Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences
Institutionen för vilt, fisk och miljö

Dispersal of young-of-the-year brown trout (Salmo trutta L.) from spawning beds – *Effects of parental contribution, body length and habitat*

Master thesis by Susanna Andersson

Supervisors: Daniel Palm *SLU*, Gustav Hellström *Umeå University*

Disposition

- Stocking of eggs in a habitat restored stream
- Electrofishing
- Dispersal pattern among Young-of-the-year trout

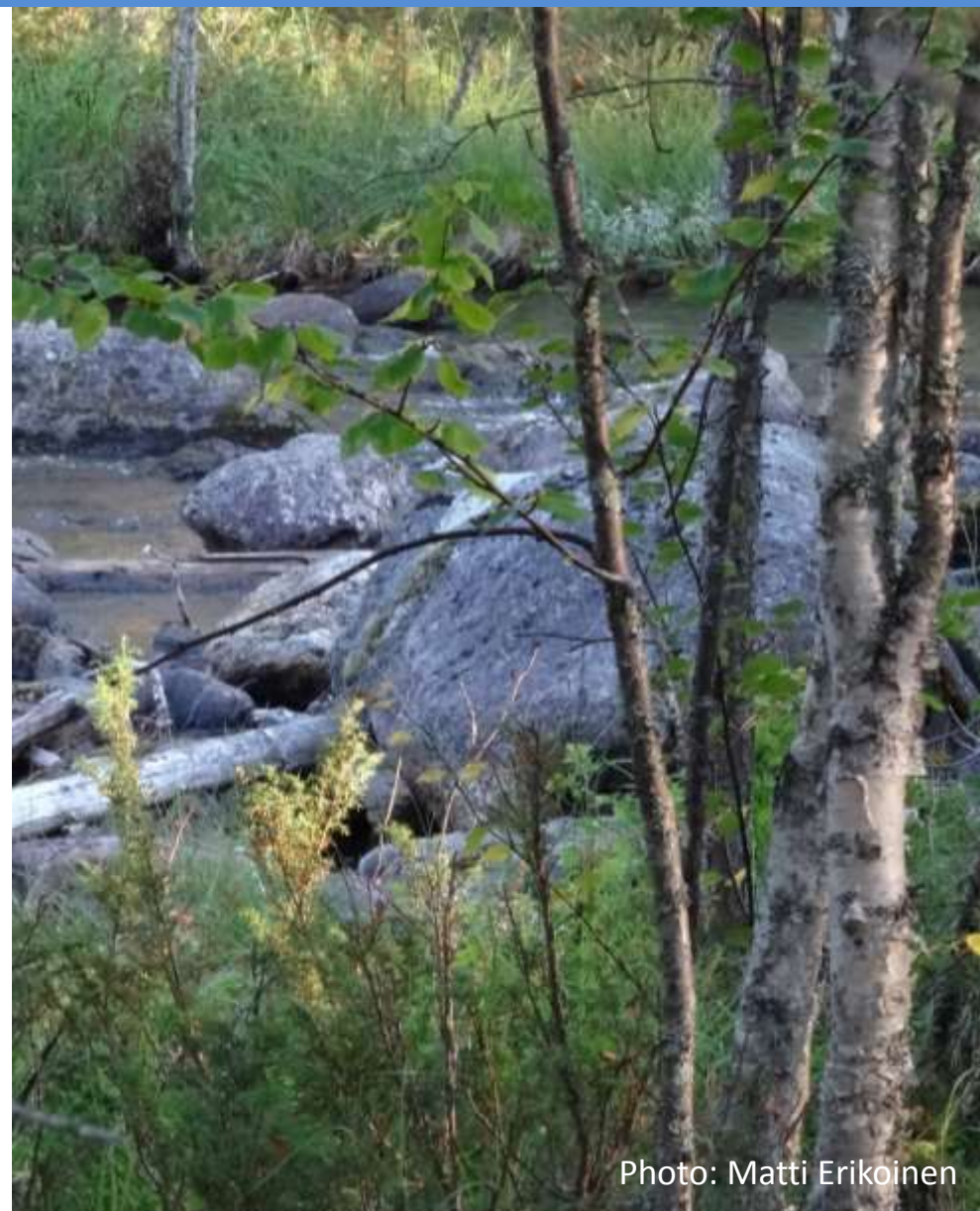


Photo: Matti Erikoinen

Why?

