

From: [Redacted]
To: [Cowan C \(Caroline\)](#); [Redacted]
Cc: [Redacted]
Subject: RE: Cabinet Secretary TNZJT - Briefing for Committee
Date: 19 June 2023 13:26:00

Hi all,

I think [Redacted] has already given a good overview on marine heatwaves from MCCIP.

A few other points to note:

- There is also a warm record in the wider North Atlantic, so this signal in the coastal seas could have been transported in along the ocean current pathways, but it could also be due to local atmospheric processes (the recent warm weather). Most likely it's a combination of both.
- We still know very little about these short-lived, extreme events: both in terms of their extent through the water column (or whether only a near-surface phenomenon) and how they impact marine species, habitats and ecosystems.
- Examples of the impacts of ocean warming more generally include changes to fish body size in wild capture fish species and higher mortality rates in salmon aquaculture when winters are milder.
 - Baudron, A.R., Needle, C.L., Rijnsdorp, A.D. and Tara Marshall, C. (2014), Warming temperatures and smaller body sizes: synchronous changes in growth of North Sea fishes. *Glob Change Biol*, 20: 1023-1031. <https://doi.org/10.1111/gcb.12514>
 - Moriarty M, Murray AG, Bex B, Christie AJ, Munro LA, Wallace IS. Modelling temperature and fish biomass data to predict annual Scottish farmed salmon, *Salmo salar* L., losses: Development of an early warning tool. *Prev Vet Med*. 2020 May;178:104985. doi: 10.1016/j.prevetmed.2020.104985. Epub 2020 Apr 6. PMID: 32289615.
- Australia is at the forefront of research on the impact of marine heat waves globally. Scientists there have reported reductions of kelp forest, jellyfish bloom occurrences and coral reef loss due to marine heatwaves.
- We anticipate warming temperature to continue to grab headlines this year: forecasts suggest a shift to El Nino conditions by late 2023 (with significant impacts in the Pacific and usually higher global average temperatures), and the warming in the Atlantic mentioned above means there is now a significant "hurricane generation region" (the seasonal forecast has already been adjusted from "near normal" in May, to a "above average but more unpredictable" this past week by one weather forecaster).

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[Redacted - out of scope]