



Gladstone Healthy
Harbour Partnership



Fish condition health indicators for the Gladstone Harbour Report Card 2025



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Project ISP23B-2024-25

June 2025



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Cover images – Gladstone Sportfishing Club live weigh-in station at Bray Park during the 2025 Boyne Tannum Hookup (top) Tagging and measuring fish before weighing and release (bottom).

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SUMMARY

Fish condition (FC) health assessments in the Gladstone Harbour study area for the 2025 Report Card were based on a combination of Visual Fish Condition (VFC) and Fish Body Condition (FBC). Owing to fish movement FC is scored at the harbour level rather than at the individual monitoring zones level.

Fish images were used for VFC, and length-weight data were used to assess FBC based on activities listed below. Images were collected from activities 1-3 while length-weight data were collected from activity 1 only.

1. Images and length-weights from the live weigh-in section of the Boyne Tannum HookUp (BTHU) fishing competition using the Suntag app (May 2025).
2. Images from Suntag taggers including Gladstone Sportfishing Club members using the Suntag app during normal fishing trips (June 2024-May 2025).
3. Images from the ABT Barramundi tournament in Lake Awoonga using the TMF ABT app (September 2024).

VISUAL FISH CONDITION

Images were assessed for VFC using the following indicators fins, skin, eyes, parasites, and deformities. VFC was assessed using both machine learning algorithms and human assessors. Microsoft Azure was used again this year to undertake the machine assessment. There was close to 100% agreement between the human and machine assessment of each indicator.

The VFC of 5 key species Yellowfin Bream, Pikey Bream, Barred Javelin, Mangrove Jack, and Dusky Flathead was calculated based on 1,261 images mostly captured by the TMF apps. Barramundi stocks in the Gladstone region remain low and no images were obtained from the study area. The numbers of images for the key species are shown in the accompanying summary table.

Fin damage was the most detected issue across the key species at 59%, was highest for Pikey Bream at 72%, and for Yellowfin Bream at 71%. Fish handling, the use of inappropriate landing nets and containers for transporting the fish to the live weigh-in stations are likely to have contributed to the moderate to high level of fin issues although most issues were classified as light. Skin damage was not observed in any images. There was one detection for eyes in a Grass Emperor, 1 detection for a parasite in a Pikey Bream and 2 detections of deformities in Yellowfin Bream and 1 in Pikey Bream. The accompanying summary table shows the resulting VFC scores.

FISH BODY CONDITION

FBC was calculated using Relative Condition Factor (RCF) as used in previous years. FBC was calculated for a total of 331 fish for 4 of the target species. FBC scores were only obtained for Yellowfin and Pikey Bream and there were insufficient numbers of Mangrove Jack. Barred Javelin and Dusky Flathead were not included in the live

weigh-in this year and only a small number were presented. Due to a number of factors no weights were obtained at the Gladstone Marina station. The resulting FBC scores are shown in the accompanying summary table.

FISH CONDITION SCORES AND GRADES

VFC and FBC scores were averaged to provide a species FC score on a 0-1 scale that were converted to GHHP grades from A-E. The following table provides a summary of the scores and grades including the image numbers (VFC) and sample sizes (FBC) in brackets. All of harbour scores were calculated for each metric by averaging over fish species, and an overall harbour score was calculated as the average of those scores. The all of harbour FC score was 0.83 based on the average FC for Yellowfin Bream and Pikey Bream and the grade was B. The FC grades for Yellowfin Bream was B, and for Pikey Bream was A. The FC grades for Barred Javelin, Dusky Flathead and Mangrove Jack were A, based on VFC only. There was no FC grade for Barramundi as there were no samples for VFC and FBC from the study area.

Species	Visual Fish Condition (VFC)	Fish Body Condition (FBC)	Fish Condition (FC)	GHHP Species Grade
Yellowfin Bream	0.96 (444)	0.67 (248)	0.82	B
Pikey Bream	0.99 (244)	0.71 (68)	0.85	A
Barred Javelin (VFC only)	0.96 (439)	0.18 (2)	0.96	A
Dusky Flathead (VFC only)	0.94 (66)	2.10 (1)	0.94	A
Mangrove Jack (VFC only)	0.94 (68)	0.96 (12)	0.94	A
<i>Barramundi</i>	NA (0)	NA (0)	NA	NA
All of harbour	0.96	0.69	0.83	B

Figures in red indicate FBC sample size below minimum required and not used in FC.

COMPARISON WITH OTHER SITES

This year the only site comparison made was for Barramundi in Lake Awoonga using 128 images. Barramundi from the lake can impact fish health when the dam spills and fish enter the downstream waterways, so it was considered relevant to include them in the assessment as a comparison.

However there has been no spilling of Awoonga since 2017. An assessment was made for Barramundi in lake Awoonga for VFC only as no weights were able to be obtained. This resulted in a FC score of 0.92 (VFC only) which converts to a GHHP grade of A.

1. INTRODUCTION

The Gladstone Healthy Harbour Partnership (GHHP) was established in 2012 to assess the health of Gladstone Harbour. The GHHP produces an annual report on the health of the harbour that includes environmental, social, cultural, and economic indicators. Fish recruitment and fish health were identified as important environmental indicators for the report card by the Gladstone community.

In 2018 GHHP and the Fisheries Research and Development Corporation (FRDC) commissioned Infofish Australia to undertake a trial of new tools to assess visual fish health using photographs and artificial intelligence algorithms to recognise fish parts such as fins, tail, gills, eyes and mouth, and fish health issues such as fin and tail damage, wounds and “redness” (e.g. lesions, scale damage).

Following the successful completion of that project GHHP has undertaken fish condition health assessments in 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and included a fish condition health indicator score in its 2019-2024 report cards using 5 key species.