- Habitat restoration of streams
- Stocking of eggs or young trout
- Knowledge about dispersal biology is necessary

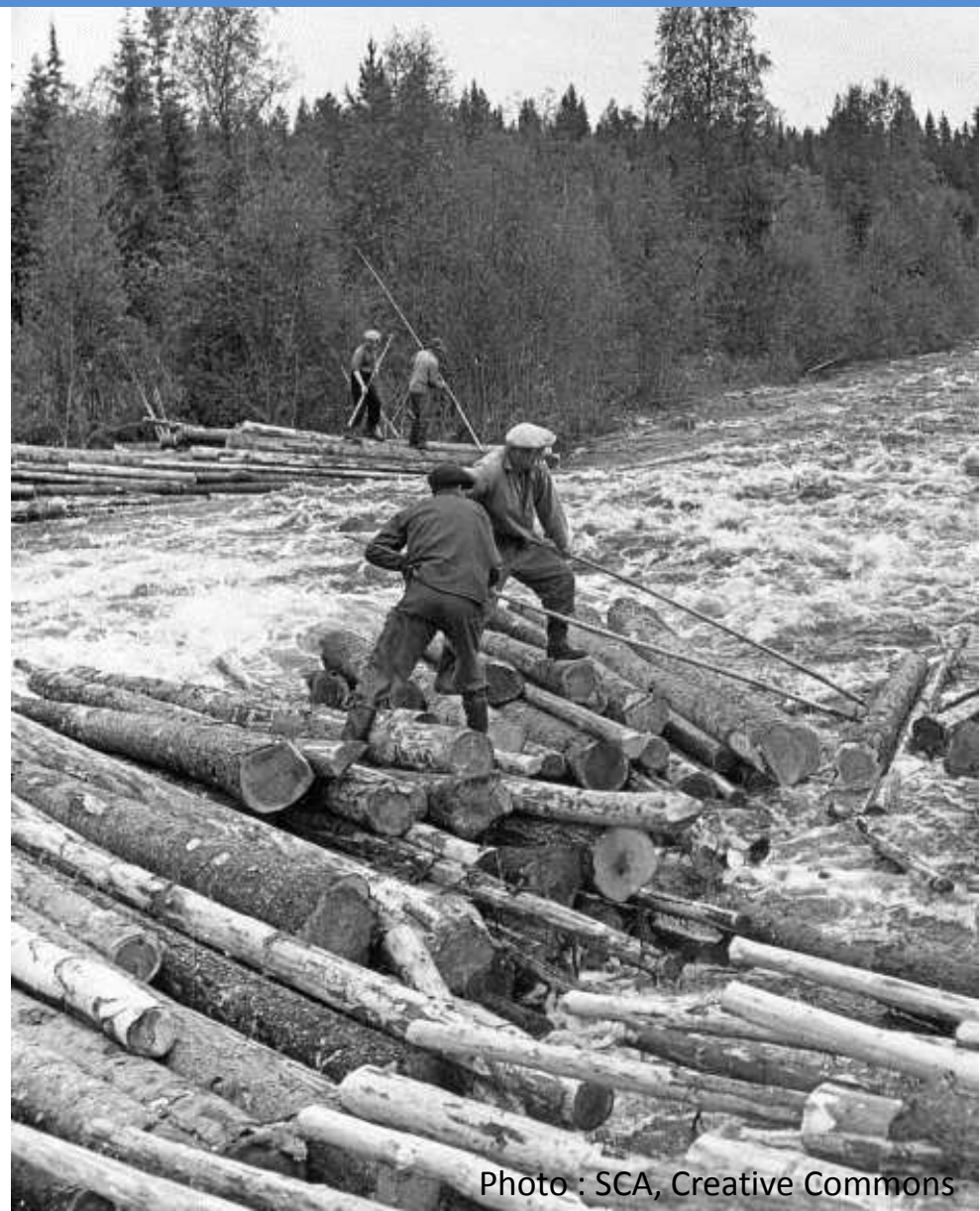
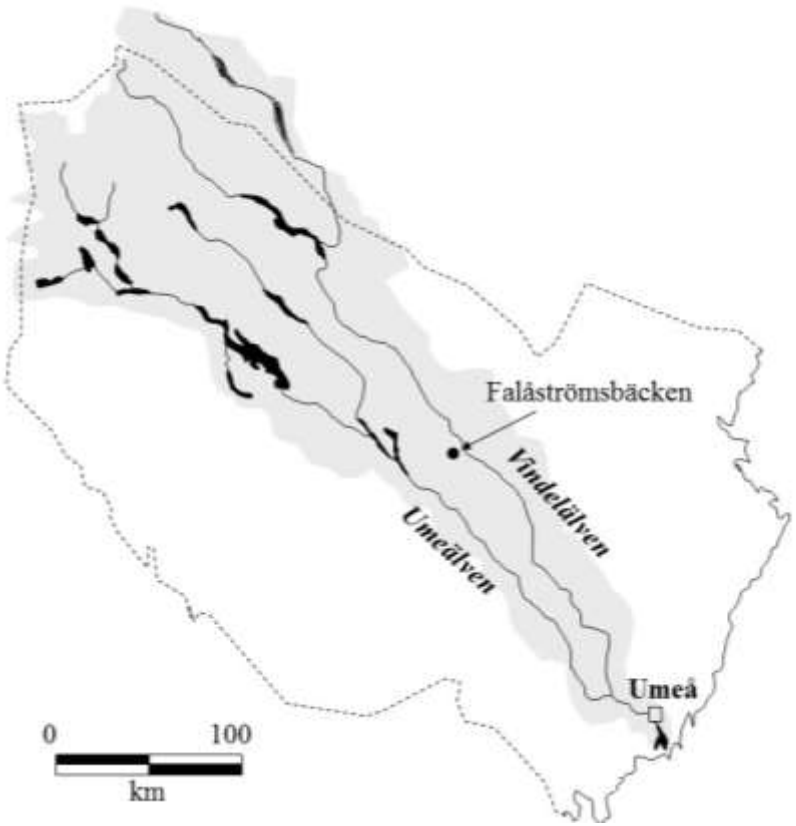


