Project information

Keywords
ecology, anadromous Fish, telemetry

Project title
The coastal migratory behaviour of anadromous fish in relation to environmental parameters

Year
2015

Project leader
Guttorm Christensen

Participants

Akvaplan-niva: Guttorm Christensen and Jenny L.A. Jensen
UiT-Norges Arktiske Universitet: Prof. Audun H. Rikardsen
Norsk Institutt for Vannforskning (NIVA): M.Sc. Kate Hawley
Fisheries and Oceans Canada: Adj. Prof. J. Brian Dempson
University of Waterloo: Prof. Michael Power

Flagship
Fjord and Coast

Funding Source

Norterminal, Sør-Varanger Gruve, APN, FRAM Fjord&Coast

Total, ca. 3 million in 2015

Summary of Results

The F&C project have given valuable information on the marine whereabouts of anadromous Arctic charr and brown trout, and as the project is included in a bigger project the results can be put in a bigger context by relating them to the documented behavior of Atlantic salmon and European whitefish at the end of the project period (2017). The results from the first study year of the main and Fjord & Coast project can be found at: http://www.akvaplan.niva.no/no/resource_centre/news_detail/new_report_on_salmonid_migration

The master student involved in the F&C-project will hand in his thesis on the 15th of December, and the findings from the project will be more thoroughly presented then. In summary, the preliminary findings include that Arctic charr utilize cold fjord areas (Fig. 1) at shallow depths, while brown trout utilize larger parts of the fjord (Fig. 2) where they encounter higher temperatures at somewhat more variable depths. Fish length was demonstrated to affect which marine areas both Arctic charr and brown trout utilize at sea (Fig. 3 & 4), supporting a relationship suggested in a recent study from the Alta fjord. In addition, the master student's findings indicate that the length of the fish at first sea entry (i.e. smolt length) can affect which marine areas they utilize as adult individuals' years later (Fig. 4). These factors together with other parameters will be thoroughly analyzed with more advanced statistics after the last study year. The main project in combination with F&C financed tagging of brown trout resulted in tagging of brown trout from three different rivers, and a total of 93 brown trout from three quite different fjord areas have been tagged. Future analysis of these results will hopefully let us investigate more thoroughly what controls this species marine whereabouts than was anticipated in the suggested project.