The results are presented in the reports:

- Visual fish health indicators for the Gladstone Harbour Report Card 2019 (Sawynok et al. 2019),
- Visual fish health indicators for the Gladstone Harbour Report Card 2020 (Sawynok et al. 2020),
- Fish condition health indicators for the Gladstone Harbour Report Card 2021 (Sawynok et al. 2021) and
- Fish condition health indicators for the Gladstone Harbour Report Card 2022 (Sawynok et al. 2022).
- Fish condition health indicators for the Gladstone Harbour Report Card 2023 (Sawynok et al. 2023).
- Fish condition health indicators for the Gladstone Harbour Report Card 2024 (Sawynok et al. 2024).

2. OBJECTIVES

The objectives of the project were to produce:

1. Visual Fish Condition (VFC) and Fish Body Condition (FBC) scores and grades for the 2025 Gladstone Harbour Report Card. A template for the required scores and grades is presented in **Error! Reference source not found.** and the conversion scale for the A to E grades is presented in Figure 1. The scores and grades are calculated using the statistical methods developed in the 2019 visual fish condition project (Sawynok S et al. 2019).
2. An updated fish condition project report.

Table 1: Desirable fish condition score inputs that contribute to the 2025 Gladstone Harbour Report Card fish condition grade for all of harbour.

Species	Visual Fish Condition (VFC)	Fish Body Condition (FBC)	Fish Condition (FC)	GHHP Grades
Yellowfin Bream	score	score	score	grade
Pikey Bream	score	score	score	grade
Barred Javelin	score	score	score	grade
Dusky Flathead	score	score	score	grade
Mangrove jack	score	score	score	grade
Barramundi VFC only	score	NA	NA	grade VFC only
All of harbour	score	score	score	grade



Figure 1: Grading scale for the 2025 Gladstone Harbour Report Card.

3. GLADSTONE HARBOUR MONITORING ZONES

The Gladstone Harbour has been divided into 13 environmental monitoring zones for the GHHP Report Card as shown in Figure 2. However, owing to the potential for fish movement, fish health is scored at the harbour level. The single harbour score is justifiable as fish are mobile and the health of the key species cannot necessarily be attributed to individual monitoring zones.



Figure 2: Gladstone monitoring zones for the GHHP Report Card (from 2020 Gladstone Harbour Technical Report).

4. METHODS

4.1 COLLECTING FISH SAMPLES

Data were collected from 1 June 2024 to 10 May 2025. For each species, a minimum of 25 images/samples throughout the study area was required for the species to be included in the indicator calculation. There were 3 methods for collecting the fish samples.

1. Images and length-weights from the live weigh-in section of the Boyne Tannum HookUp (BTHU) fishing competition using the Suntag app (May 2025).
2. Images from Suntag taggers including Gladstone Sportfishing Club members using the Suntag app during normal fishing trips (June 2024-May 2025).
3. Images from the ABT Barramundi tournament in Lake Awoonga using the TMF ABT app (September 2024).

The data collected through the Suntag and TMF ABT apps were:

- Photos of one side of the fish, preferably on a measuring ruler.
- Tag number for fish that were tagged.
- Total length of the fish to nearest half centimetre.
- Weight of the fish in grams if weighed.
- Date and GPS location of where the fish were caught (automatic).

At the BTHU there were 2 stations where fish were presented for measuring, weighing and photographing. These were at the main station at Bray Park near the mouth of the Boyne River where Infofish staff and Gladstone Sportfishing Club volunteers collected data and at the Gladstone Marina where Gladstone Sportfishing Club volunteers collected data under the guidance of Infofish. This year an approximate location (e.g. Boyne River, Gladstone Harbour etc.) where the fish were captured was recorded to determine the geographic distribution of samples. As well as data collected through the Suntag app as shown in Figure 3, length-weights were recorded manually during busy periods. Figure 4 shows a Yellowfin Bream presented at the BTHU live weigh-in being measured before being tagged and weighed.

The following fish species were the target species, however images were recorded from all species caught (see Appendix 1).

- Yellowfin Bream (*Acanthopagrus australis*)
- Pikey Bream (*Acanthopagrus berda*)
- Barred Javelin (*Pomadasys kaakan*)
- Dusky Flathead (*Platycephalus fuscus*)
- Mangrove Jack (*Lutjanus argentimaculatus*)
- Barramundi (*Lates calcarifer*)

