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One of the key roles of Salmon Watch Ireland is to keep the public informed about peer-reviewed research relating to Atlantic salmon.

The following papers provide valuable insight into how Atlantic salmon respond to a changing ocean climate, and how shifts in marine ecosystems can significantly influence the growth and survival of post-smolts at sea.

We are clearly experiencing major changes in weather patterns and climate. It would be unrealistic to assume that these changes have no impact on Atlantic salmon.

In the Northeast Atlantic, the very foundations of the marine ecosystem are evolving — and these changes are likely to have far-reaching consequences for salmon survival.

What if we cannot save the Irish Atlantic salmon – Are they on an extinction vortex despite best efforts of all.

Atlantic salmon are in obvious trouble — and the reasons go far beyond our rivers. New research shows that survival at sea is being undermined by major changes in the marine ecosystem itself. In this article, we take a look at three peer-reviewed papers that help illuminate these issues more clearly.

Marine survival of Atlantic salmon has declined sharply across much of the North Atlantic, with the greatest losses occurring soon after young fish leave rivers and enter the ocean. While warming temperatures are often assumed to be the primary cause, the mechanisms linking climate change to salmon survival remain debated.

Three recent scientific studies shed new light on this problem by examining salmon growth, survival, and environmental conditions from complementary perspectives. Together, they show that simple temperature-based explanations — such as thermal stress or "shock" at sea entry — do not consistently explain survival patterns. Instead, the strongest evidence points to large-scale changes in marine ecosystems, particularly long-term declines in plankton productivity and energy that ripple up the food web.

By combining growth records from tens of thousands of salmon, six decades of plankton observations, and detailed analyses of river and coastal temperatures, these papers build a coherent picture: climate change is affecting salmon primarily through bottom-up food-web processes, reducing the energy available to support early marine growth and survival. Salmon, in effect, are acting as sentinels of broader ecosystem change in the North Atlantic.

Taken together, this evidence suggests that a return to historic levels of salmon abundance depends on a natural reversal of declining marine productivity, without which full recovery is unlikely to be achievable.

Even the most ambitious river restoration and management measures cannot compensate for a marine environment that no longer provides sufficient or appropriate food to support early survival. At the same time, indirect human pressures at sea — including illegal fishing and bycatch in pelagic fisheries — further erode already fragile populations and can be fatal to recovery efforts. In a low-productivity ocean, the margin for error is vanishingly small, and it may be necessary to allow the vast majority of surviving fish to return and spawn if complete collapse is to be avoided.

Again, we reiterate our complete opposition to the commercial harvesting of Atlantic salmon. In the context of depleted marine productivity and ongoing ecosystem change, any directed exploitation further reduces the already limited

number of fish available to sustain populations. Recreational exploitation must therefore be fully aligned with the overriding premise that the vast majority of salmon must be allowed to return and spawn.

In parallel, the additional pressures associated with salmon farming — including disease transmission, parasite loading, and genetic impacts from escapees — further constrain recovery and must be addressed as part of any credible strategy to halt decline. Where marine survival is limited by broad ecosystem change, reducing all avoidable human pressures becomes essential to preventing further losses and averting collapse.

Headline Findings

Around 2005, the Northeast Atlantic underwent a major ecosystem shift that permanently reduced salmon growth and survival.

Young salmon are entering a marine environment with less food, even when their timing has adapted to warming rivers.

The temperature "shock" salmon experience when moving from rivers to the sea does *not* explain declining marine survival across populations.