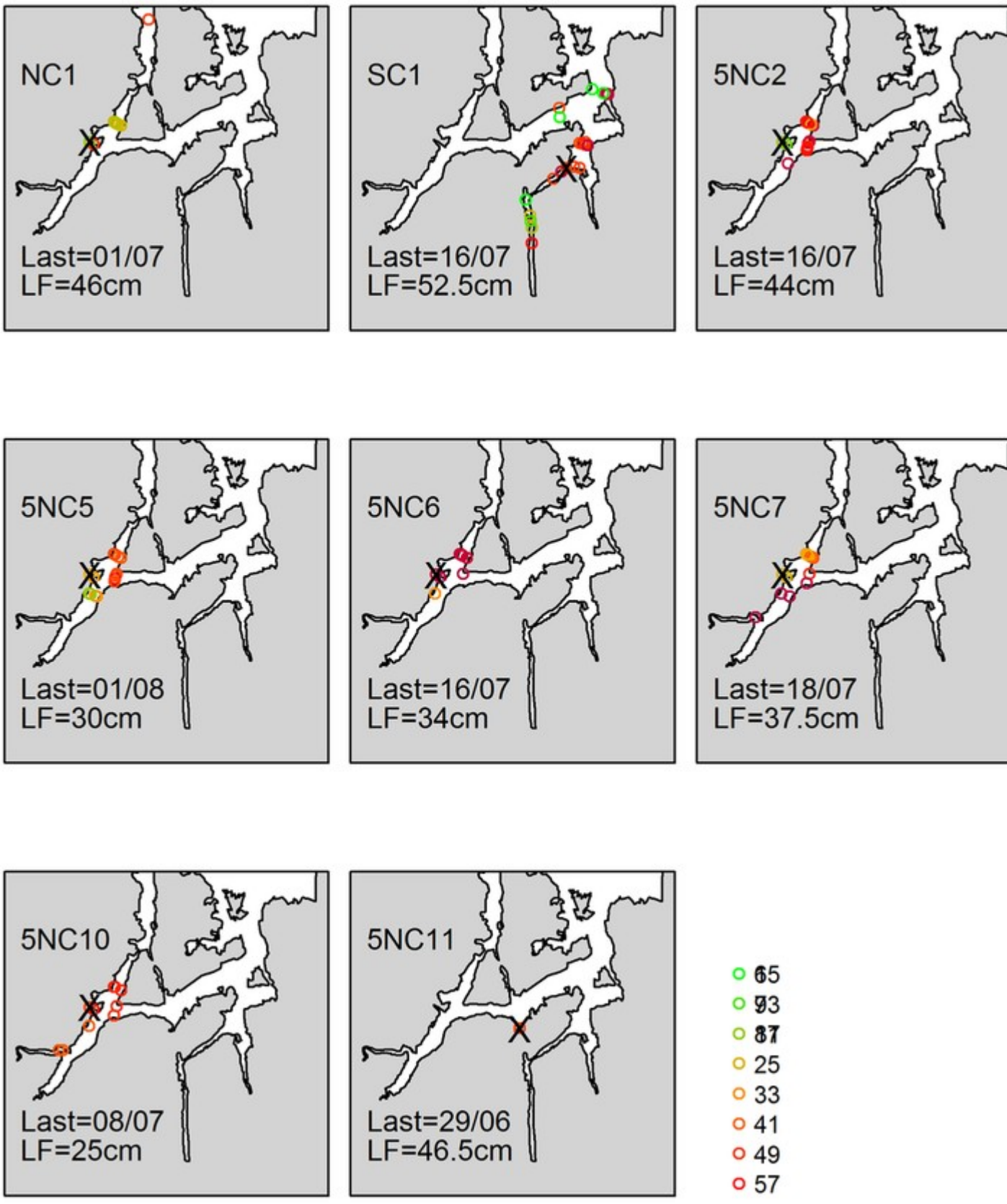

Figure 1. Registrations of individual Arctic charr at sea during 2015. The different colors in the graph indicate days since the 15th of May according to the legend in the lower right corner. NC indicate

Arctic charr tagged in Braselv 2014, 5NC Arctic charr from Braselv tagged in 2015 and SC Arctic charr tagged in Langfjorden 2014. Date of last record and fork length (LF) is indicated for each individual.