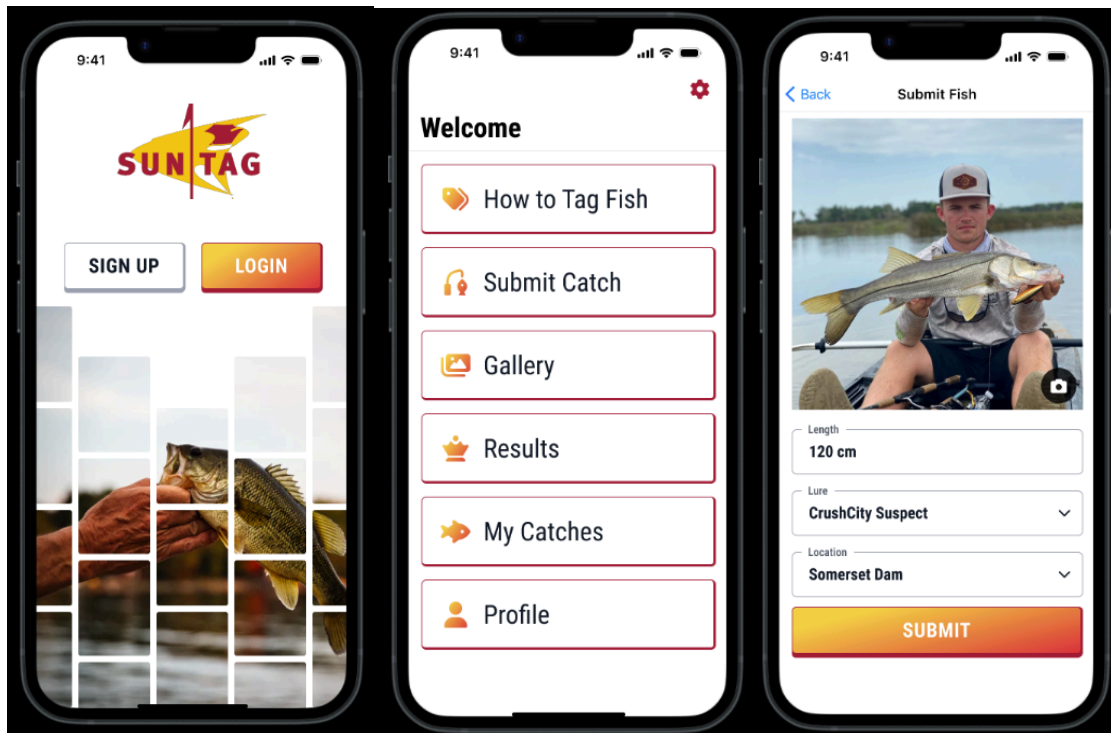


Figure 3: Suntag App screens to capture fish images and collect details of the fish.



Figure 4: Yellowfin Bream caught during the BTHU being measured before being tagged and weighed.

Length-weight data used to assess FBC were collected at:

- BTHU (2-4/5/2025) in conjunction with the live weigh-in conducted by the Gladstone Sportfishing Club.

This year length-weight data was not able to be included for Dusky Flathead and Barred Javelin as these species were not part of the live weigh-in and only a small number of samples were able to be obtained. Due to several factors no weights were recorded at the Gladstone Marina station. Figure 5 shows collecting an image of fish at the BTHU live weigh-in station at Bray Park in 2025.



Figure 5: Collecting fish images at the BTHU.

4.2 VISUAL FISH CONDITION (VFC)

A simplified flow chart for Visual Fish Condition (VFC) is presented in Figure 6 (Sawynok et al 2018a).

VFC was assessed for all samples obtained from the study area as well as samples obtained from Lake Awoonga. For all images the assessment was carried out using the same methods outlined in Sawynok et al. 2020. Both human and machine assessment continue to be used. Microsoft Azure was again used as the machine learning tool as this has been adopted by a number of fisheries agencies including Fisheries Queensland.

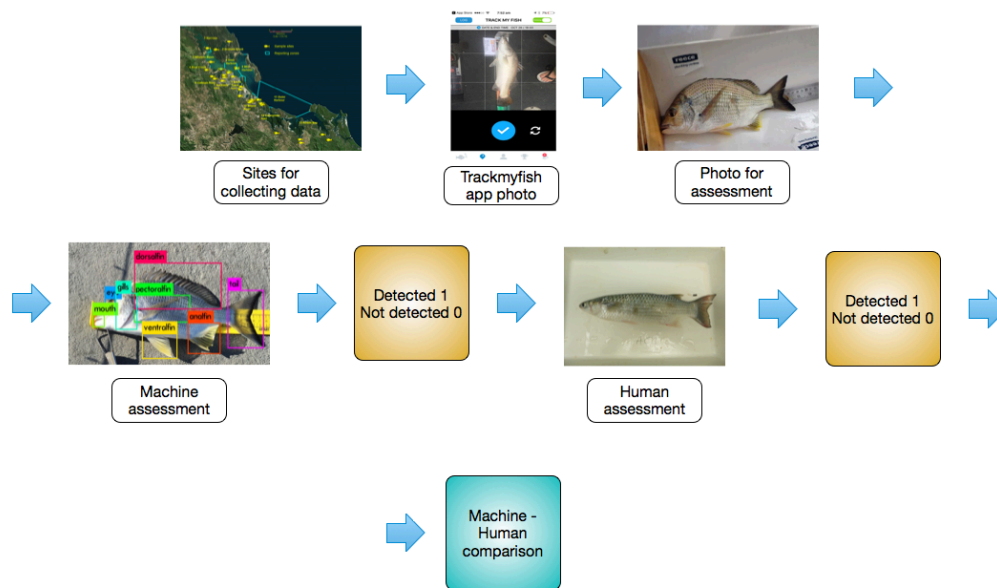


Figure 6: Simplified flow chart of the process from field collection of data to the comparison of the machine and human assessment for VFC.

The 5 visual condition factors assessed were:

- Fins
- Skin
- Eyes
- Parasites
- Deformities

Using Table 2 an overall score was generated for each individual fish with a low score reflecting healthier fish. The overall score was then converted to a 0-1 score using the following formula with high VFC scores reflecting healthier fish.

$$VFC = \frac{\text{maximum score} - \text{fish score}}{\text{maximum score}}$$

Table 2: Designation and score for the VFC assessed.

Fins		
Variable Condition	Designation	Score
No Active Erosion	0	0
Light Active Erosion	1	10
Moderate Active Erosion with some haemorrhage	2	20
Severe Active Erosion with some haemorrhage	3	30

Skin		
Variable Condition	Designation	Score
Normal no aberrations	0	0
Mild skin aberrations	1	10
Moderate skin aberrations	2	20
Severe skin aberrations	3	30

Eyes		
Variable Condition	Designation	Score
No aberrations	0	0
Opaque/Milky Eye	1	10
Swollen Eye	2	20
Haemorrhaging or bleeding Eye	3	30
Missing Eye	3	30

Parasites		
Variable Condition	Designation	Score
No parasites	0	0
Observed parasites	1	10

Deformities		
Variable Condition	Designation	Score
No deformity	0	0
Observed Deformity	3	30

4.3 FISH BODY CONDITION (FBC)

FBC is equal to Relative Condition Factor (RCF) and was calculated using the same methods as in previous years (Sawynok S et al. 2020). RCF was calculated as the proportion of the actual weight to the calculated length-weight where a condition factor of 1 is consistent with a fish of average condition, above 1 being above average and below 1 below average.

Scores calculated for the FBC are presented in Table 3. Historic length-weight data collected at the BTHU from 2014-2024 were also used to provide a baseline for FBC.