Photo : SCA, Creative Commons

Questions:

- Do dispersal differ between families?
- Is the dispersal restricted to a limited area?
- Does mesoscale flow and habitat characteristics influence dispersal?
- Do trout managers need to consider dispersal patterns for successful restoration?

Study stream



Habitat restoration Falåströmsbäcken

Fish species in Falåströmsbäcken






October 2014: Parent individuals

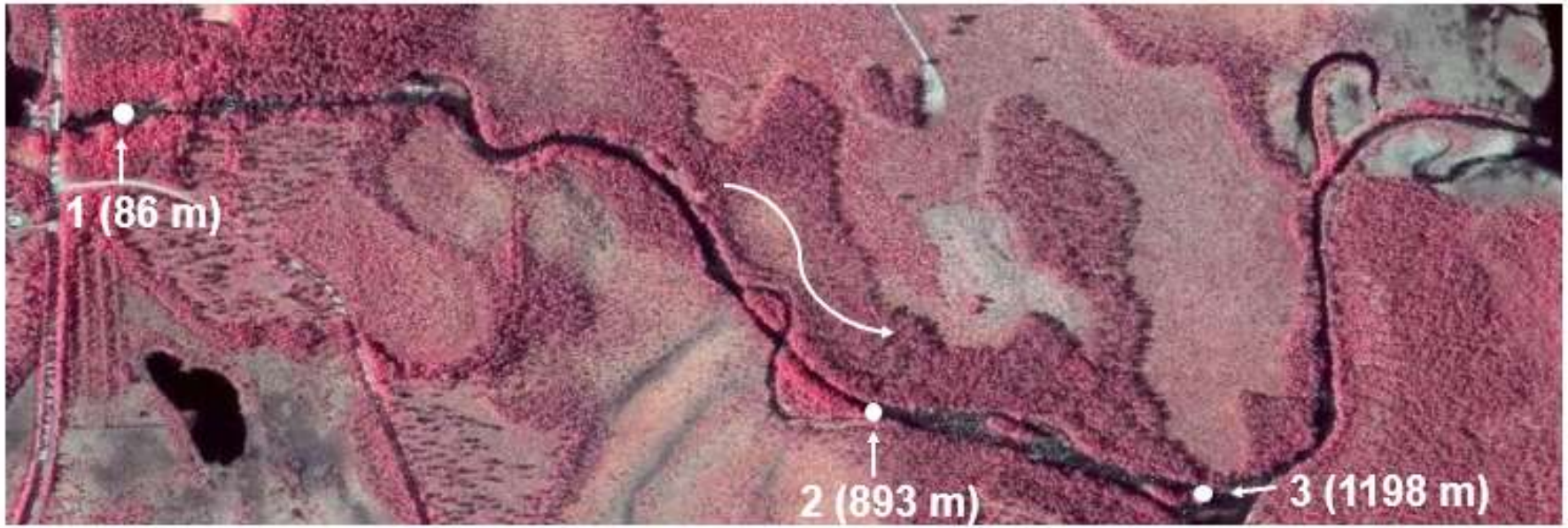
Downstream power plant in Norrfors

Photo : Åke Forssén

