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## **RLRAG 40 Agenda 4: Rock Lobster Stock Assessment Results**

### Summary

This document provides key figures that will be included in the 2022/23 assessment report. It also demonstrates how the drafted harvest strategy would be applied in this season. In the Western Zone application of the draft harvest strategy results in a shift to higher CPUE band in step 2 (with the TACC at 242t). In the Eastern Zone it results in no change to the CPUE band, step or TACC as the CPUE has only increased slightly and PRI is below the threshold.

Further details on length-frequency data and modelling of the Western Zone will be presented at the RLRAG.

Feedback from the RLRAG is sought on all aspects of the fishery through the 2022/23 season that should be taken into consideration, perspectives on the presented data and the application of the draft harvest strategy.

## Western Zone Harvest Strategy Application

This section describes the application of the drafted harvest strategy to the 2022/23 stock assessment.

Part 1 from the draft harvest strategy that egg production is sufficient to ensure the ongoing sustainability of the stock. This is readily met (analyses not yet finalised, hence not shown here but the stock is well above this limit):

### Harvest Control Rule Part 1: Ensuring Egg Production LRP is met

Model estimated egg production must be above the limit reference point of 20 percent of the virgin level with a 90 percent probability. This decision rule must be satisfied before the CPUE-based harvest strategy can be used to set the TACC.

In 2022/23 the standardised CPUE rose from 0.74 to 0.787 kg/potlift. Hence the CPUE band increased by one step. The PRI was also above the new threshold RP (see Figure 7).

Consequently, the CPUE band increases by one level. This takes it to the end of the step, accordingly from now onwards step 2 will be used:

### Harvest Control Rule Part 2: TACC Determination

When Decision Rule #1 has been met, the TACC is set using the standardised CPUE-TACC Table 10 and 11 (for the Western and Eastern Zones, respectively). Note that the HCR initially (at the time of its adoption) commences in Step 1.

1. 1. The fishery will move to the next CPUE band (and possibly a higher TACC unless the cap has been reached) if:
  - i) the standardised CPUE is in a band higher than in the previous season;AND
  - ii) the **PRI** (rounded to two decimal places) is at or above the threshold level of 1.63 undersize per pot lift for the Western Zone or 0.26 undersize per pot lift for the Eastern Zone.

Note that the CPUE band can only increase a single level per year. If the new CPUE band has reached the final value for that step (as indicated by the arrow) then the next step will be used for setting this TACC and the TACC in all subsequent years.

Application to Western Zone in 2022/23

CPUE	Step 1	Step 2	Step 3	Step 4	Step 5
<0.25	0	0	0	0	0
0.250 - <0.275	0	0	0	0	0
0.275 - <0.300	0	0	0	0	0
0.300 - <0.325	5	4	4	3	3
0.325 - <0.350	15	13	12	10	9
0.350 - <0.375	26	24	21	18	16
0.375 - <0.40	40	35	31	27	23
0.40 - <0.425	54	48	43	37	32
0.425 - <0.45	70	63	55	48	42
0.45 - <0.475	88	78	69	61	52
0.475 - <0.50	107	95	84	74	63
0.50 - <0.525	127	114	100	88	75
0.525 - <0.55	149	133	118	103	88
0.55 - <0.575	173	154	136	119	102
0.575 - <0.60	197	176	156	136	117
0.60 - <0.625	224	200	176	154	132
0.625 - <0.65	233	224	198	173	148
0.65 - <0.675	242	233	221	194	166
0.675 - <0.70	242	242	229	215	184
0.70 - <0.75	242	242	242	226	213
0.75 - <0.80	⇒	242	242	242	225
0.80 - <0.85		⇒	242	242	242
0.85 - < 0.90			⇒	242	242
>= 0.90				⇒	242

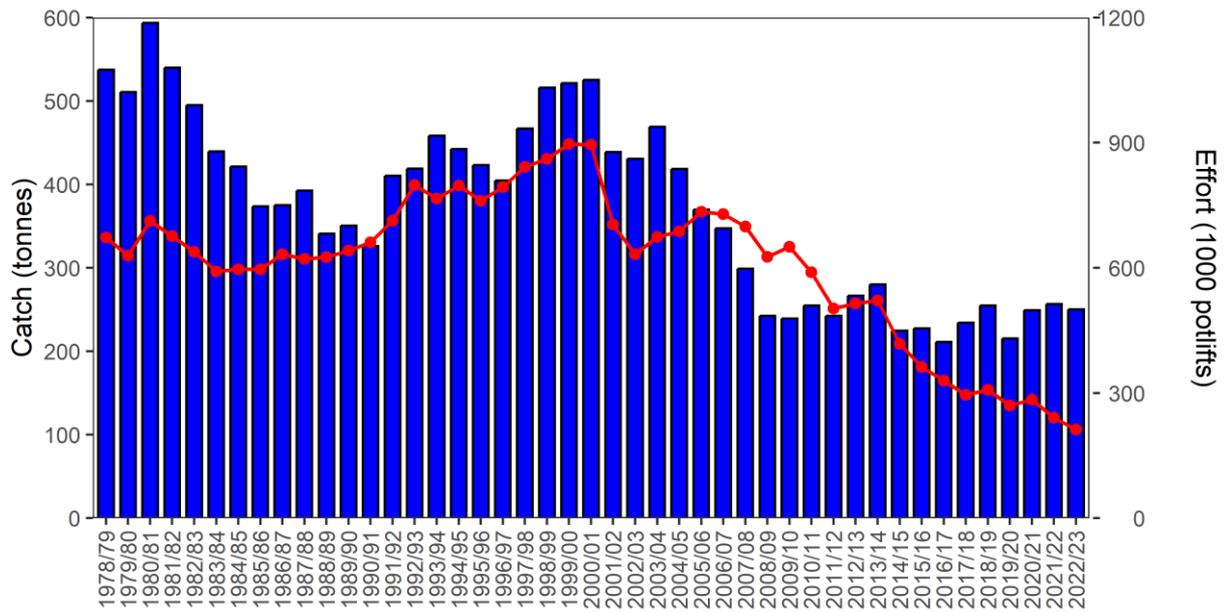


Figure 1: Total catch (blue bars; tonnes) and nominal effort (red line; x1000 pot-lifts) in the Western Zone.