Table 3: Determining RCF scores for Fish Body Condition.

Species		Relative Condition Factor score				
		Mean	Median	Min	Max	Std dev
Species 1	number	score	score	score	score	score
Species 2	number	score	score	score	score	score

4.4 INFLUENCE OF RIVER FLOW

To provide some context to the assessment of FC there was a need to examine some environmental conditions. Fish health can be influenced by river flow and rainfall. Skin aberrations are often associated with freshwater flows. While there can be considerable variation in flows and rainfall throughout the study area the following were used as measures of relevant environmental conditions.

Monthly flows recorded at the Castlehope recording station 132001A on the Calliope River were considered indicative of flows in the rivers and creeks in the study area.

The exception is the Boyne River where flows are related to water releases and spilling of Awoonga dam. Spilling has been associated with fish health issues since 2011, particularly in Barramundi in the Boyne River, however there was no spilling during the study period and no spill has occurred since 2017. Data on the dam level were obtained from the Gladstone Area Water Board (GAWB).

4.5 GENERATING SPECIES SCORES AND GRADES

A species FC score was generated for each key species by averaging VFC and FBC as shown in **Error! Reference source not found.** and these were averaged to provide a single harbour wide score for fish condition health. Only those species that had both VFC and FBC scores calculated, were included in all of harbour report card score. Cut-off scores and grades are shown in Figure 7.

$$FC = \frac{VFC + FBC}{2}$$

There were sufficient data recorded in 2024-05 for the following key species:

- Yellowfin Bream
- Pikey Bream
- Barred Javelin (VFC only)
- Mangrove Jack
- Barramundi (VFC only)

Table 4: Generating FC scores (average of VFC and FBC) and grades for key species.

Species	Visual Fish Condition (VFC)	Fish Body Condition (FBC)	Fish Condition (FC)	Species Grade
Yellowfin Bream	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)
Pikey Bream	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)
Barred Javelin	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)
Dusky Flathead	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)
Mangrove Jack	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)
Barramundi	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)
All of harbour	0 – 1	0 – 1	Score (0 – 1)	Grade (A – E)



Figure 7: The grading scale and the scores used in the GHHP 2024 report card.

4.6 GENERATING HARBOUR SCORES AND GRADES

A harbour-wide FC score was generated by averaging the individual species FC scores for Yellowfin Bream (YB) and Pikey Bream (PB).

$$\text{All of harbour score} = \frac{\text{YB score} + \text{PB score}}{2}$$

4.7 COMPARISON WITH OTHER LOCATIONS

Barramundi stocked in Lake Awoonga are relevant to fish health issues in Gladstone Harbour and are likely to contribute to fish health issues in the future. Fish leave Lake Awoonga when it spills but it has not spilled since 2017. Images were only assessed for VFC as no weights were obtained for Barramundi, and FBC was unable to be calculated. Images from Lake Awoonga were obtained from the ABT Barramundi Australian Open competition held in September 2024.

5. RESULTS

5.1 VISUAL FISH CONDITION (VFC)

VFC was assessed for 1,595 images from the study area including 1,261 of key species, 334 images of other species and 128 images of Barramundi from Lake Awoonga (stocked fish) from June 2024-May 2025. Figure 8 shows the sources of the images, and Figure 9 shows the timeframe in which the images were collected.

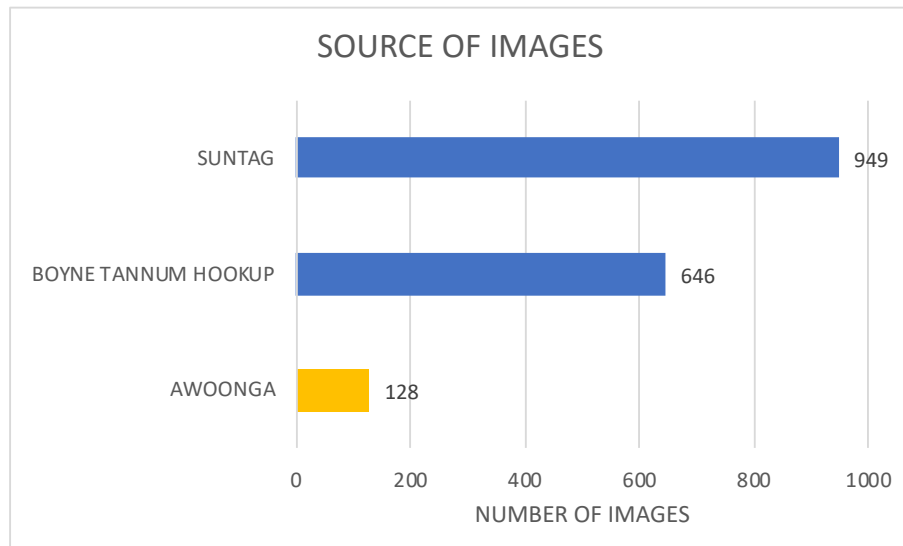


Figure 8: Sources of images for assessing Visual Fish Condition (VFC).