March 2015: Stocking of eggs

Eight families at three locations


Photo : Daniel Holmqvist



March 2015: Stocking of eggs

Eight families at three locations


Photo : Daniel Palm


Photo : Daniel Holmqvist


Photo : Daniel Palm

August & September 2015: Electro fishing

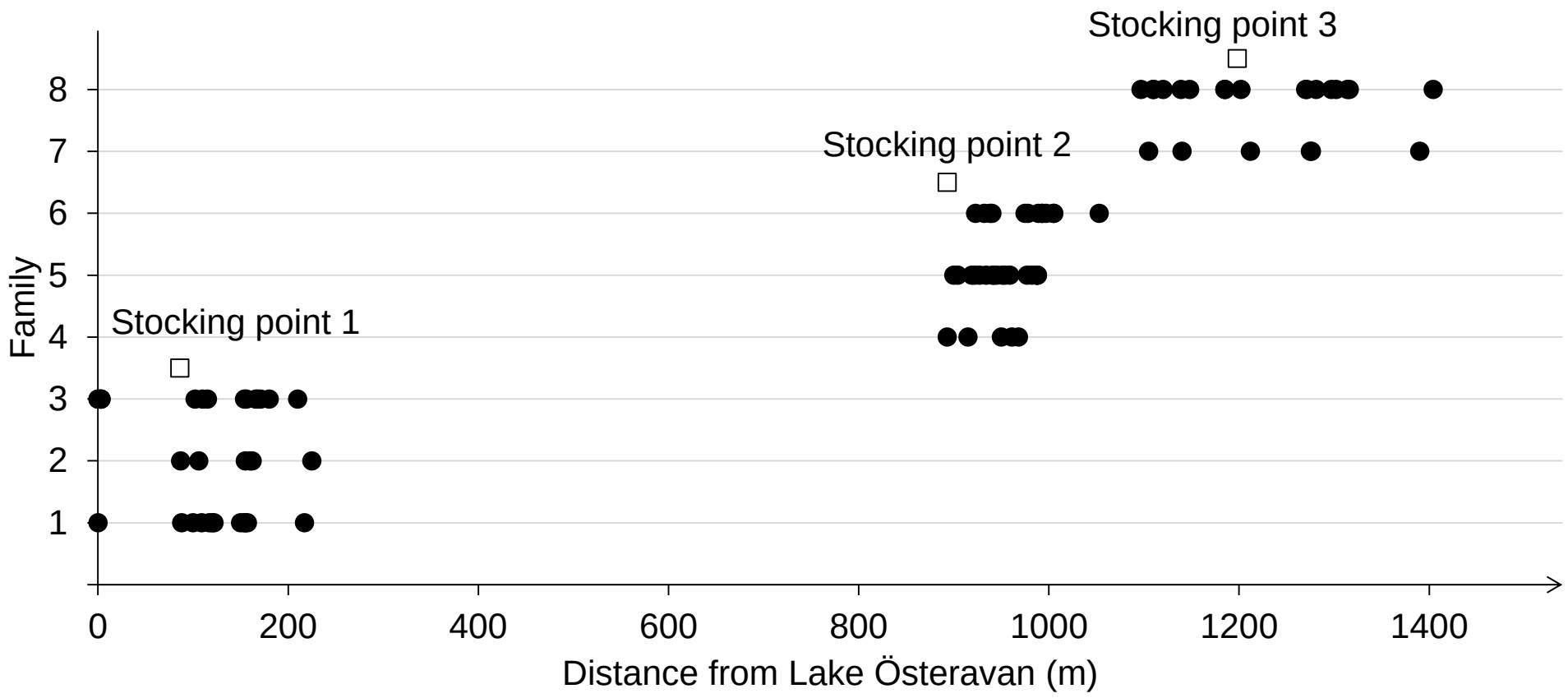
DNA-analysis on chosen individuals

About the results

- 433 trout
- More bullheads
- Most of the trout close to the stream banks
- Earlier study have observed the same pattern [1]