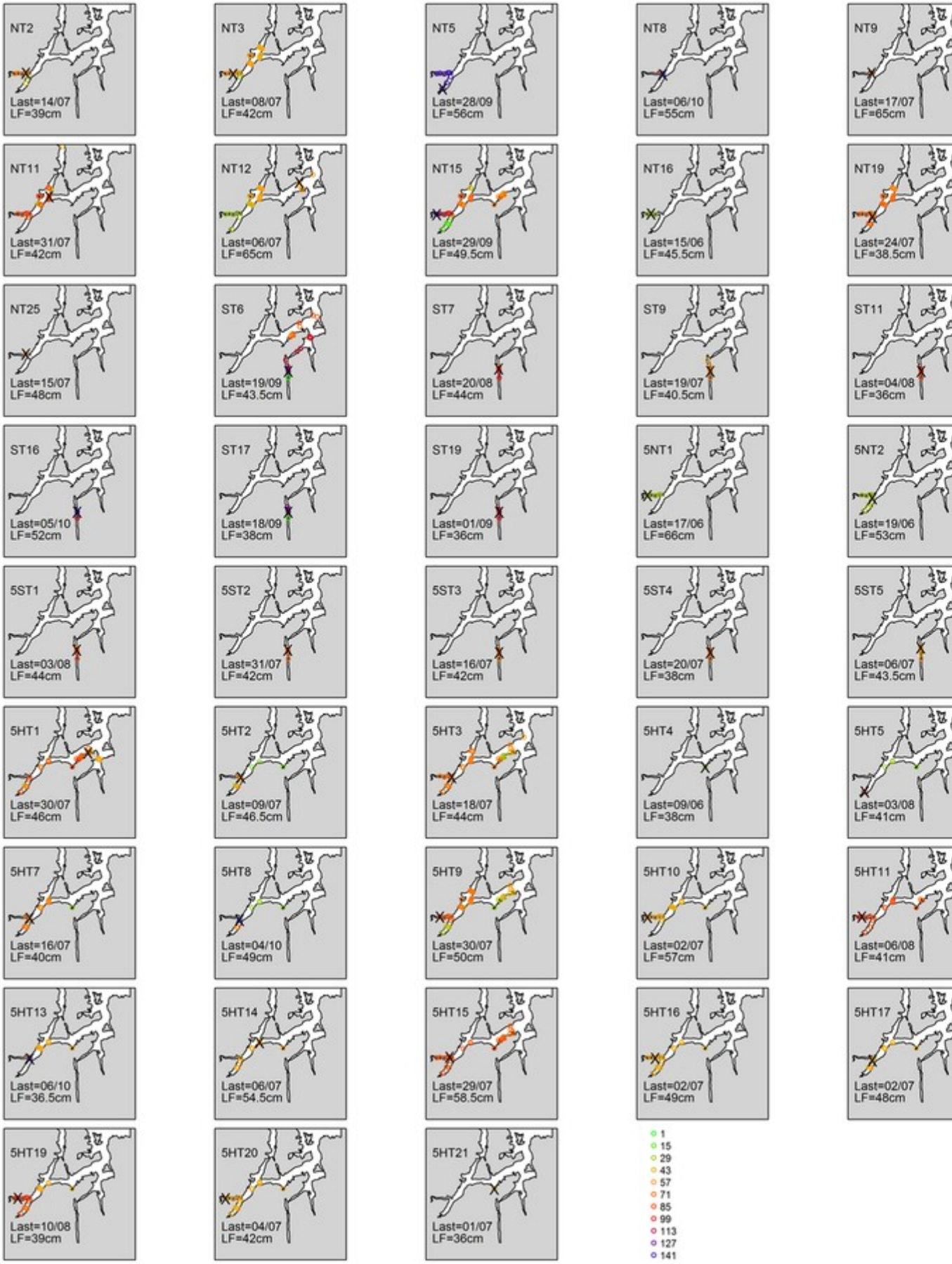

Figure 2. Registrations of individual brown trout at sea during 2015. The different colors in the graph indicate days since the 15th of May according to the legend in the lower right corner. NT indicate

brown trout tagged in Neiden 2014, 5NT brown trout from Neiden tagged in 2015, ST brown trout tagged in Langfjorden 2014, 5ST brown trout tagged in Langfjorden 2015 and 5HT brown trout tagged in Høybukt 2015. Date of last record and fork length (LF) is indicated for each individual.