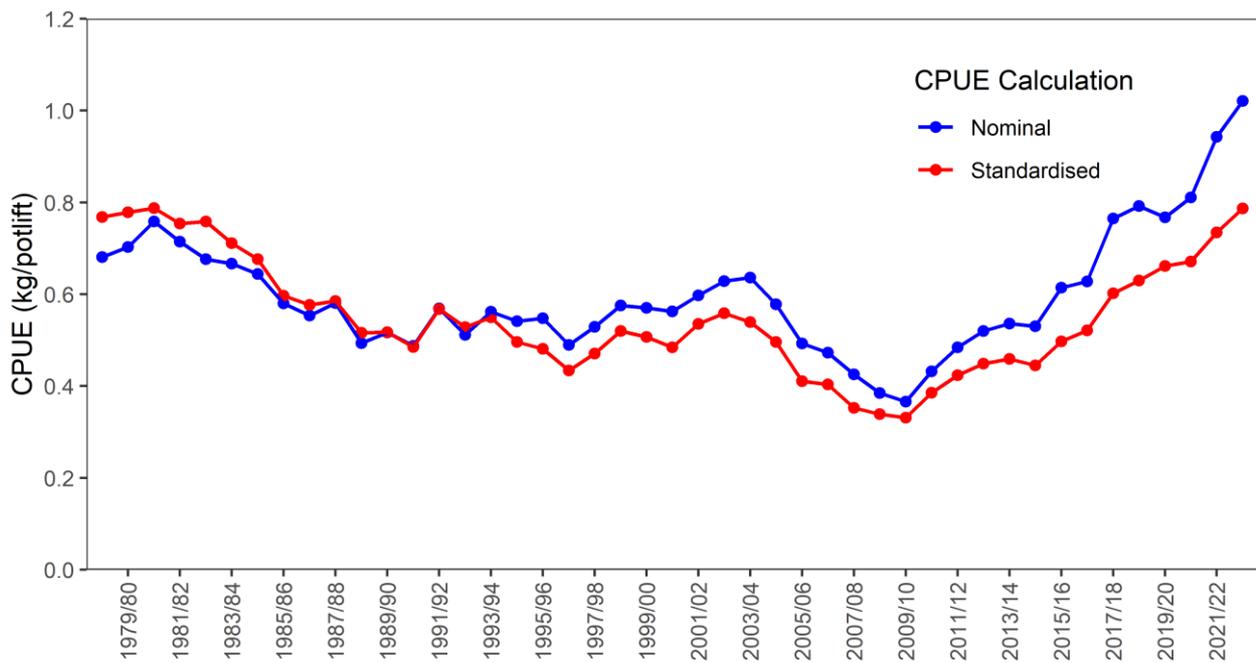
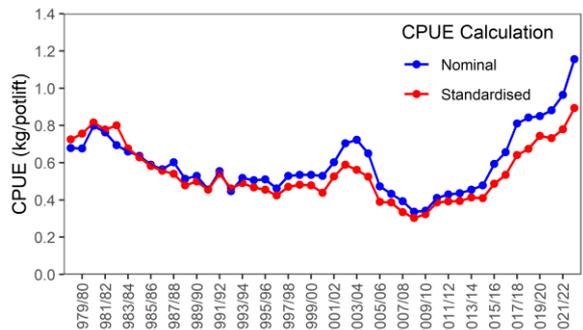
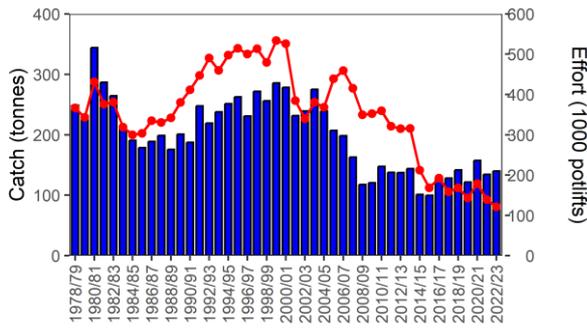
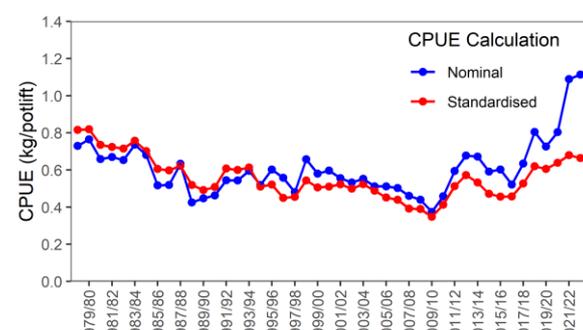
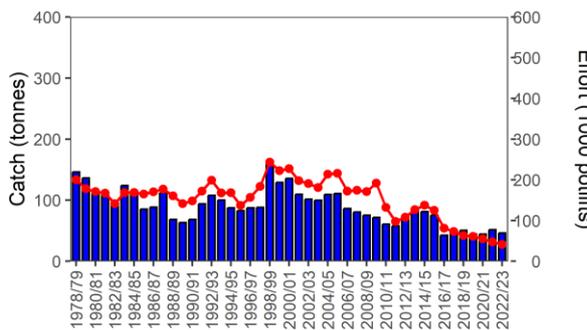


