

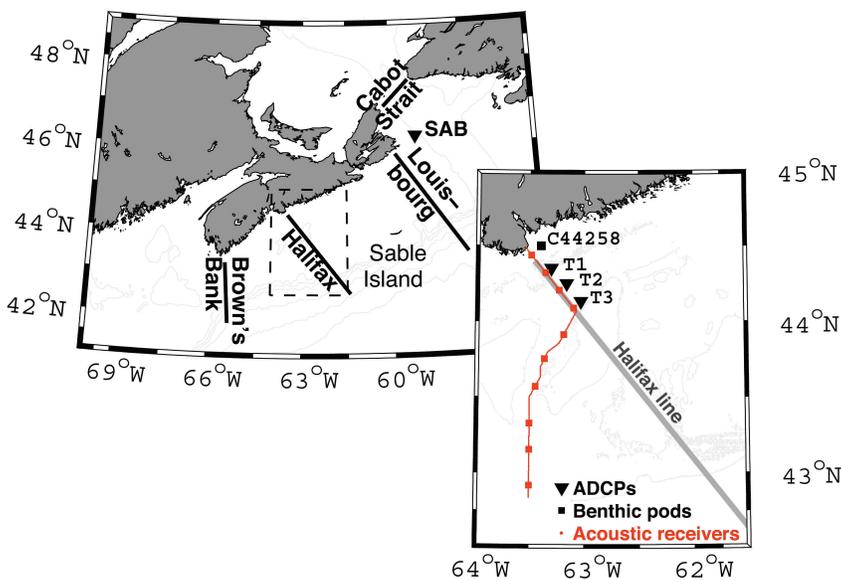


Bio-physical interactions between Atlantic Salmon and coastal conditions along the Halifax Line

Mathieu Dever, John Kocik and Dave Hebert
4th Ocean Tracking Network symposium - June 3rd, 2014

The available datasets

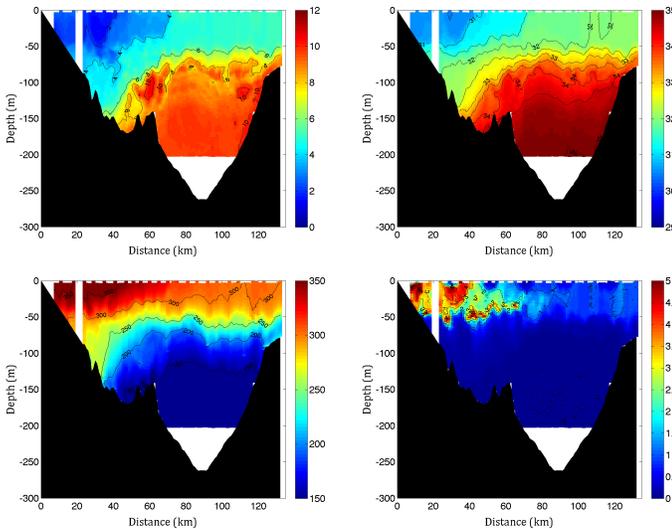
Many variables are measured over the Scotian Shelf as part of the Ocean Tracking Network, as well as already existing monitoring programs



- Currents
- Hydrography (T, S, P, O₂)
 - Bottom sensors
 - CTD casts (AZMP)
 - Underwater gliders
- Environmental conditions
- Acoustic detections

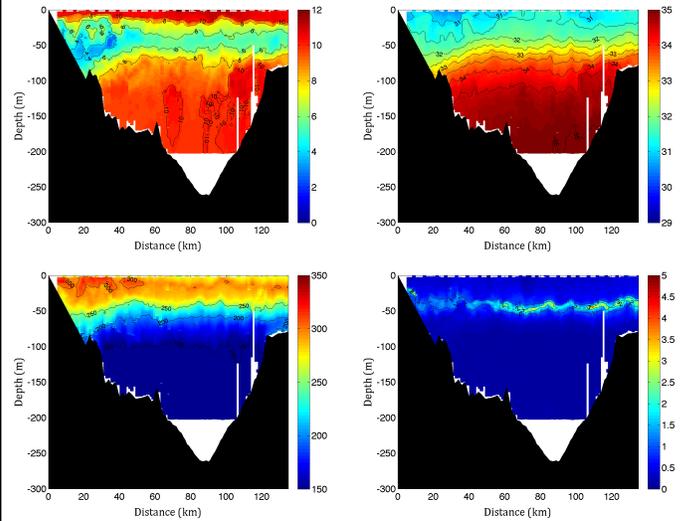
Hydrography along the Halifax Line (T,S,O₂,Chl)