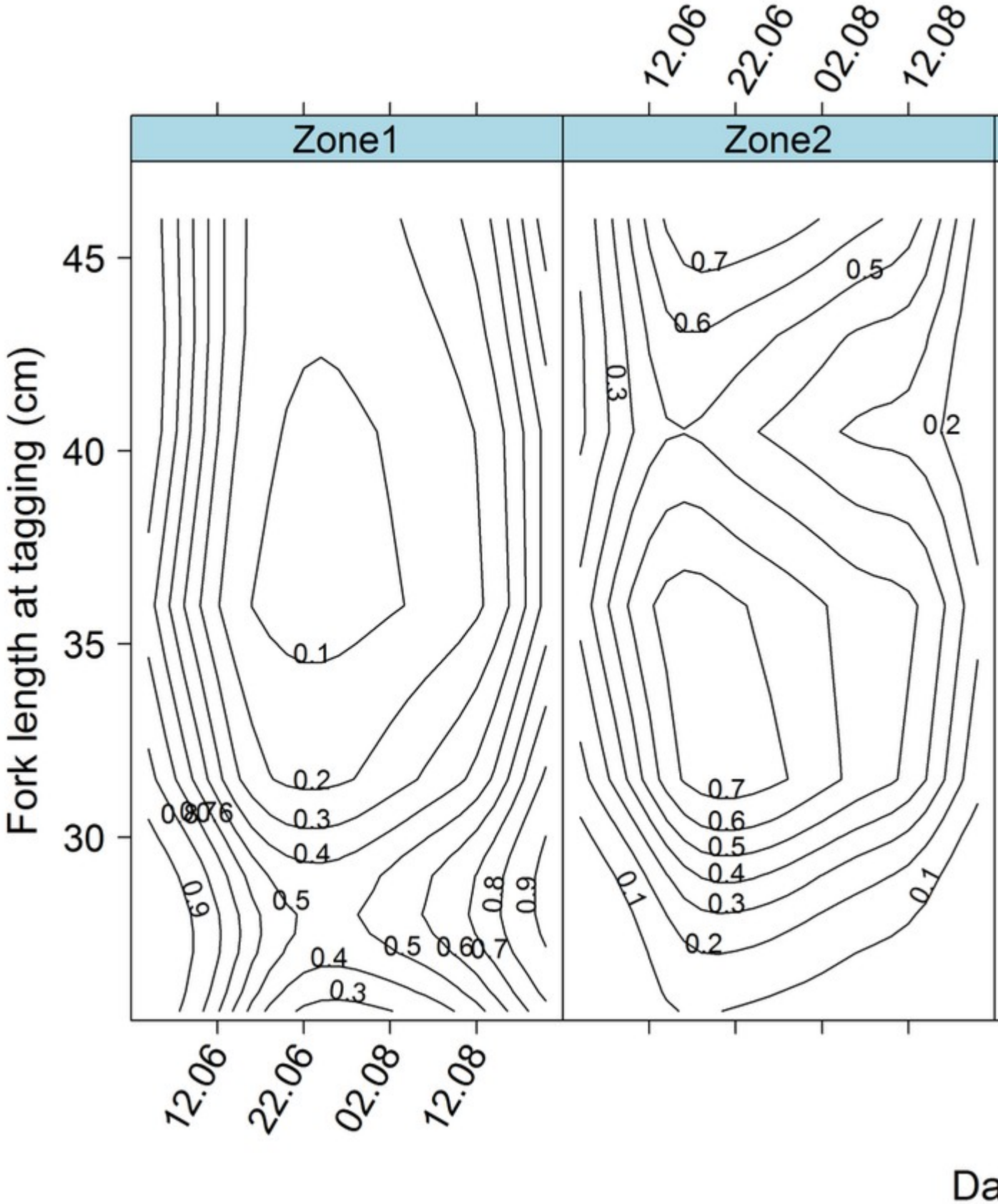

Figure 3. The likelihood of finding an Arctic charr individual in Zone 1-4 (zone 1 = close – zone 4 = far, distance from the fishes' home river) relative to fish length (y-axis) and time (x-aksis).

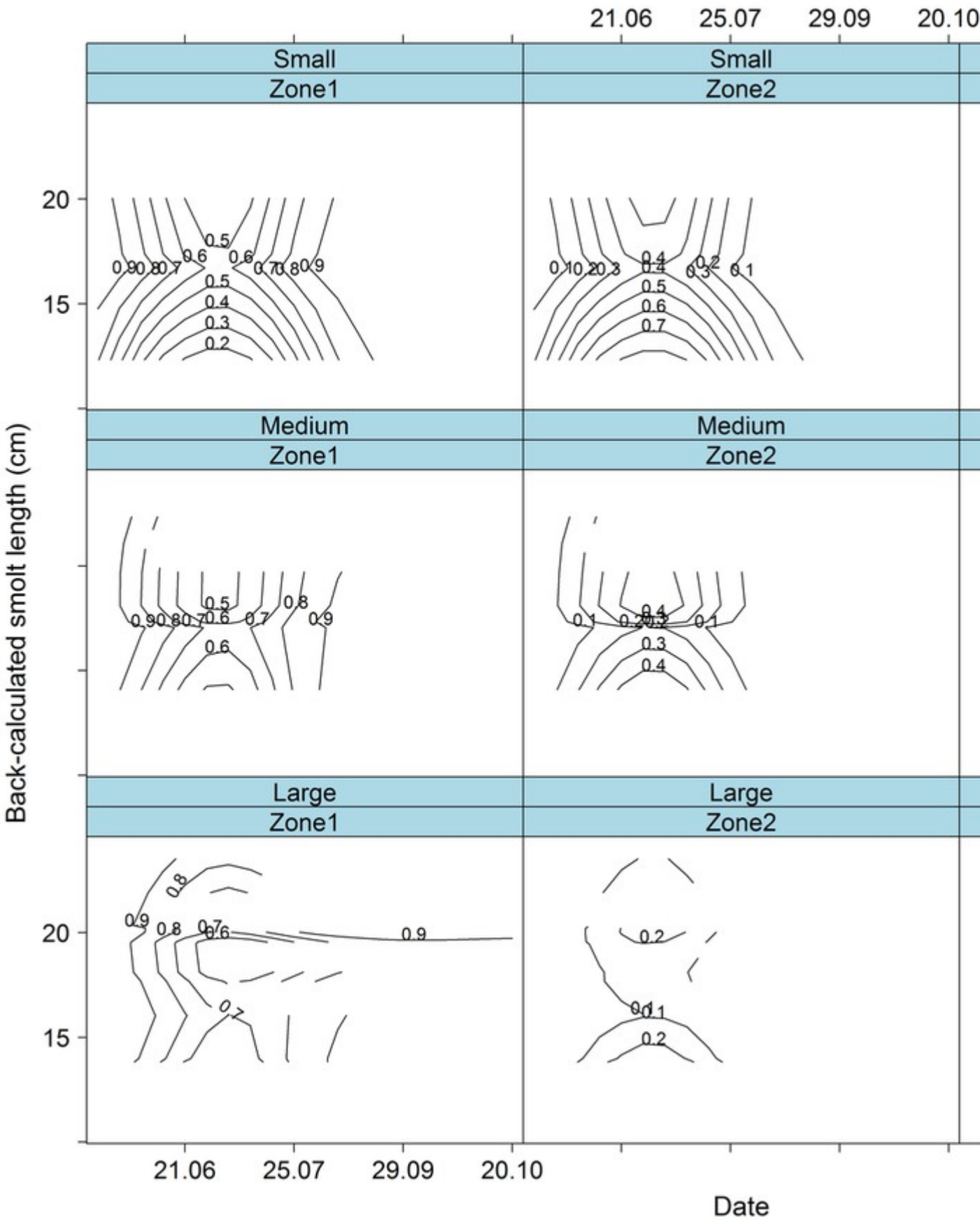
Small
Zone1
Small
Zone2
Medium
Zone1
Medium
Zone2
Large
Zone1
Large
Zone2
Back-calculated smolt length (cm)
20
15
21.06
25.07
29.09
20.10
Date