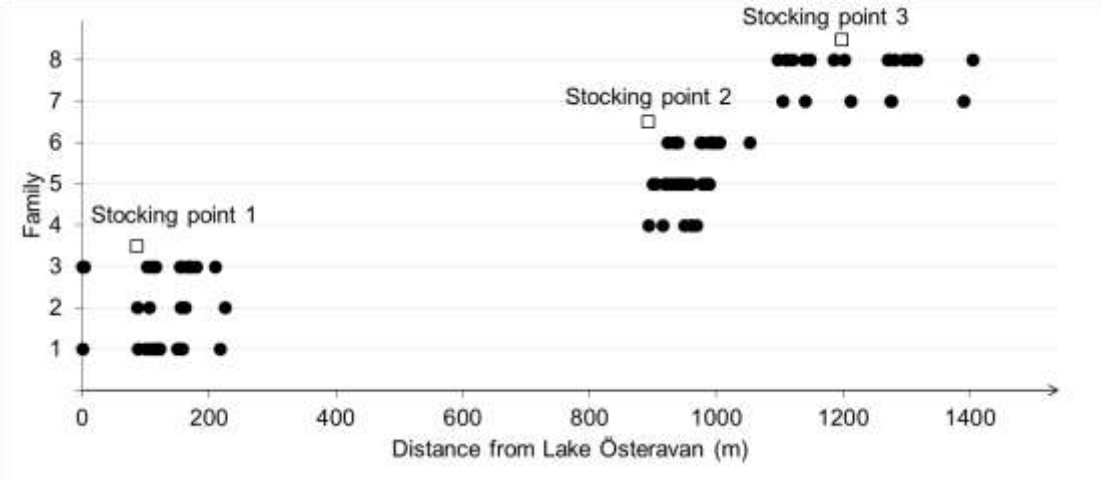
1. Roussel, J. M. & Bardonnet, A. 1999. Ontogeny of diel pattern of stream-margin habitat use by emerging brown trout, Salmo trutta, in experimental channels: influence of food and predator presence. *Environmental Biology of Fishes,* 56, 253-262.

Do dispersal differ between families?



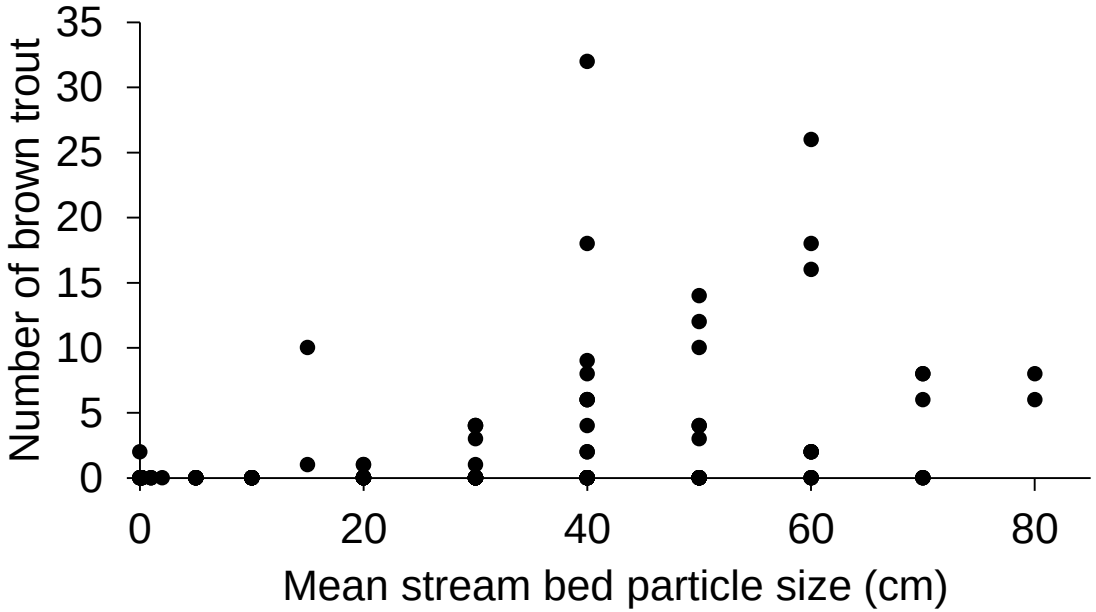
Is the dispersal restricted to a limited area?

