

Effects of Rapidly Fluctuating Water Levels on Juvenile Atlantic Salmon (*Salmo salar* L.)

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Overview

Study I: Habitat use: Allopatric & sympatric

Study II: Long-term effects of hydropeaking

Study III: Long-term effects of stranding

Study IV: Habitat use: Ecological trap

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Study I: Main results & Conclusion

- Juvenile Atlantic salmon more often in deep water than juvenile brown trout
- Atlantic salmon habitat use **NOT** affected by brown trout
- Brown trout habitat use **IS** affected by Atlantic salmon
→ more trout in shallow habitat

→ **Sympatric trout more vulnerable to stranding than allopatric trout**



Photo: Michael Puffer



Source: <http://www.fs.fed.us/ne/amhers/photo/gallery/scuba.html>

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Study II: Main results & Conclusion

- Winter: No effect on growth or body fat
- Summer: Small effects on body mass, body fat and movement

→ **But: Under poor feeding conditions costs may be significant and could affect smolt production!**



Photo: Per Harald Olsen

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Study III: Main results & Conclusion

- No discernable effect on body length
- Small effects on body mass
 - Winter trapping: stranded fish 10% lighter
- No effect on body fat



Photo: Michael Puffer



Photo: Michael Puffer

Study IV: Main results & Conclusion

- Habitat use density-**independent**, both in the experiment and the field
 - **Ramping zone is a population sink!**
- Habitat use affected by: fish-size, presence of overyearlings (large fish), time of day, season

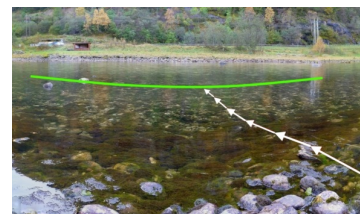


Photo: Michael Puffer

Conclusions

- In general, very little non-lethal effects of hydropeaking

→ Salmon very well adapted to variable environment

- Trout are more vulnerable to stranding than salmon
- Stranding related mortality can have high impact on salmon populations due to density-independent habitat use

→ Can lead to extinction of weak salmon populations!

