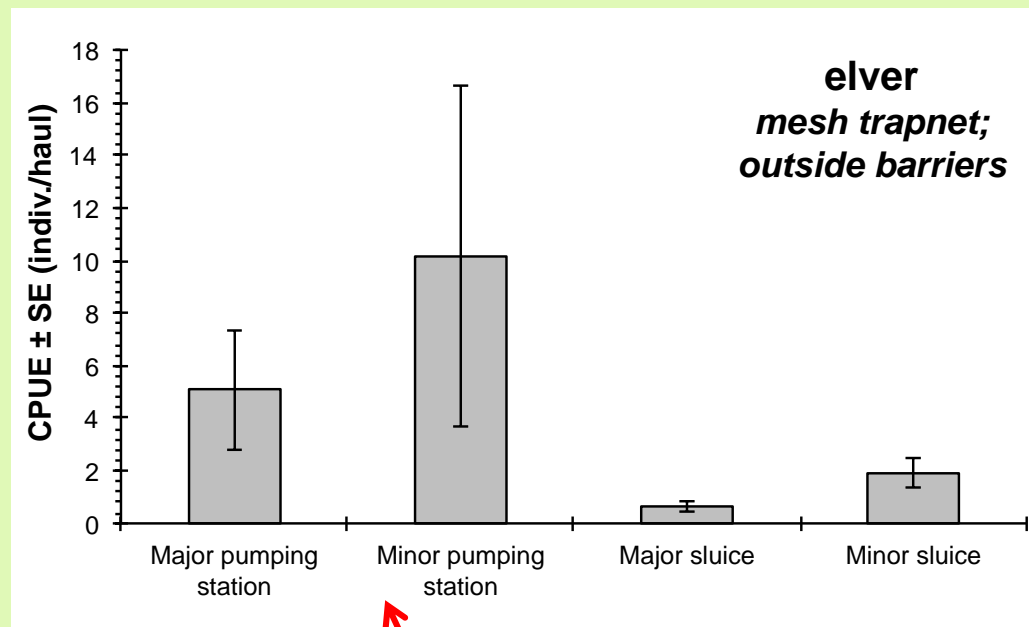


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Results: temporal variation



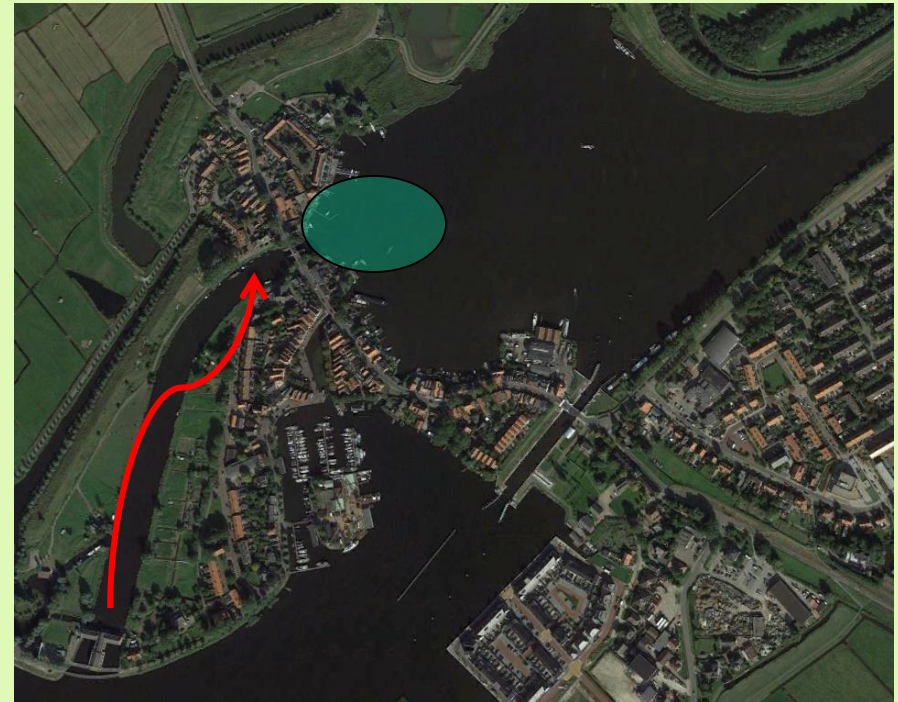
Results: comparing barriers



Why?

Discussion: why do elver cluster at the pumping stations?

- While at sea, elver passively migrate using tidal currents
- At inland waters, tidal currents decrease and elver actively swim
- They strongly focus on fresh water, detecting differences in water composition
- At our study site, pumping station has regular high discharge volumes
- Creates large fresh water attraction flow



Discussion: what are the options at Spaarndam?

Elver



- Continued discharge from pumping station
- Potential attraction flow in sluice has much smaller volume
- Elver will continue to focus on the attraction flow from pumping station
- **Adjusting sluice management for elver at this site not recommended**
- **Instead, a species specific passage is required to facilitate elver migration.**

Other fish species



- **For other migratory fish species adjusting sluice management can have a positive effect**

Conclusions

- 1) Elvers dominate the total catch
- 2) Elvers strongly congregate at pumping stations
- 1) Elvers do not congregate at the sluices
- 2) Elvers do not benefit from fish friendly sluice management
- 3) Other fish species do congregate in front of the sluices
- 4) Other fish species can benefit from fish friendly sluice management
- 5) At sites with multiple barriers, focus elver migration measures at spots with highest attraction flow options

Thank you for your attention

any questions?