Please follow the links for the three papers here


REGULAR ARTICLE

FISH BIOLOGY

River–sea thermal differential experienced by salmon post-smolts is not a proximal driver of marine survival

Emma Tyldesley | Neil Banas | Richard Kennedy | Graeme Diack | Colin Bull


ICES CIEM

Patterns of declining zooplankton energy in the northeast Atlantic as an indicator for marine survival of Atlantic salmon

Emma Tyldesley, Neil S. Banas, Graeme Diack, Richard Kennedy, Jonathan Gilhooly, David G. Johns, Colin Bull

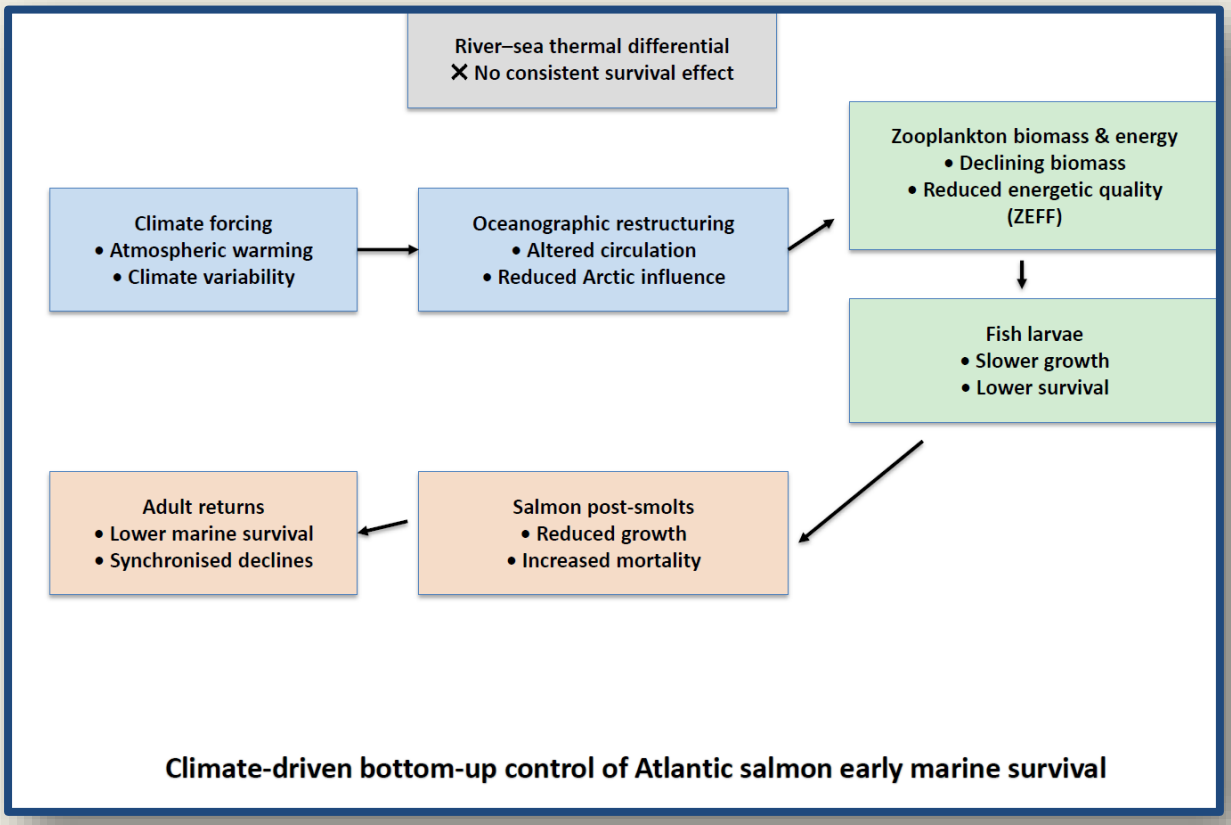

SCIENCE ADVANCES | RESEARCH ARTICLE

APPLIED ECOLOGY

Ecological regime shift in the Northeast Atlantic Ocean revealed from the unprecedented reduction in marine growth of Atlantic salmon

Knut Wilk Vollset, Kari Urdal, Kjell Utne, Eva B. Thorstad, Harald Sægrov, Astrid Raunsgard, Øystein Skaugstø, Robert J. Lennox, Gunnel M. Østborg, Ola Ugedal, Arne J. Jensen, Geir H. Bolstad, Peder Fiske

Simple Diagram to explain the outcome of these studies.



Next Week we will take a look at the pelagic fisheries in the areas where Atlantic salmon feed. Can such a massive unsustainable fishery affect the very survival of Atlantic salmon at sea.