Figure 2: Standardised (red) versus nominal (blue) CPUE (kg/potlift) in the Western Zone. Note that standardised CPUE values differ slightly from one assessment to the next as the depth, seasonal and fisher coefficients are shared across years and are re-estimated including the new data.

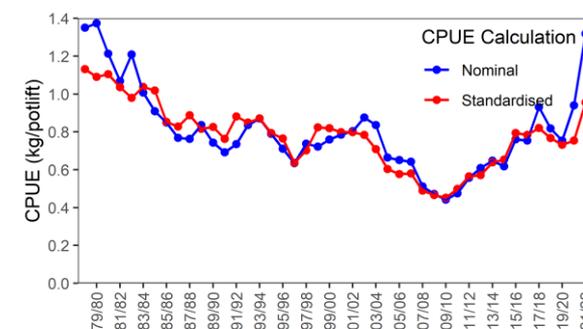
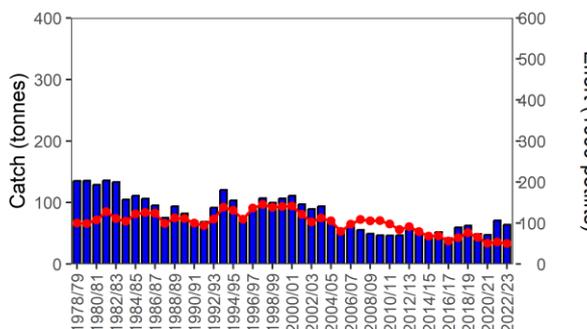
**PORTLAND**



**WARRNAMBOOL**



**APOLLO BAY**



Fishing Year (Nov – Sept)

Figure 3: Regional catch (blue bars), effort (red line), and standardised (red) and nominal (blue) CPUE (kg/potlift) in the Western Zone.

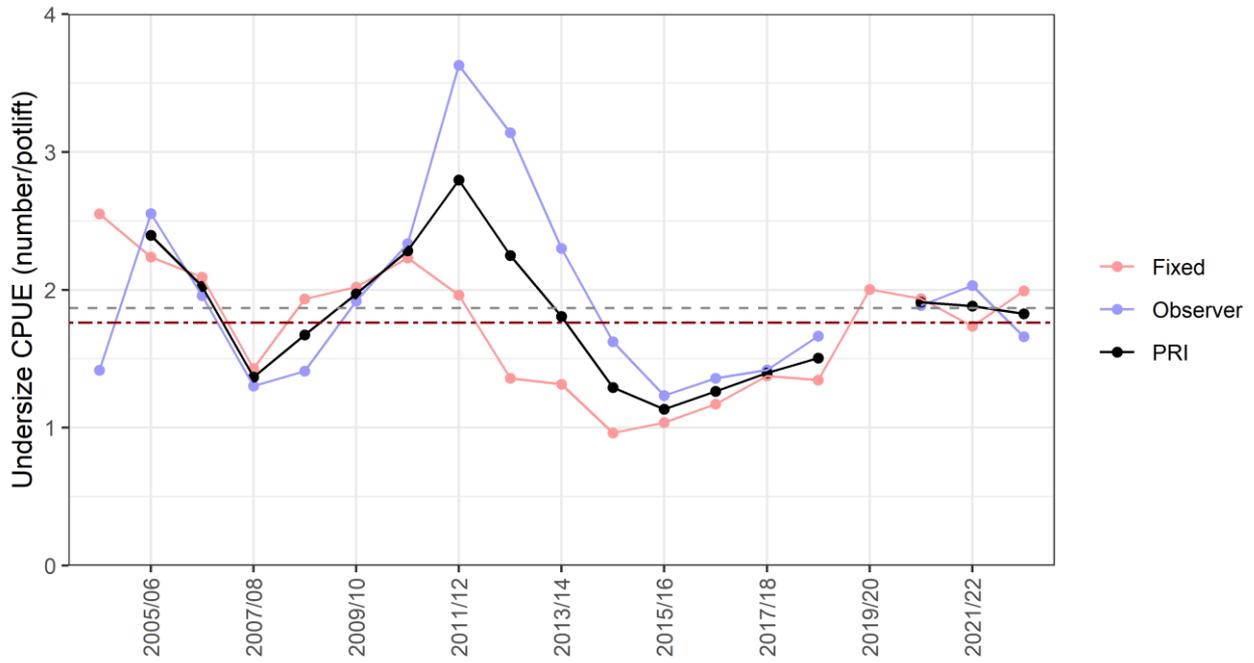


Figure 7: The undersize catch rate (kg/potlift) for the Western Zone as calculated from fixed sites (red), observer coverage (blue) and the final combined PRI (black). The dashed line shows the trigger point (1.81 undersize/potlift). A PRI value for 2019/20 was unavailable due to limited coverage resulting from COVID restrictions.

