

# Live Wrasse Fishery

## Monitoring and Control Report 2022

The wrasse fishery supplies live wrasse to UK Salmon farms for use as natural sea lice control. In the Southern IFC District, wrasses are removed from the Weymouth and Portland area, in and around the Studland to Portland Special Area of Conservation (SAC). In accordance with requirements under the Conservation of Habitats and Species Regulations, the fishery has been assessed through a Habitats Regulations Assessments (HRA) in order to ensure the activity does not lead to an adverse effect on site integrity. The fishery is managed through regulated Minimum Conservation Reference Size (MCRS) and voluntary 'Wrasse Fishery Guidance' and is monitored in line with a Monitoring and Control Plan (MCP). This fishery report describes the outcomes of the data analysis for the 2022 season used to assess the monitoring variables and their trigger points described in the MCP.

### Method

Southern IFCA receive count data on the number of wrasses landed to buyers. The buyer data is used to monitor the removal from the fishery during and at the end of the fishing season.

All fishers voluntarily submit wrasse Catch Return Forms (CRF) throughout the season which details their daily fishing location, effort and catch. CRF data is used to calculate Landings Per Unit Effort (LPUE) for either 'pot' or 'rod and line' fishing methods.

Generalised Linear Models (GLM), run in the programming software 'R' are used to consider which variables (Year, Day of Year or Area Fished) best describe the variation in LPUE.

Further information on methodology is available on the Southern IFCA website 'Live Wrasse Fishery' page.

### Fishing Compliance, Effort and Location

In 2022, Southern IFC officers carried out 22 compliance inspections and found 100% adherence to the MCRS and fishery guidance maximum sizes. Ten fishing vessels participated in the 2022 season for only 14 weeks. Monitoring and control variable one (25% increase in industry demand) was exceeded after 10 weeks of fishing; the total number of wrasses removed was 3.1% above the trigger point, set on the 2018 baseline (*Table 1*).

*Table 1. Comparative fishing effort levels for the Southern IFCA wrasse fishery 2018 to 2022.*

	2018	2019	2020	2021	2022
<b>No. wrasses landed</b>	32,825	42,295	34,299	36,331	42,296
<b>No. fishing vessels</b>	9	11	9	10	10
<b>No. weeks fishing</b>	17	17	18	17	14

Similar to previous years, the majority of fishing effort trips reported on CRFs occurred outside the SAC, in Balaclava Bay, Portland Harbour, Weymouth Bay and Ringsted.

In 2022, many fishers resumed rod and line fishing whilst continuing to pot fish. Rod fishing usually targets the west side and bill off the Isle of Portland, and therefore more wrasse fishing occurred within this area of the SAC compared to 2020/21. It should be noted, that most rod and line fishing stopped in mid-August due to order fulfilment complications and issues at salmon farms. In 2022, only three pot fishing trips were reported to occur within the SAC and overall pot fishing activity appeared to decrease. Comparisons of fishing effort between years, (total fishing trips, no. of pots and rod hours fished) cannot be confidently described due to missing data in all years. Compliance with CRF submission had increased over time with 80%, 86%, 84% and 94% of the total fish removed recorded on CRFs for the years 2018 to 2021 respectively. However, in 2022, this fell to 84%.

