Reply to Supplement of O'Farrell (2025)

O'Farrell (2025) highlighted some discrepancies and errors in Gargan et al. (2016) which have been addressed in the Online Correction published in May 2024 (https://www.int-res.com/abstracts/aei/v8/c_p675-689/). We therefore intend to only briefly respond to the issues raised in his Supplement in this reply.

Text S1. Sea age, length frequency distribution and spawning history of Tawnyard Lough sea trout kelts

The Comment by O'Farrell (2025) points out differences in sea age distribution between data from O'Farrell & Whelan (1991) and Gargan et al. (2016). There are 4 years of data covering 1985 to 1988 inclusive. There is very good agreement in the data for 1985 and 1988 and reasonable agreement in the data for 1987 but some discrepancy for 1986 where a higher proportion of 0 sea fish were recorded. Over 400 sets of sea trout scales were read for both O'Farrell & Whelan (1991) and Gargan et al. (2016) and differences may arise from interpretation of sea age based on scale reading.

Taken together, the sea age data for the 1985–1988 period is not markedly different from that in O'Farrell & Whelan (1991) and both sets of data indicate that a stable sea trout population structure typical of the west of Ireland was present prior to 1989 (see Section 4 of the Reply Comment). We therefore assert that, while there is some divergence in the data for one year prior to the 1989/1990 sea trout collapse, both sets of data show a similar sea age population structure.

The Comment by O'Farrell (2025) raises the issue of some discrepancies in the calculation of the percentage of previous spawner calculation in Gargan et al. (2016). While the data is similar in 3 of 4 years highlighted, discrepancies may relate to interpretation of scale reading with regard to spawning marks on scales.

The Comment by O'Farrell (2025) also points out that a total of 149 sea trout kelts recorded at the Tawnyard trap during 1992 (16 fish) and 1993 (133 fish) were transported to the Burrishoole catchment as part of the sea trout broodstock programme. O'Farrell (2025) argues that the removal of these kelts had a subsequent loss of survivors to future sea trout kelt numbers. However, we believe that the survival and subsequent recruitment of this low number to future Tawnyard trap numbers would be extremely low as marine survival of sea trout was very low and usually below 2% in those years (Table 5.6 & 5.7 of Gargan et al. 2006).

Text S2. Sea trout egg deposition in the Tawnyard Lough sub-catchment of the Erriff River system

The Comment by O'Farrell (2025) raises concerns in Gargan et al. (2016) regarding the calculation of sea trout egg deposition. Gargan et al. (2016) estimated sea trout egg deposition using the lengths of sea trout kelts recorded in the Tawnyard Lough trap each year, the 1985 fork length-fecundity linear regression equation for Erriff sea trout (from O'Farrell et al. 1989), the maturation patterns of female sea trout in Tawnyard Lough in 1983 and 1984 based on O'Farrell (1986), an estimate of overwinter mortality (36%) and inclusion of sea trout taken on rod and line in Tawnyard Lough the previous year. The estimated sea trout egg deposition averaged 269,705 for each year from 1984–1987.

There have been 2 other estimates of sea trout ova deposition in the Tawnyard Lough subcatchment. O'Farrell et al. (1989) examined commercial catches from the Killary Harbour draft-net fishery, rod catches from the Erriff Fishery and downstream trap catches from Tawnyard Lough and after considering the sex ratio, percentage maturation, fecundity and relative abundance of each sea age group, estimated the 1986 egg deposition at 252,140 from a spawning escapement of 745 fish. A second estimate was published by Solomon (1998), who calculated the annual mean egg deposition for the Tawnyard Lough catchment at 257,705 for the years 1984–1987.

All 3 estimates of sea trout egg deposition were in general agreement, despite using slightly different methodologies, and we remain confident that the methodology applied in our calculations provided a robust estimate of sea trout egg deposition in the Tawnyard sub-catchment.

The O'Farrell (2025) Comment points out that Gargan et al. (2016) failed to specify the sea trout sex ratio used. This issue has been addressed in Section 5 of the Reply Comment.

The O'Farrell (2025) Comment was also critical that Gargan et al. (2016) extrapolated sea trout fecundity data for the Tawnyard Lough sub-catchment from the 1980s and assumed that sea trout maturation patterns and fecundity determined during this period continued to apply. These sea trout fecundity data from the 1980s are the only data available for the Tawnyard sea trout population and we consider that it was appropriate to use these data throughout the time series. The O'Farrell (2024) Comment refers to a reduction in fecundity data found by de Eyto et al. (2015) for the Erriff catchment, but this data refers to salmon and not sea trout.

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