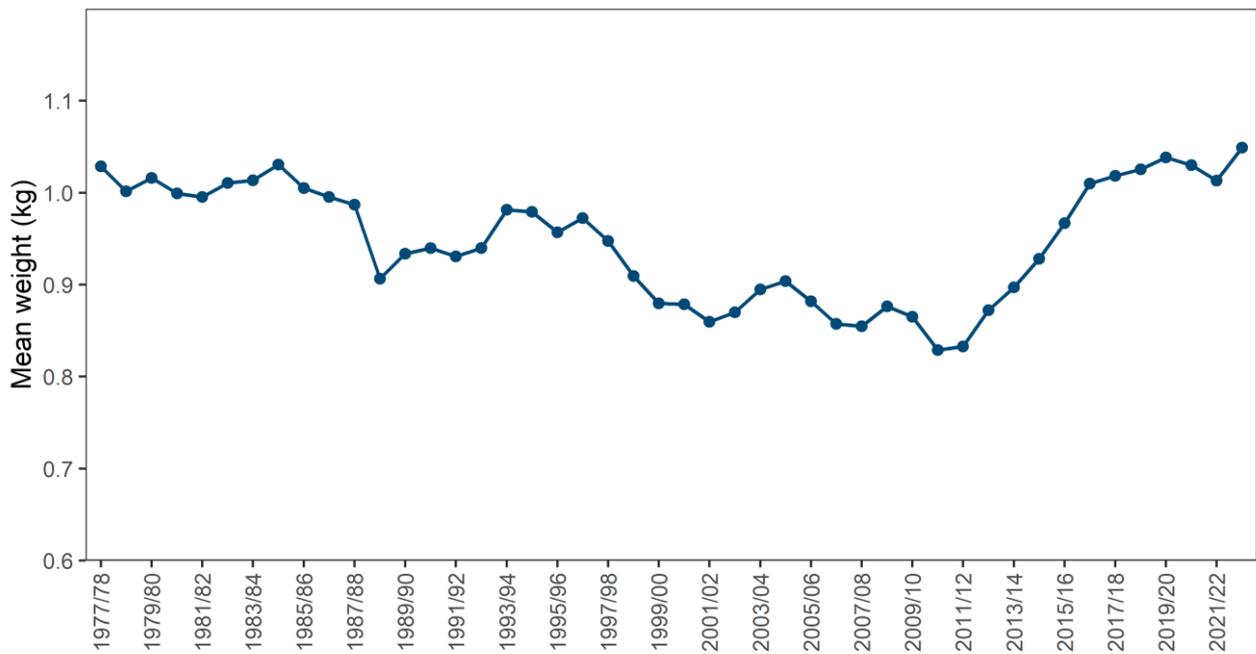


Figure 8: Mean weight of legal-sized lobster in the Western Zone fishery.