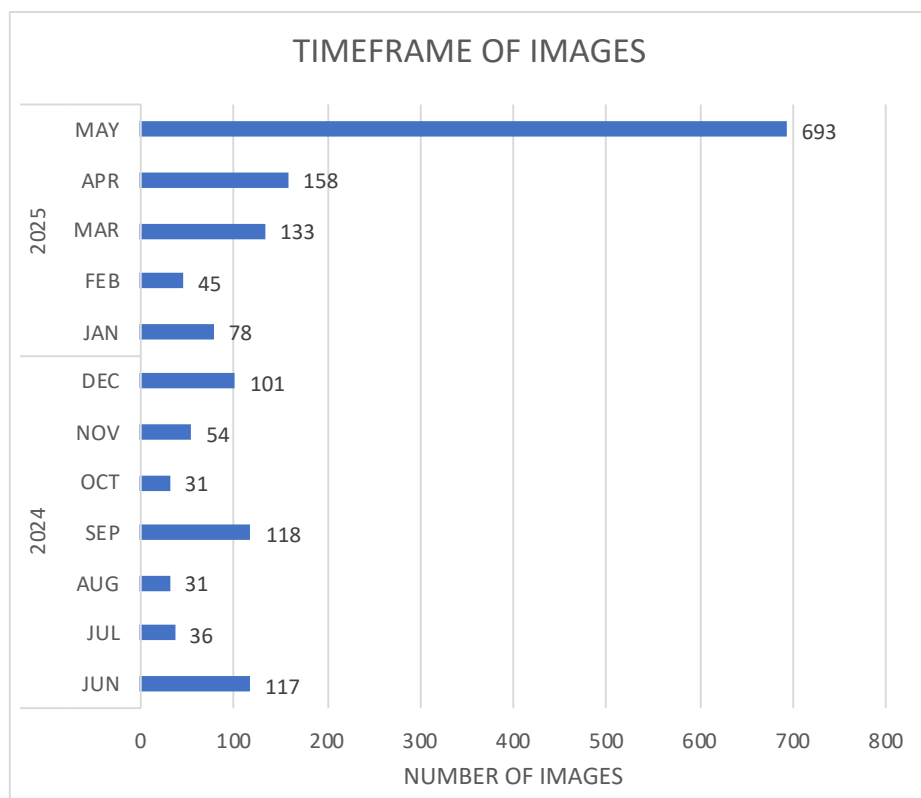


Figure 9: Timeframe for when images were obtained in 2024-2025.

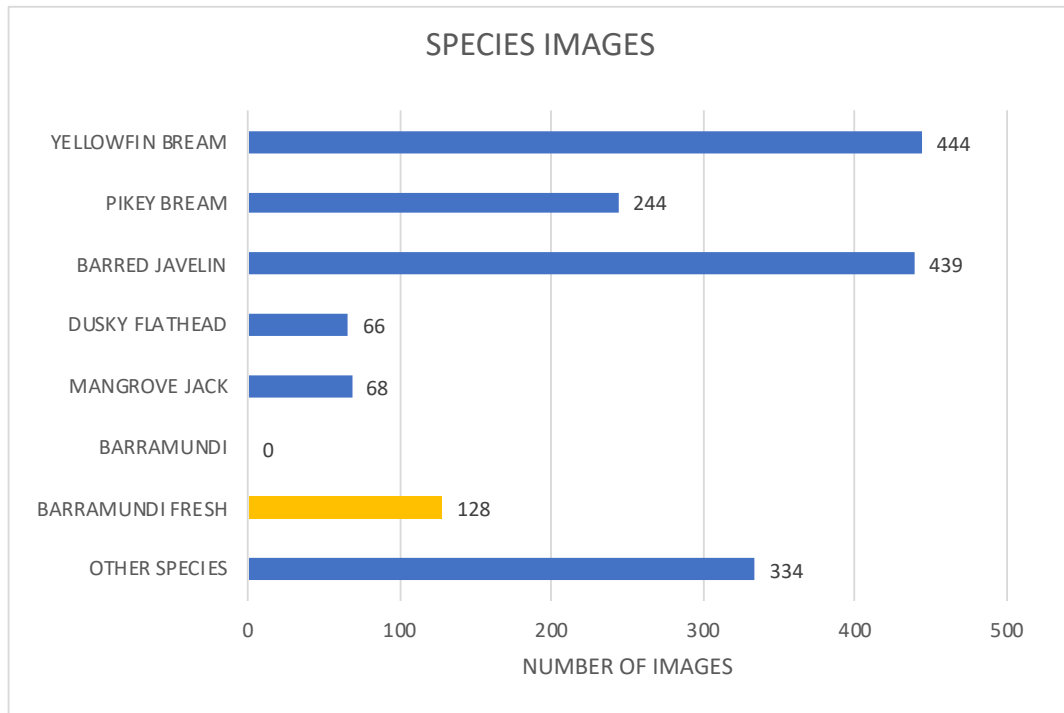


Figure 10: Number of images for each of the key species.