Figure 4. The likelihood of finding a brown trout individual in Zone 1-3 (zone 1 = close – zone 3 = far, distance from the fishes' home river) relative to smolt length (y-axis) and time (x-aksis). The fish are categorized as small (40 cm) at tagging.

For the Management

The findings from the study will greatly aid managers in making sound decisions regarding how to manage these species especially at sea, but also in rivers. There is currently a national debate on restricting the fishing times of these species at sea, and the findings provides new knowledge on temporal and spatial aspects of these species marine residency, as well as harvest rates. In addition, the findings on how these species utilize coastal areas related to different temperatures should provide an important management tool. Also, the findings include that both species utilize estuarine areas and areas close to the river mouths to a great extent, which also should have management implications.

Published Results/Planned Publications

We aim to publish 2-3 scientific papers in peer reviewed journals on the topics funded by the FRAM-center 2015. The master student from the first study year (from the main project) is planning publication of his thesis at the beginning of 2016. The current master student (Fjord & Coast) will finish his thesis in the beginning of 2016, and is planning to work on a publication after that. Further publication by researchers will occur at the end of the project period in 2017.

Communicated Results

The results from the main project will be reported to the other funding sources in the beginning of 2016. This will include a larger report, that will be available online. The report from the main project in 2014 received large attention in local media and especially on social networks after distribution through FRAM/Akvaplan-niva. The findings from the F&C project (2015) have been communicated to local managers during a seminar (all local hunting and fishing associations in Finnmark county), and a report will be provided to the County Governor of Finnmark in the beginning of 2016. The findings will also be presented at the Norges miljø- og biovitenskapelige universitet when the master student working on the project finishes his thesis. Local media have covered the main project during spring and summer. We are working on a video which summarize the entire project, which will be used in presentations and on social media.

Interdisciplinary Cooperation

No

Budget in accordance to results

The budget was used in accordance to the suggestion in the revised project plan, and the results are as expected.

Could results from the project be subject for any commercial utilization

No
Conclusions

The F&C project have provided funding which allowed continued studies of Arctic charr and brown trout within the larger project focusing mainly on Atlantic salmon. By studying these species over multiple years, the fish encounter differing environmental conditions at sea. This is invaluable in predicting how a species may respond to e.g. increasing global water temperatures. In addition, the data should have high value for management institutions, as there is very little data on these species at sea. Arctic charr has declined so much in numbers over the last decade that strong fishing restrictions are in place in Norway. Comarative data of this species in relation to brown trout that are not decreasing in the north, gives managers a good foundation for making sound knowledge based management desitions.