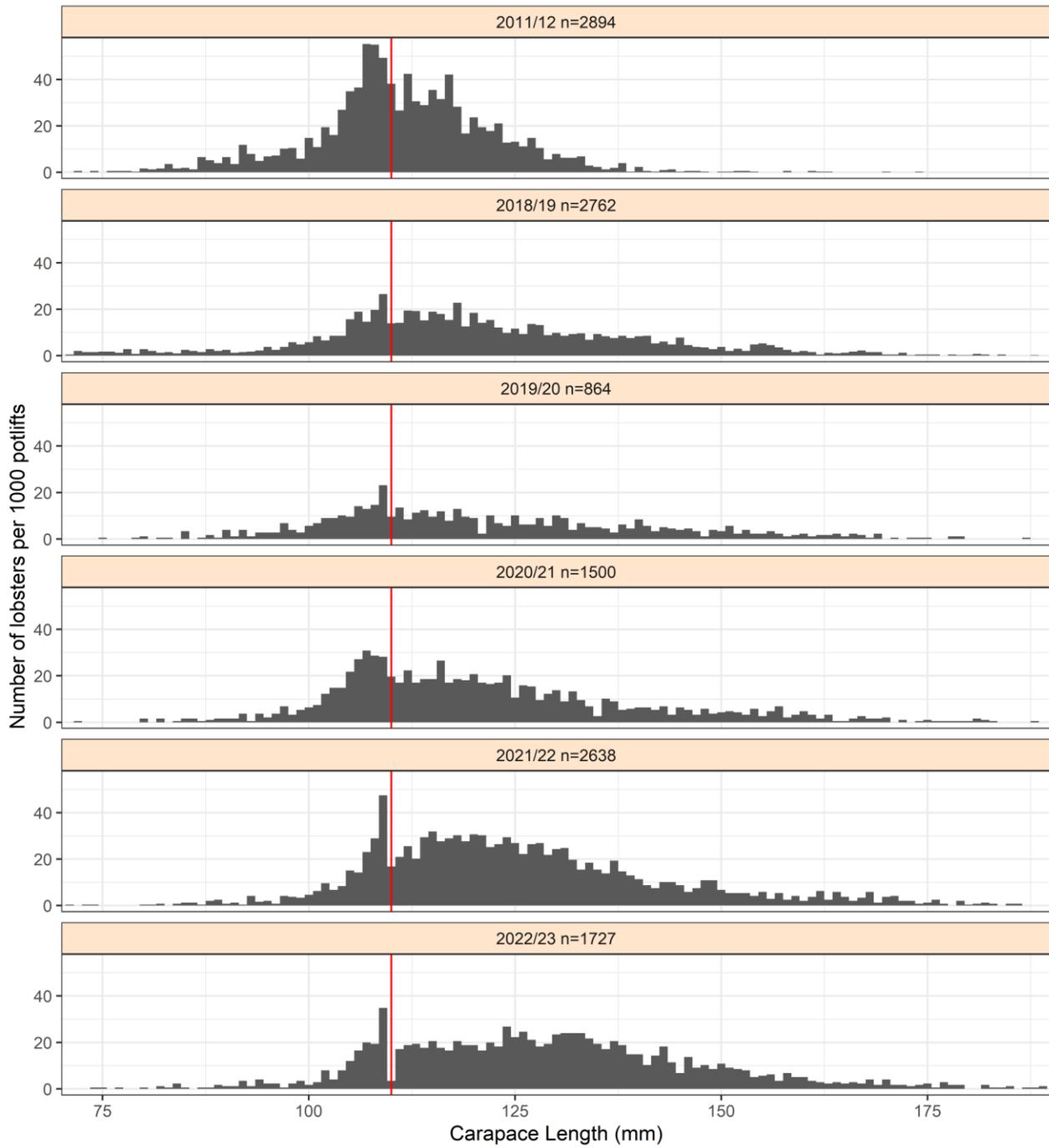


Figure 9: Length-frequency plots for 2011/12 and the last five seasons for male lobsters measured by the Western Zone observer program to highlight the changes that have occurred. The red line indicates the legal size limit.

## Eastern Zone Harvest Strategy Application

In the Eastern Zone standardised CPUE has increased slightly from 0.49kg/potlift to 0.491kg/potlift. The PRI is below the new

In the Eastern Zone the PRI has remained below the proposed threshold level.

For both of these reasons the TACC will remain at the same level/band:

2. The TACC will remain at the same level and the same band when:
  - i) the standardised CPUE remains in the current band;OR
  - ii) the standardised CPUE has increased to a higher band, but the PRI is below the trigger point.

Additionally it should be noted that if the PRI remains below the threshold in the following year this will trigger a review:

4. The harvest control rule will be reviewed when:
  - i) The catch rate band decreases for two consecutive years; or
  - ii) The PRI is below threshold for two consecutive years.

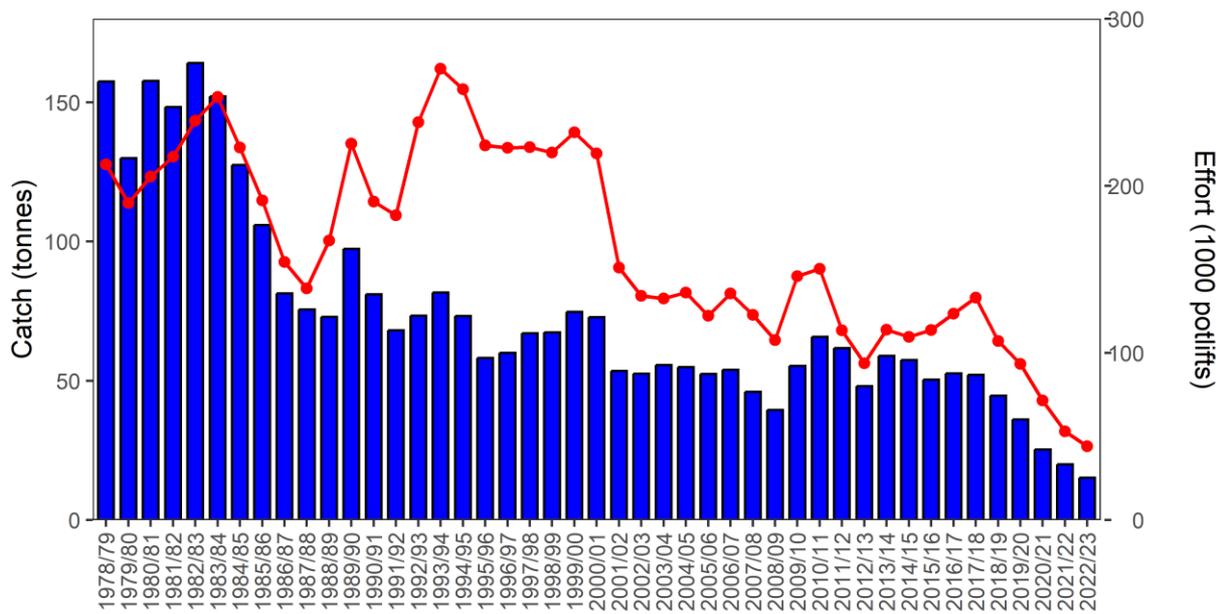


Figure 15: Total catch (blue bars; tonnes) and nominal effort (red line; x1000 pot-lifts) in the Eastern Zone.