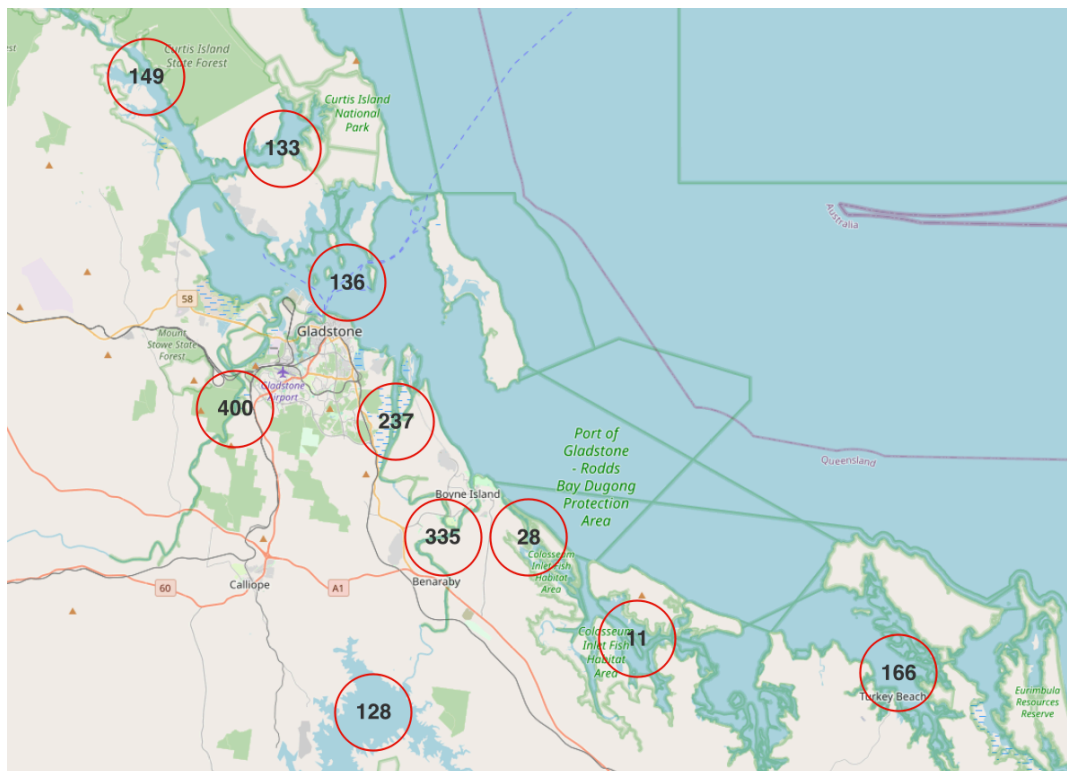


Figure 11: Number of images obtained at locations.

Figure 10 shows the number of images collected for each species and Figure 11 shows the general area from where the images were obtained for the key species. There was a total of 1,595 images of species in the study area. VFC was not assessed

for Barramundi as there were no images obtained in the study area. However, there were 128 Barramundi images obtained from Lake Awoonga (stocked fish) for comparison.

VFC was assessed based on images of the key species using human and machine assessments for each condition and the overall result was close to 100% agreement between the 2 methods.

Table 5: and Table 6 provide the severity of detection for fins and skin damage for the key species. The level of severity was mostly light active erosion for fins and no detections for skin. There were no detections for eyes in the key species, however 1 detection was recorded for a Grass Emperor. There was 1 detection for parasites in a Pikey Beam, and 2 detections of deformities in Yellowfin Bream and 1 detection in Pikey Bream.

Table 5: Severity score of variable fins condition for key species (eg YB = Yellowfin Bream) and the number of observations.

Fins	Score	YB	PB	BJ	DF	MJ	B
No Active Erosion	0	127	69	221	58	35	9
Light Active Erosion	10	314	174	185	8	31	3
Moderate Active Erosion with some haemorrhage	20	1	1	5	0	1	0
Severe Active Erosion with some haemorrhage	30	0	0	0	0	0	0

Table 6: Severity score of variable skin conditions for key species (eg YB = Yellowfin Bream) and the number of observations.

Skin	Score	YB	PB	BJ	DF	MJ	B
Normal no aberrations	0	442	244	411	66	67	12
Mild skin aberrations	10	0	0	0	0	0	0
Moderate skin aberrations	20	0	0	0	0	0	0
Severe skin aberrations	30	0	0	0	0	0	0

Table 7: shows the number of observations of VFC issues in images of the key species. Fin damage was the most detected issue across all species at 59% however was highest in Pikey Bream (72%) and Yellowfin Bream (71%). It was lowest for Dusky Flathead (12%). Fish handling, the use of inappropriate landing nets and containers for transporting the fish to the live weigh-ins are likely to have contributed to the moderate to high level of fin issues although most issues were classified as light.

Skin damage was not observed in any images. There was 1 detection for eyes in a Grass Emperor, 1 detection of a parasite in a Pikey Bream and 2 detections of deformities in Yellowfin Bream and 1 in a Pikey Bream.

Table 7: Observation of VFC issues in key species in 2024-25.

Species	Images	Fins	Skin	Eyes	Parasites	Deform-ities	GHHP score
Yellowfin Bream	444	315 (71%)	0	0	0	2 (0.5%)	0.94
Pikey Bream	244	175 (72%)	0	0	1 (0.4%)	1 (0.4%)	0.94
Barred Javelin	439	190 (43%)	0	0	0	0	0.96
Dusky Flathead	66	8 (12%)	0	0	0	0	0.99
Mangrove Jack	68	32 (47%)	0	0	0	0	0.96
<i>Barramundi</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>NA</i>
Key species	1261	720 (57%)	0	0	1 (0.1%)	3 (0.2%)	

5.2 FISH BODY CONDITION (FBC)

Fish Body Condition (FBC) was assessed using Relative Condition Factor (RCF) as used in previous years (Sawynok S et al 2020). There was a total of 331 fish of 5 species where length and weight were recorded at the BTHU live weigh-in (see Table 8 and Figure 12)

Figure 13 shows how many samples of key species were obtained from each location.

For each of the key species historic data recorded during the BTHU competition from 2014-2024 were used to generate the length-weight curve of best fit and subsequently to generate the parameters for each of the key species. Figure 14 shows the length-weight scatterplot for each of the key species showing the difference in length-weight.

Table 8: Numbers of fish where length-weight were recorded at the BTHU competition.

SPECIES	BTHU
Yellowfin Bream	248
Pikey Bream	68
Barred Javelin	2
Dusky Flathead	1
Mangrove Jack	12
Total	331

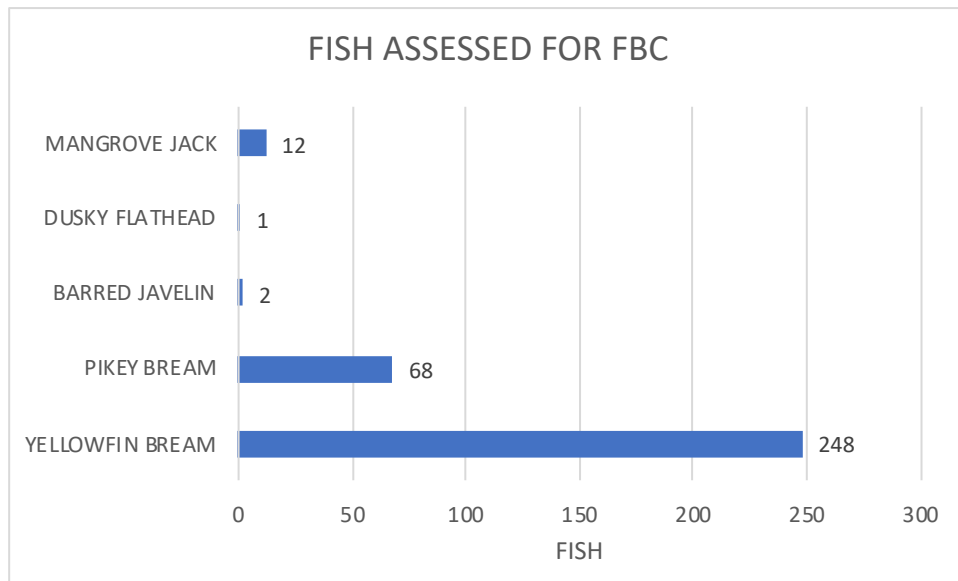


Figure 12: Numbers of fish where length-weight was recorded at the BTHU competition.