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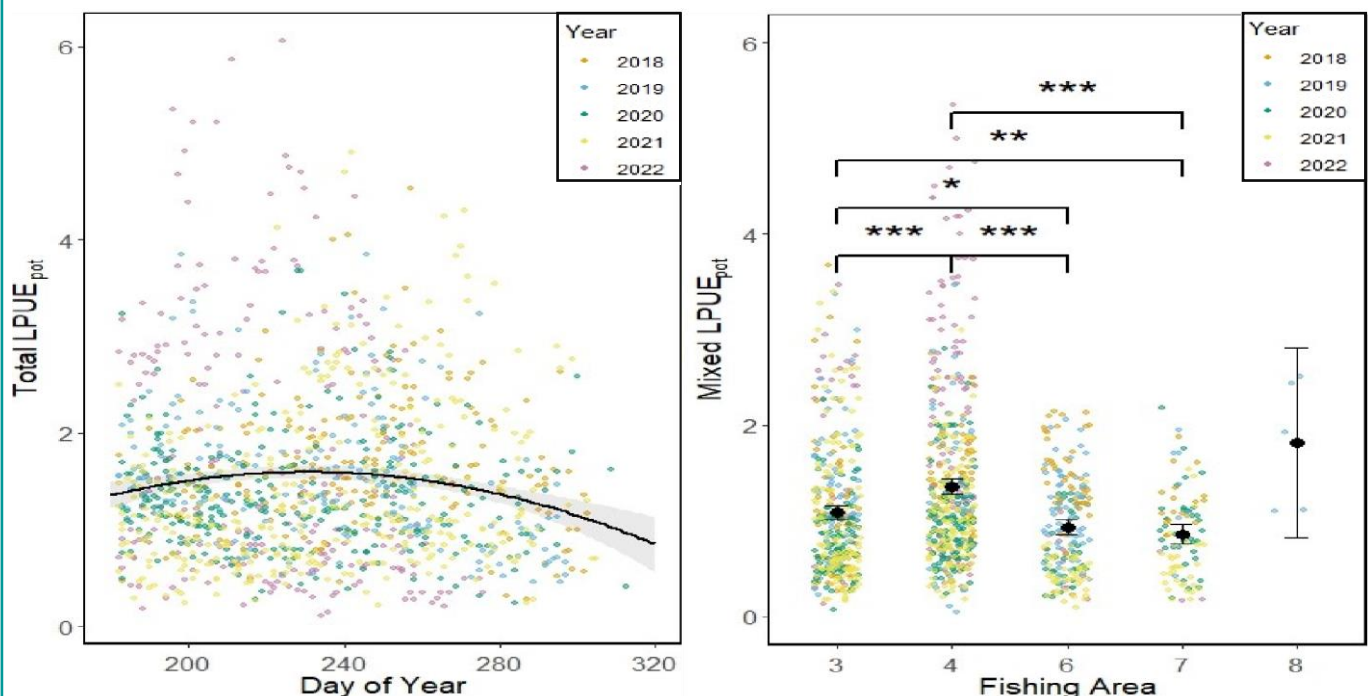
### Landings Per Unit Effort (LPUE)

In order to complete the Generalised Linear Model analysis, the number of wrasses landed are separated into five categories: total wrasse LPUE per pot, mixed wrasse LPUE per pot (excluding ballan), ballan wrasse LPUE per pot, corkwing wrasse LPUE per pot, and Ballan wrasse LPUE per rod hour fished. The following figures show the variables which best explain the variation in LPUE and the corresponding significance levels for each level of a variable. Note: colours indicate either year or area fished and are displayed in the relevant key. To simplify plots, where many significant interactions were found, only the NS interactions have been highlighted and therefore all other interactions were found to be significant.

### Total and Mixed Wrasse LPUE<sub>pot</sub>

When 2022 data was analysed, the variation in total LPUE<sub>pot</sub> was best explained by the day of year (DOY) (Figure 1). This is a change from 2021 in which fishing area best explained the data. The mean Total LPUE<sub>pot</sub> was lower at the end of a season than the start and reached a peak towards the end of August. This is similar to the trend seen in 2020.

The variation in mixed LPUE<sub>pot</sub> was best explained by year in 2021, but when 2022 data was included, this changed to fishing area (Figure 1). Portland Harbour and Weymouth Bay (Fishing Area 4) had a significantly higher LPUE<sub>pot</sub> than the other areas. It should be noted that no fishing trips have been recorded as occurring in area 8 since 2019.