WINTER (March)



- Nova Scotia Current's signature
 - low T
 - low S
- 2-layer system
 - high O₂
 - high Chl

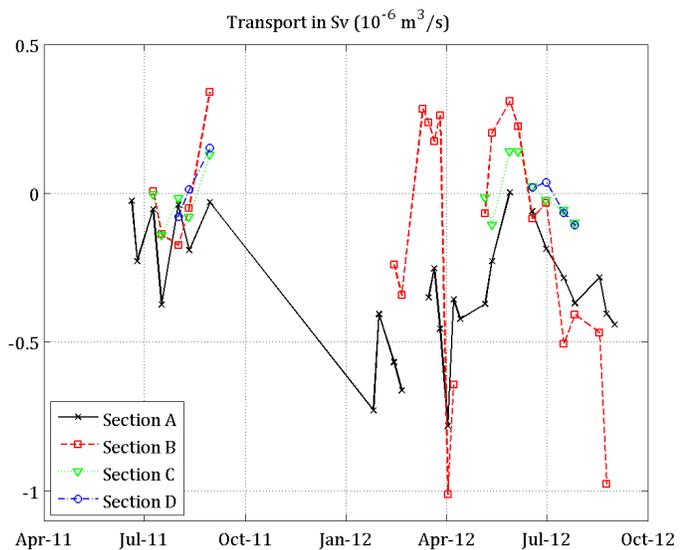
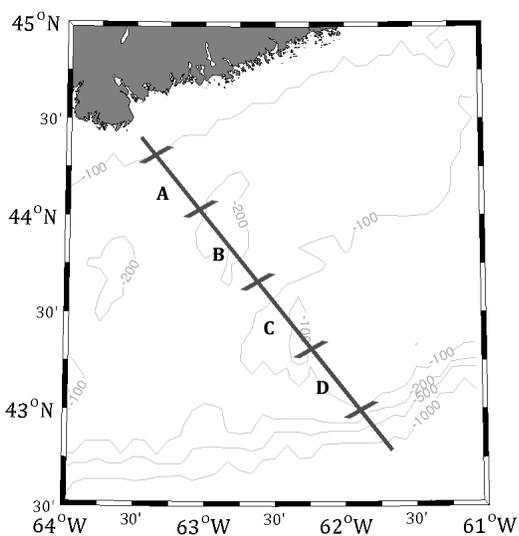
SUMMER (June)



- 3-layer stratified system (Cold Intermediate Layer)
- Weak Nova Scotia current

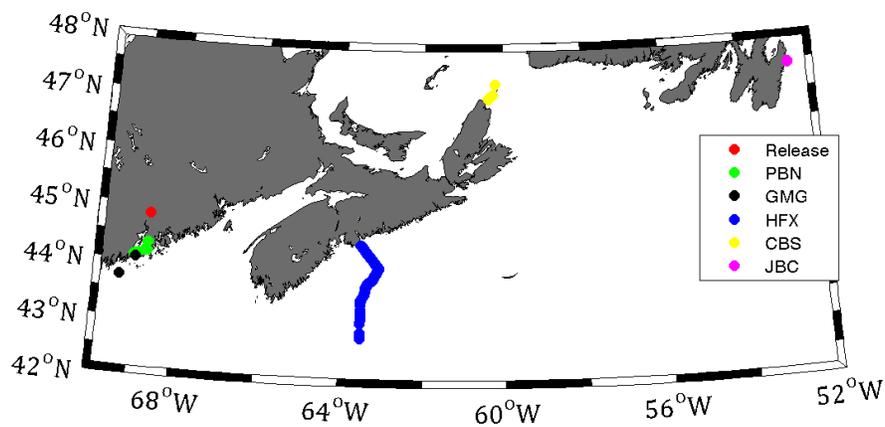
The timing of this stratification varies inter-annually

NSC Spatial variability



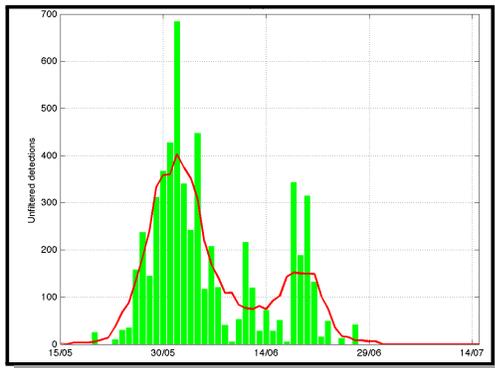
- Most of the alongshore transport is located onshore (section A).
- The transport in section B can sometimes be comparable to the one in section A