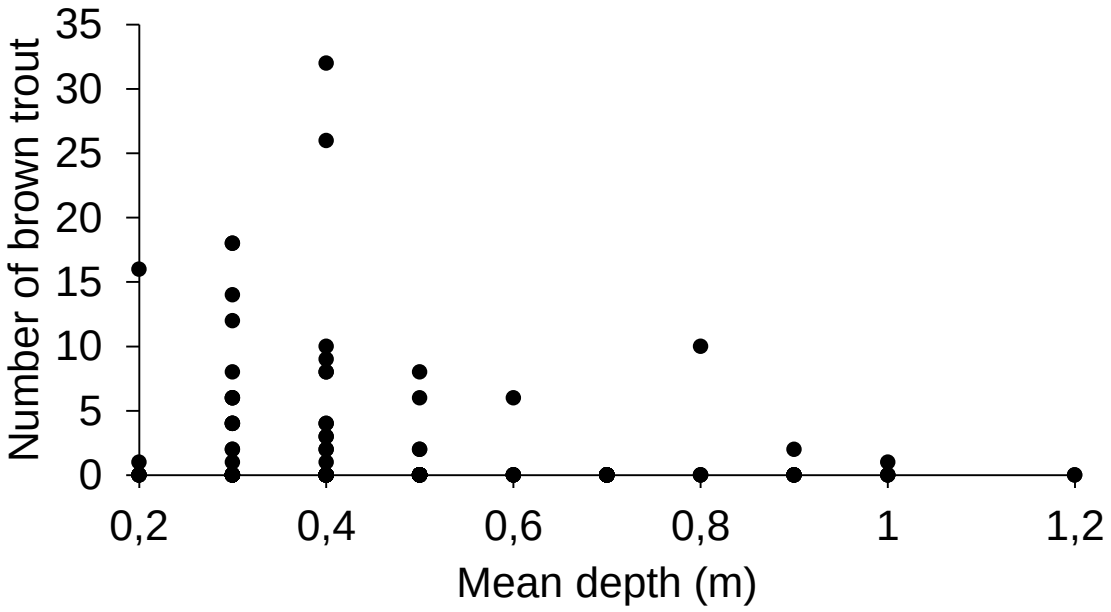
- Mainly downstream eg. 1, 2, 3
- Downstream: 97% in 200m
- Upstream: 97% in 100m



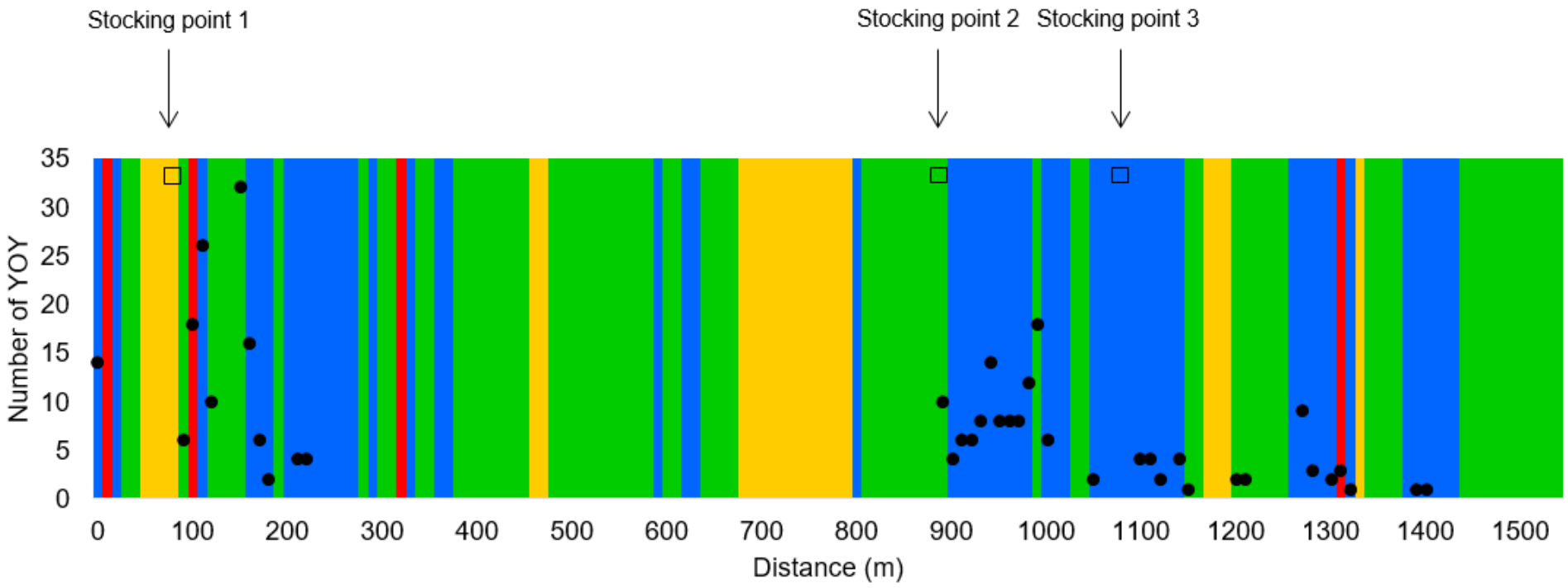
1. Beall, E., Dumas, J., Claireaux, D., Barriere, L. & Marty, C. 1994. Dispersal patterns and survival of Atlantic salmon (Salmo salar L) juveniles in a nursery stream. *Ices Journal of Marine Science,* 51**,** 1-9
2. Daufresne, M., Capra, H. & Gaudin, P. 2005. Downstream displacement of post-emergent brown trout: effects of development stage and water velocity. *Journal of Fish Biology,* 67**,** 599-614.
3. García de Leaniz, C., Fraser, N. & Huntingford, F. A. 2000. Variability in performance in wild Atlantic salmon, Salmo salar L., fry from a single redd. *Fisheries Management and Ecology,* 7**,** 489-502.