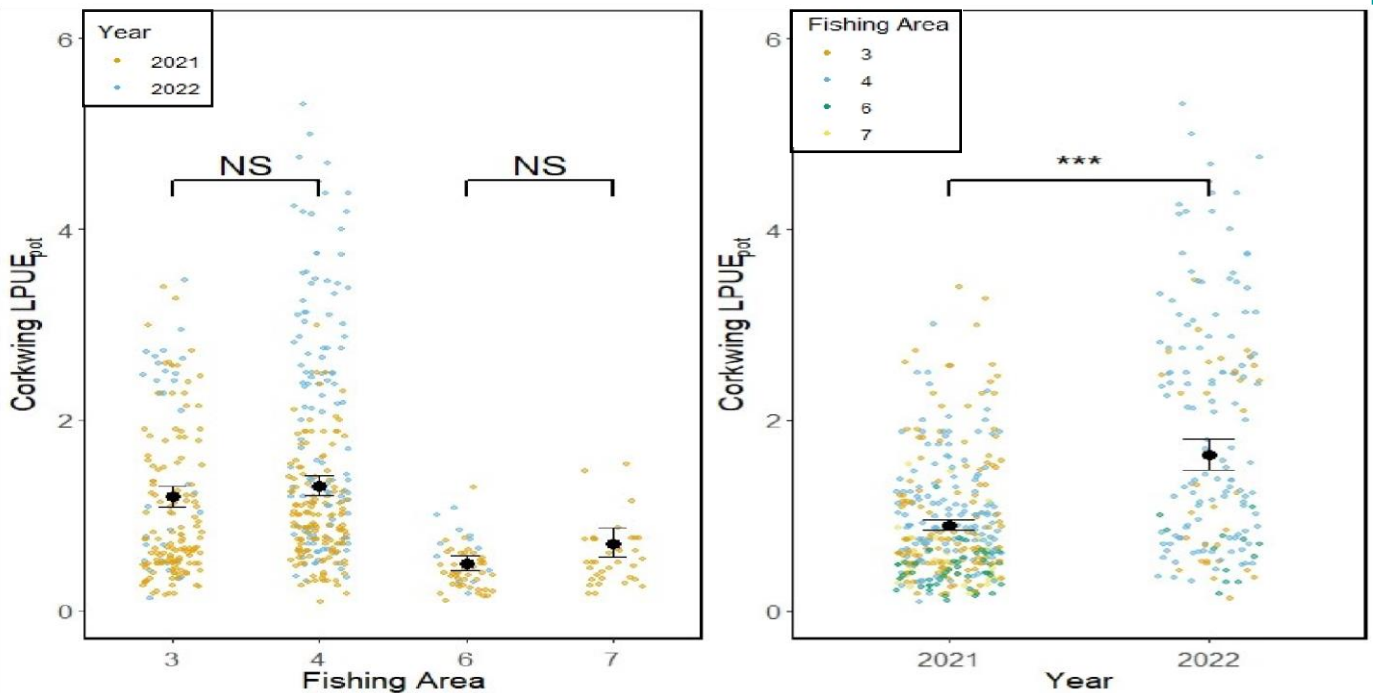
**Figure 1:** Predicted effects of (left) the day of year (DOY) on LPUE<sub>pot</sub> of total wrasses and (right) fishing area on LPUE<sub>pot</sub> for mixed wrasses caught in the Southern IFCA District. Error bars show 95% confidence intervals around the predicted means as estimated by the Generalized Linear Models. Fishing Area 3= Balaclava Bay, 4= Portland Harbour and Weymouth Bay, 6= Ringstead Bay, 7 = White Nothe to Lulworth, 8=Lulworth to Broadbench. \*\*\* represents <0.001 significance and \* represents <0.05 significance. Pot fishing is not permitted around the Isle of Portland (Area 1 and 2). Portland Harbour and Weymouth bay (Area 4 and 5) have been combined for this analysis because fishers are active in both areas on the same day.

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### Corkwing $LPUE_{pot}$

In 2022, the variation in Corkwing  $LPUE_{pot}$  was explained by both fishing area and year (Figure 2). Significantly higher  $LPUE_{pot}$  was found in Balaclava Bay and Portland Harbour to Weymouth Bay, than in Ringstead Bay, and White Nothe to Lulworth. 2022 is the second-year data on Corkwing has been collected and in which significantly higher  $LPUE_{pot}$  was observed than for 2021 (Figure 2).



**Figure 2:** Predicted effects of (left) fishing area on  $LPUE_{pot}$  of Corkwing Wrasse and (right) year on  $LPUE_{pot}$  for Corkwing Wrasse caught in the Southern IFCA District. Error bars show 95% confidence intervals around the predicted means as estimated by the Generalized Linear Models. Fishing Area 3= Balaclava Bay, 4= Portland Harbour and Weymouth Bay, 6= Ringstead Bay, 7 = White Nothe to Lulworth. \*\*\* represents  $<0.001$  significance and NS = Not Significant. Pot fishing is not permitted around the isle of Portland (Area 1 and 2). Portland Harbour and Weymouth bay (Area 4 and 5) have been combined for this analysis because fishers are active in both areas on the same day.