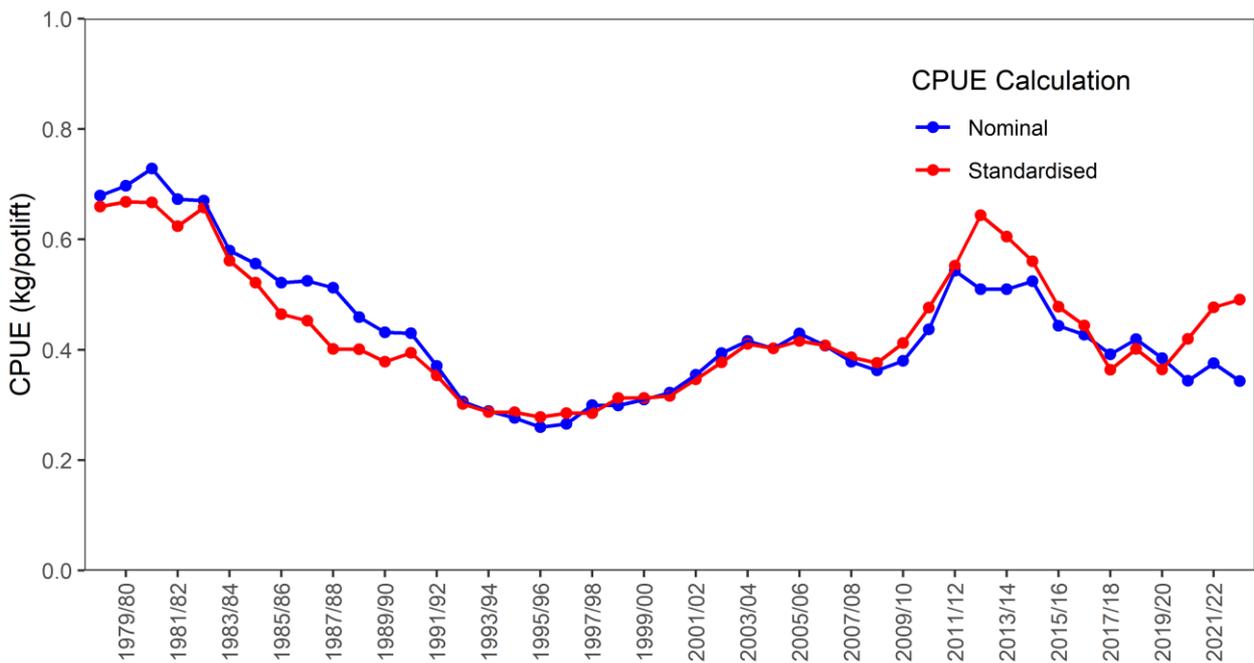
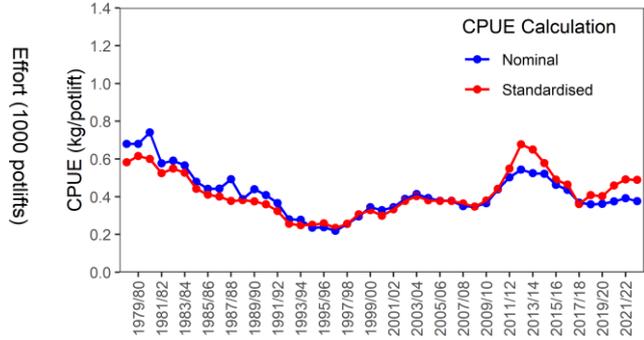
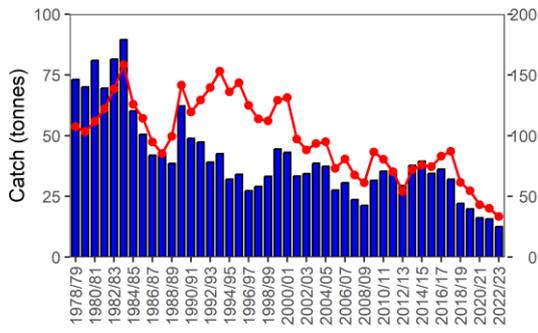
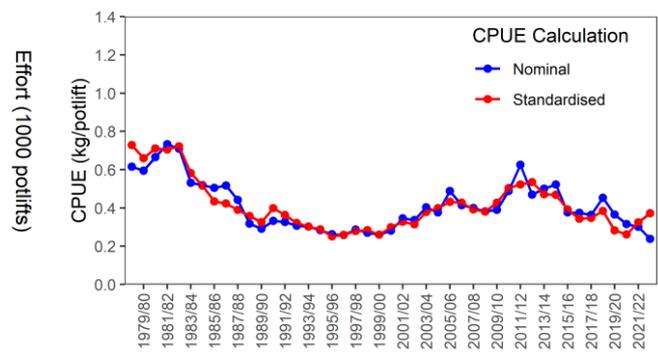
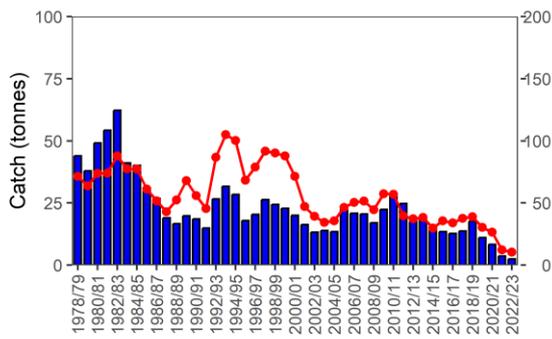


Figure 16: Standardised (red) versus nominal (blue) CPUE (kg/potlift) in the Eastern Zone. Note that standardised CPUE values differ slightly from one assessment to the next as the depth, seasonal and fisher coefficients are shared across years and are re-estimated including the new data.