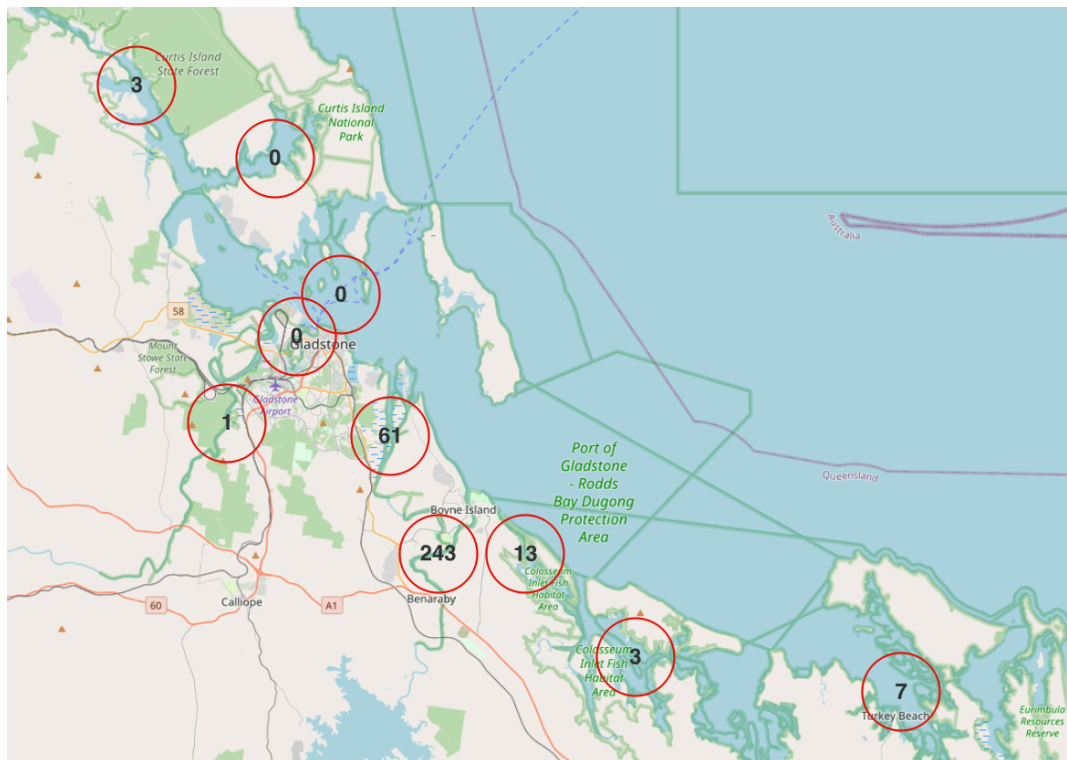


Figure 13: Number of samples at locations where length-weight was obtained at the BTHU competition for key species.

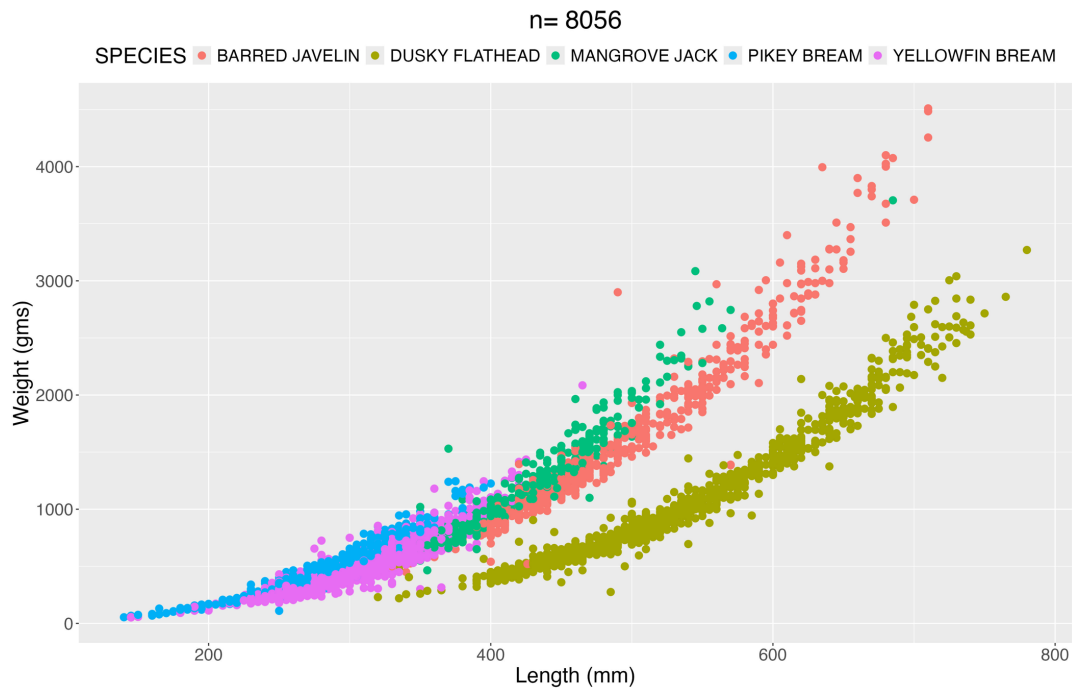


Figure 14: Length-weight data for the key species using the historic data from the BTHU from 2014-2024.