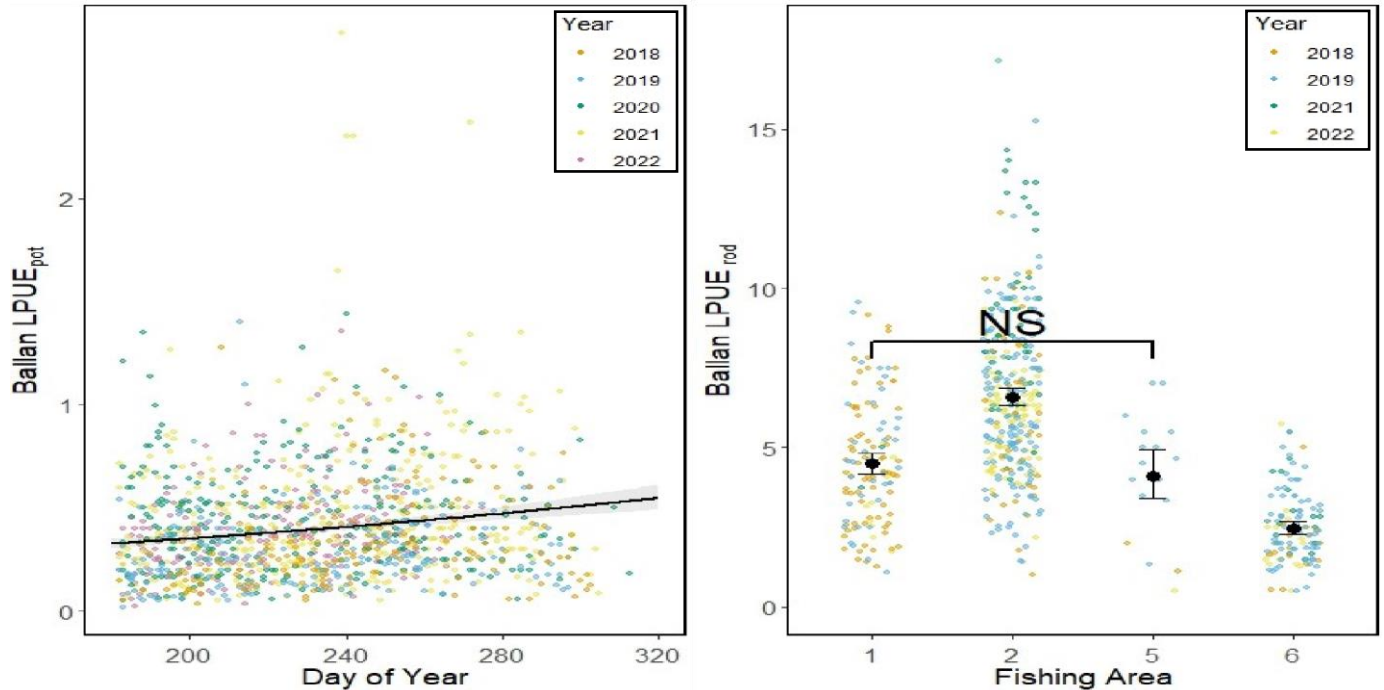
### Ballan $LPUE_{pot}$ and $LPUE_{rod}$

In 2021, ballan  $LPUE_{pot}$  was explained by all three studied variables, where as in 2022, DOY was the only factor which explained the variation (Figure 3).  $LPUE_{pot}$  increased throughout the season.

In 2022, the variation in ballan  $LPUE_{rod}$  was best explained by fishing area (Figure 3), a change from 2021 when year was the best fit. Significantly higher  $LPUE_{rod}$  is found in Portland Harbour to Weymouth Bay (Fishing Area 4) than all other areas. It should be noted that Balaclava Bay, Portland Harbour and White Nothe to Lulworth were removed from the analysis due to too few data points.

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**Figure 3:** Predicted effects of **(left)** fishing area on  $LPUE_{pot}$  of Ballan Wrasse and **(right)** year on  $LPUE_{rod}$  for Ballan Wrasse caught in the Southern IFCA District. Error bars show 95% confidence intervals around the predicted means as estimated by the Generalized Linear Models. Fishing Area 1= West Side, 2= Portland Bill, 5=Weymouth Bay, 6= Ringsted Bay. NS = Not Significant. All other interactions significant. The lack of data points in areas 3,4 and 7 required the areas to be removed from the analysis. Too few or zero rod fishing trips have occurred in Areas 3, 4, 7, and 8 for these to be included within the analysis.