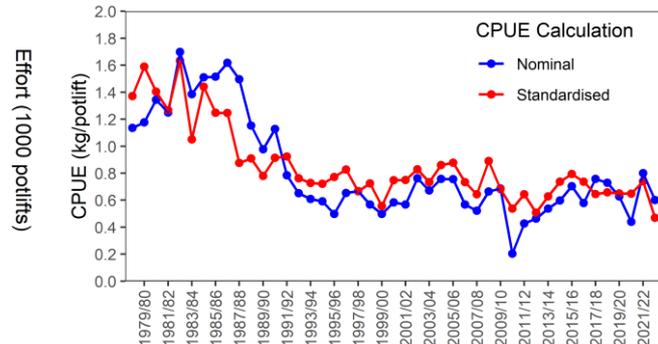
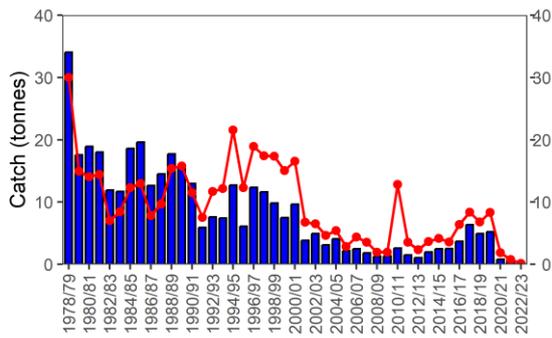
**QUEENSLIFF**



**SAN REMO**



**LAKES ENTRANCE**



Fishing Year (Nov – Sept)

Figure 17: Regional catch (blue bars), effort (red line), and standardised (red) and nominal (blue) CPUE (kg/potlift) in the Eastern Zone.

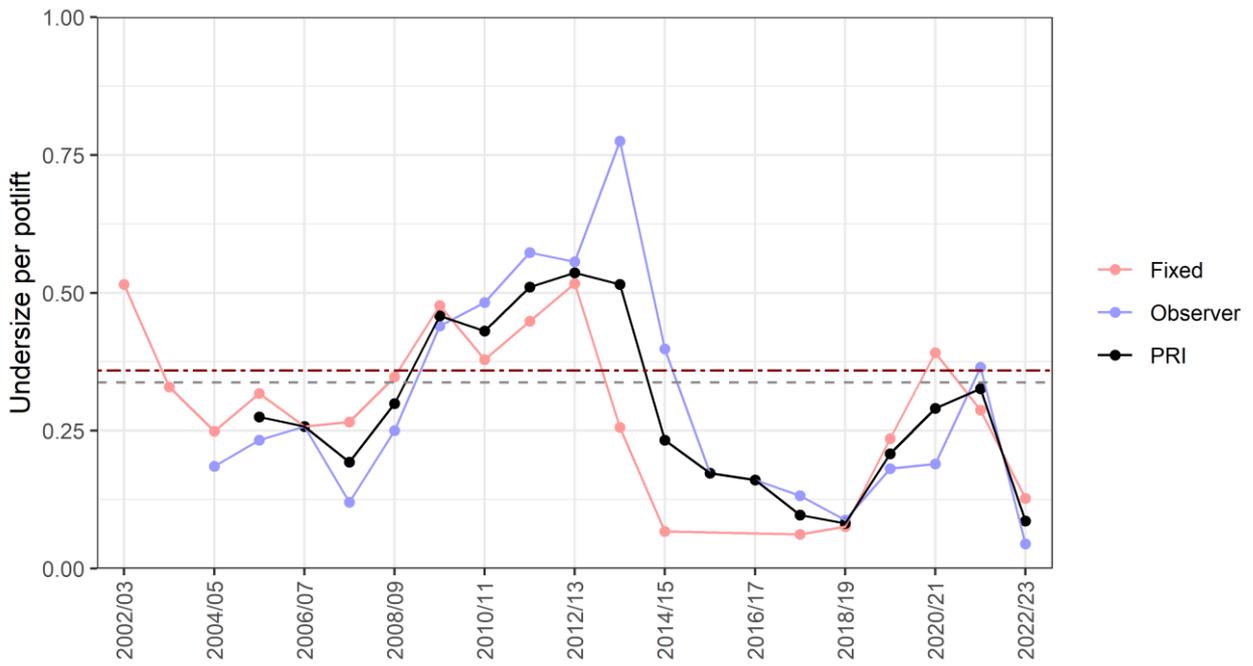


Figure 21: The undersize catch rate (kg/potlift) for the Eastern Zone as calculated from fixed sites (red), observer coverage (blue) and the final combined PRI (black). The dashed line shows the trigger point (0.32 undersize/potlift).