Does mesoscale flow and habitat characteristics influence dispersal?





Does mesoscale flow and habitat characteristics influence dispersal?



= pool
= run
= riffle without white water
= riffle with white water

Do trout managers need to consider dispersal patterns for successful restoration?

- Stocking of eggs in unsuitable habitat → extra mortality [1]
- Space of 300 m between spawning beds/stocking points
- Avoid pools
- Locate in a run
- Close to a slow-flowing riffle

1. Syrjänen, J. T., Ruokonen, T. J., Ketola, T. & Valkeajärvi, P. 2015. The relationship between stocking eggs in boreal spawning rivers and the abundance of brown trout parr. *Ices Journal of Marine Science,* 72**,** 1389-1398.

Further use of this knowledge…

- Important when following up with electrofishing
- If reproduction is natural – even more important

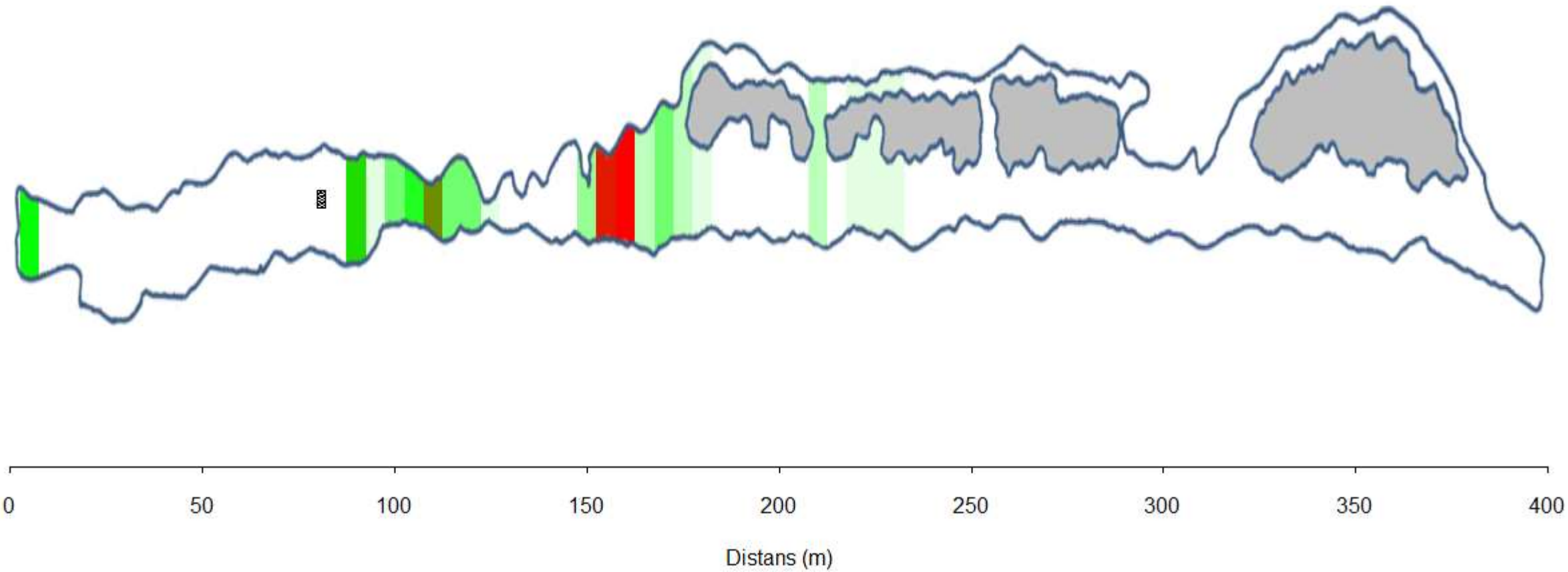
Ej signifikant

- Familj – Kroppslängd
- Familj – Spridningsavstånd (förutom familj 6 i Augusti)
- Spridningsriktning – Spridningsavstånd
- Kroppslängd - Spridningsavstånd

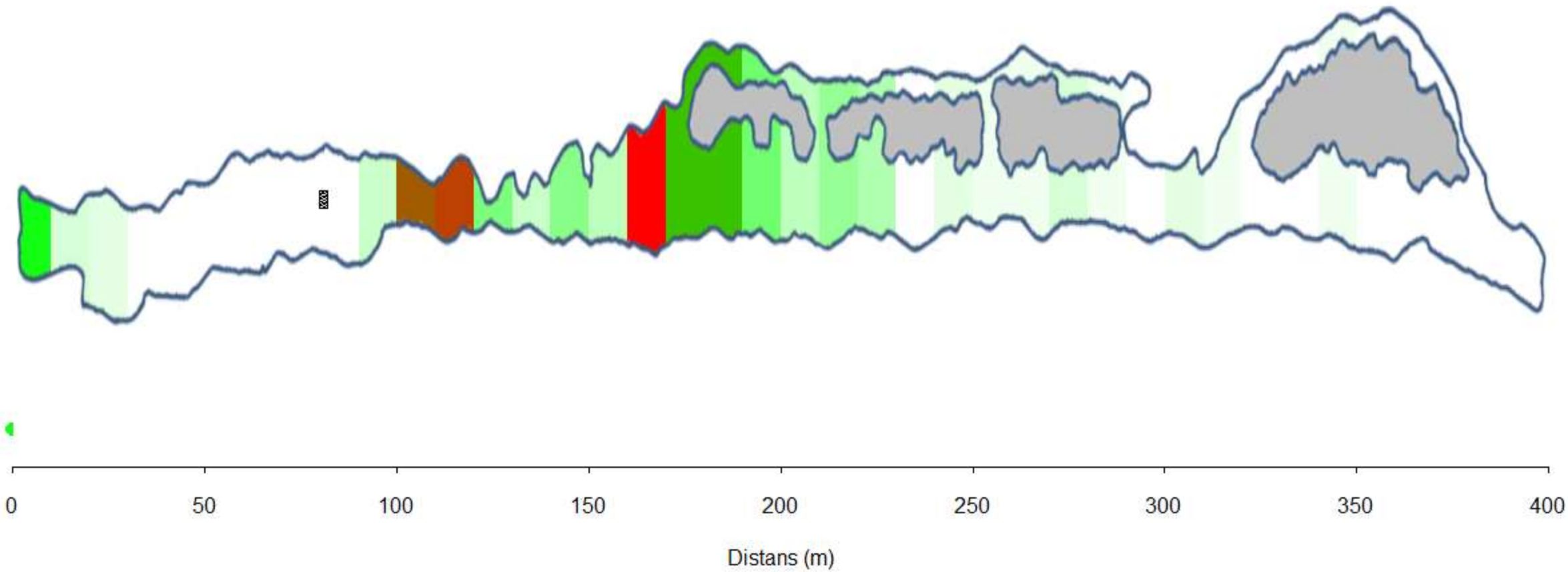
Signifikant

- Familj – Spridningsavstånd (Familj 6 i Augusti)
- Antal årsöringar – partikelstorlek
- Antal årsöringar - djup
- Antal årsöringar - strömbild

Första fisket



Andra fisket



September: Antal öringar – hastighet