### Summary of results

1. In 2022, the number of fish purchased was 29% higher than the 2018 baseline, which triggered monitoring and control variable one of the Monitoring and Control Plan.
2. Between year fishing effort data (total fishing trips, no. of pots and rod hours fished) cannot be compared with confidence, due to missing catch return form data. Data is submitted voluntarily by fishers and should be interpreted with caution. However, it was clear that fishers resumed the use of rod and line fishing in 2022.
3. To date, the data analysis does not suggest significant changes in the LPUE for the wrasse fishery between years. Where there has been a significant difference in LPUE this is seen to be an increase (Corkwing).
4. Fishing area best explains the variation in LPUE for most wrasse categories. Pot LPUE is highest outside of the SAC where the majority of fishing effort is concentrated. Rod LPUE is highest off Portland Bill where the majority of rod fishing occurs.
5. Where Day of Year was identified as being an explanatory variable, the pattern was different for Ballan in isolation, with an increase in  $LPUE_{pot}$  throughout the season, than for all wrasse species combined where there was a decline in average  $LPUE_{pot}$  by the end of the year with a peak in August

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### Discussion

In 2022, the total number of wrasse landed was 1,261 fish (3.1%) above the Monitoring Variable 1 trigger point under the Monitoring and Control Plan set as 41,035 fish (2018 baseline). Fishing effort cannot be statistically compared to the baseline year or other previous years due to incomplete data. Based upon a visual analysis of the available data an increase in rod fishing hours was seen in 2022, compared to 2020 and 2021, although it cannot be determined if this is a statistically significant increase.

The fishing area continues to explain much of the variation in LPUE. Portland Harbour and Weymouth Bay which are outside of the SAC, are consistently the most productive for species other than ballan wrasse caught by pot fishing, the majority of which are known to be corkwing wrasse. Henly et al. (2021) and Halvorsen et al., (2020) found that Corkwing wrasse are more abundant at shallower depths. Portland Harbour and Weymouth Bay are both the two largest fishing areas, over which the depth is not more than 10m, each spanning more than 5.4km<sup>2</sup>. It is conceivable that the higher LPUE found in these areas may be a result of the size of the available area which offers preferred habitat for corkwing wrasse. Whilst other fishing areas such as Ringsted Bay and White Nothe to Lulworth have only a narrow band of seabed 10m or shallower.

Meanwhile, in the rod fishery ballan wrasse LPUE was consistently higher around the Isle of Portland. CPUE of ballan wrasse has been shown to be positively linked with wave exposure (Halvorsen et al., 2020) and with larger tidal range (Henly et al., 2021). Portland Bill is very exposed to strong wave action, and the strong tidal stream creates daily races. Ballan wrasse may be more abundant in this area due to these factors.

Contrasting seasonal effects were found in the Total LPUE<sub>pot</sub> and Ballan LPUE<sub>pot</sub>. Ballan wrasse landings increase with day of year. As a nest guarding species, spawning between April and August (Darwell et al., 1992) more individuals may be active and entering the fishery from August.

Total LPUE<sub>pot</sub> rises from July until the end of August before declining. It is possible that ballan wrasse are responsible for the rise until August, along with other nest building species, corkwing and rockcook (Darwell et al., 1992). However, this may also be explained by the relationship of corkwing LPUE with temperature (Henly et al., 2021). Corkwing account for the majority of pot caught individuals and as sea temperatures increase throughout July and August corkwing may become more active and enter the fishery. Halvorsen et al. (2020) found that CPUE of Corkwing and Ballan wrasse increased between June and September, before declining in October, similar to the pattern found here for total wrasse.

The results discussed in this report have been interpreted from data submitted under voluntary Wrasse Fishery Guidance Measures adhered to by fishers. Whilst the data quality has improved since 2018, its analysis should be interpreted with caution.

### References

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- Henly, L., Stewart, J.E., Simpson, S.D. 2021. Drivers and implications of change in an inshore multi-species fishery. *ICES Journal of Marine Science*. **78**, (5):1815–1825.
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