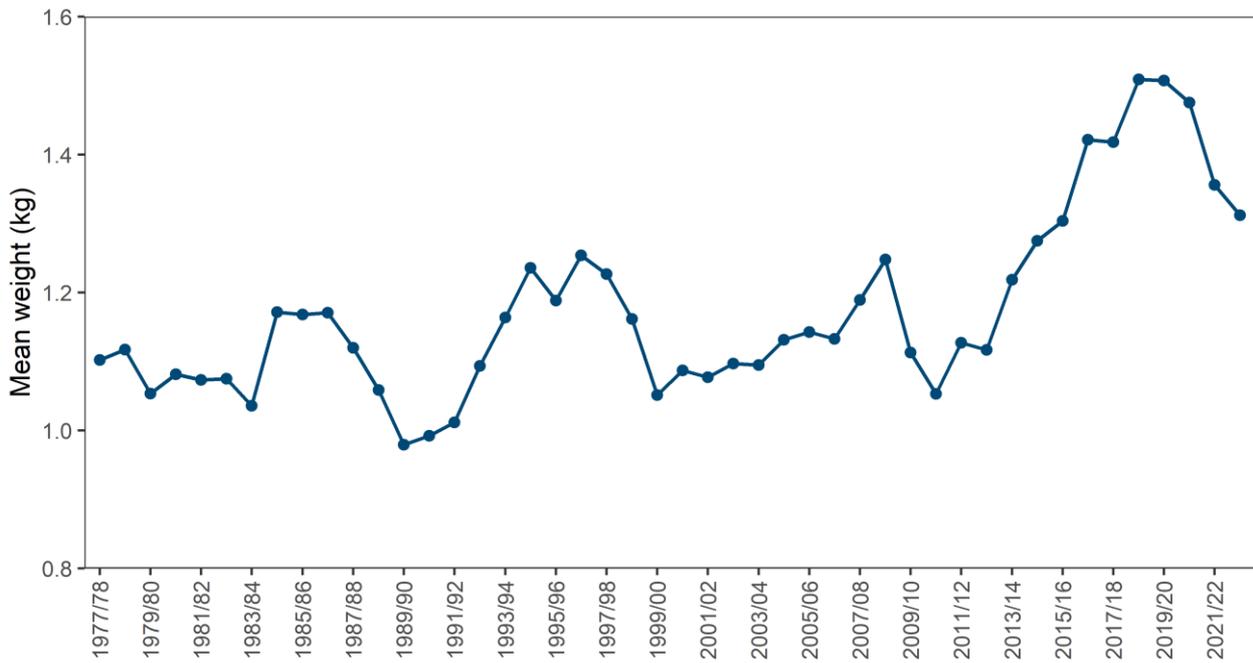


Figure 22: Mean weight of legal-sized lobster in the Eastern Zone fishery.

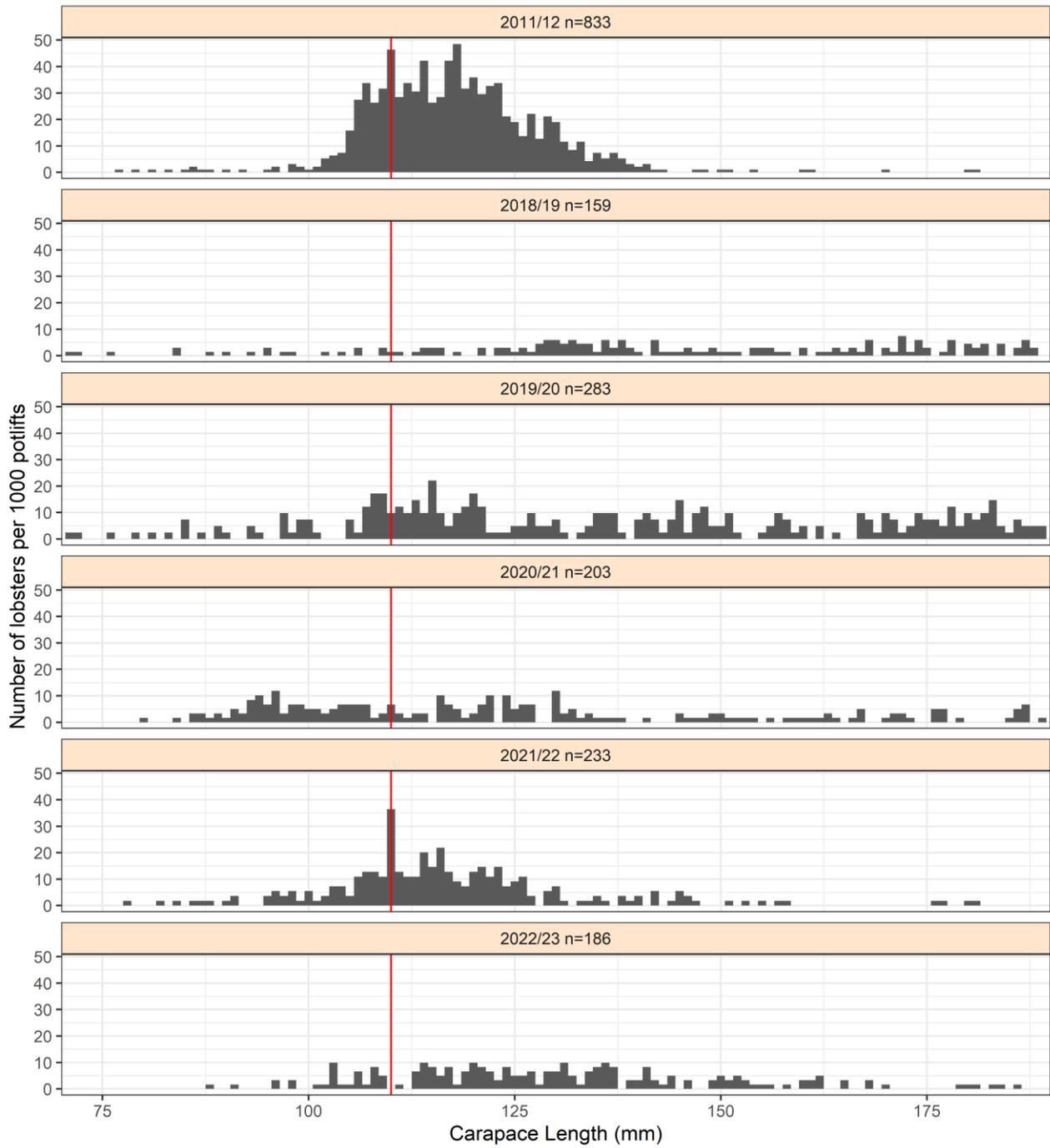


Figure 23: Length-frequency plots for 2011/12 and the last five seasons for male lobsters measured by the Eastern Zone fixed site program to highlight the changes that have occurred. The red line indicates the legal size limit.