Atlantic Salmon – the dataset



- Between 150 and 200 Atlantic Salmon smolts are tagged and released every year in the Penobscot river over the 2008-2013 period by John Kocik et al.
 - Salmons are then detected by an array at the mouth of the river (PBN) and along the Halifax array (HFX)
- ⇒ Provides valuable information on migration patterns of Atlantic Salmon

Temporal distribution and variability of detections

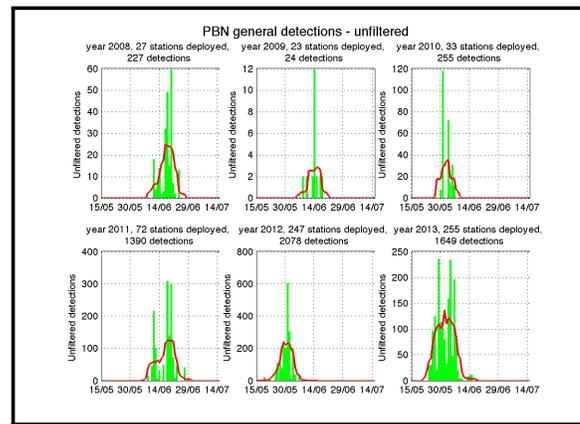


Cumulated, unfiltered detections of Atlantic Salmon at the Halifax Line from 2008 to 2013

The detection peak can vary by almost 3 weeks.

⇒ Where is this variability coming from? Is it introduced at the ocean entry or during the ocean transit?

Over the 2008-2013 period, Atlantic Salmons from the Penobscot River reached the Halifax Line between late May and the end of June.

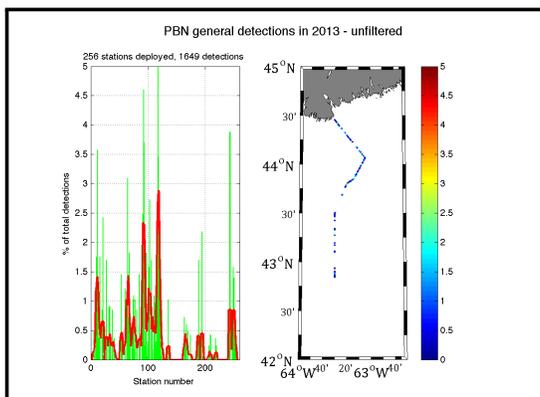
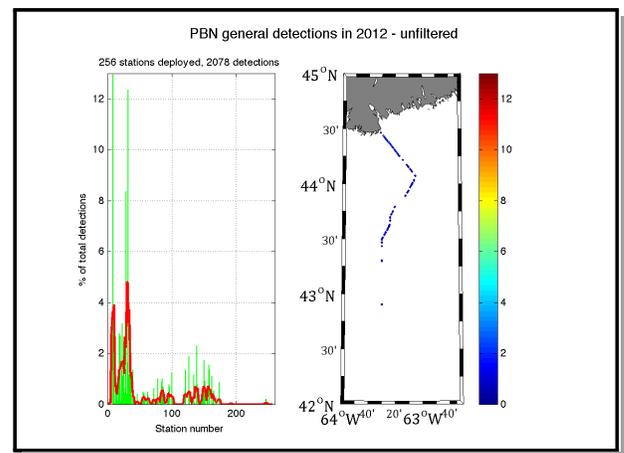


Yearly unfiltered detections of Atlantic Salmon at the Halifax Line from 2008 to 2013

Spatial distribution of Salmon

Detections also have a specific spatial distribution

- Onshore peak concentrated over the first 40 stations
- Offshore peak between stations 70 and 130
- Minimum around station 50 (maximum NSC!) and further than 170



- 2012's detection peak is located onshore (station < 50)
- 2013's detection peak is between stations 70 and 130.

Conclusions

- Understanding fish migration patterns is crucial in order to develop a sustainable management strategy
- Ocean conditions can affect the survival and distribution of Atlantic Salmon during their migration
- Sea surface temperature is negatively correlated to the ocean entry and the migration velocity of Atlantic Salmon
- The spatial distribution of detections is highly variable but also has persistent features
 - Minimum in detections where the NSC is maximum
 - Can hydrography explain the spatial variability in acoustic detections?

THANK YOU