The historic length-weight data were plotted separately for each species with the red line the curve of best fit. FBC was recalculated using RCF for all years. For each year box plots show the distribution of FBC including the median, RCF, 25th and 75th percentiles, range and outliers. Note that FBC=RCF=1 means average condition and is indicated in each plot.

Figures 15, 17, 19, 21 and 23 show the length-weight plots for the 5 key species using historic data from the BTHU from 2014-2024 while Figures 16, 18, 20, 22 and 24 show the plots of FBC for each year from 2014-2025.

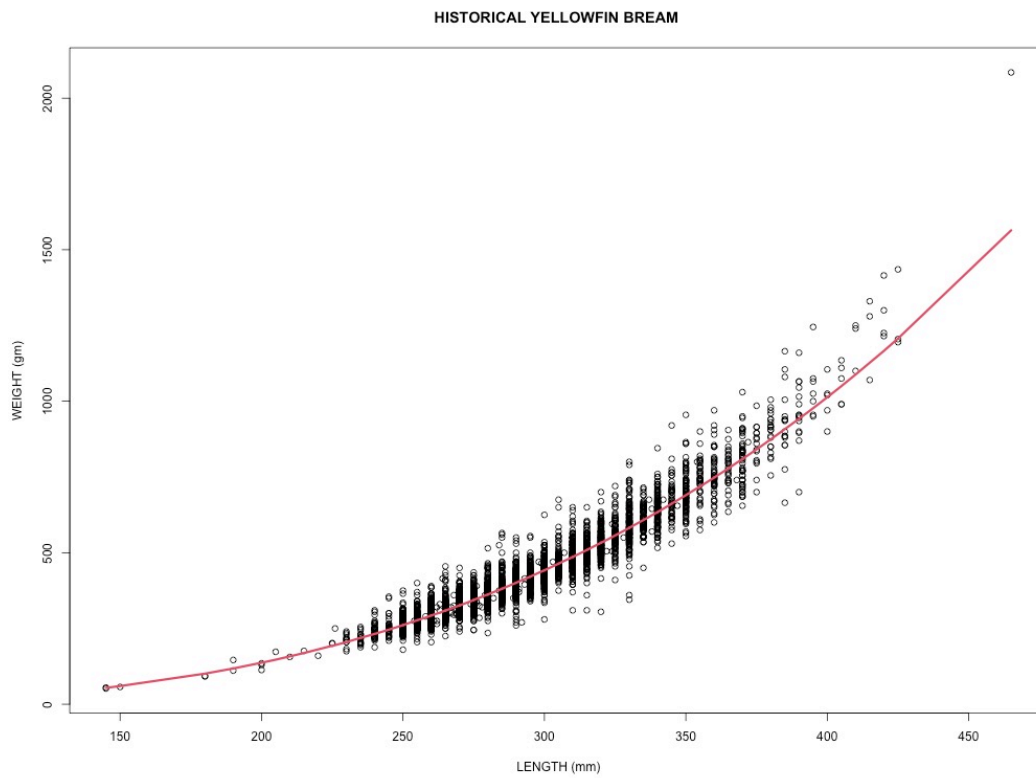


Figure 15: Length-weight plot for Yellowfin Bream using data from the BTHU from 2014-2025.

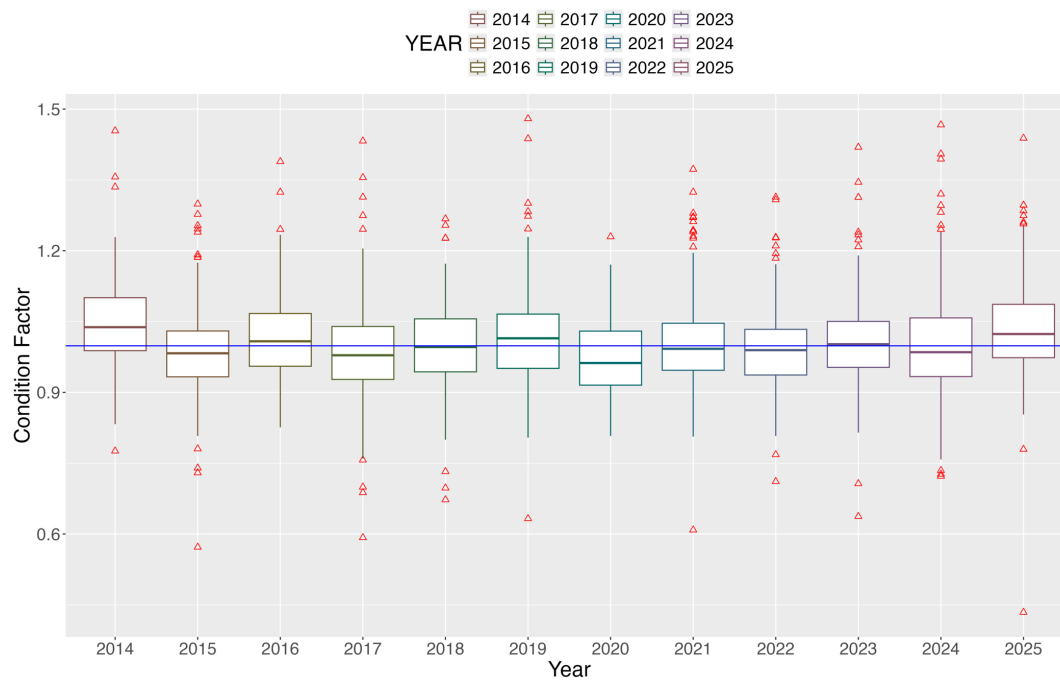


Figure 16: Plot of FBC for Yellowfin Bream from 2014-2025.

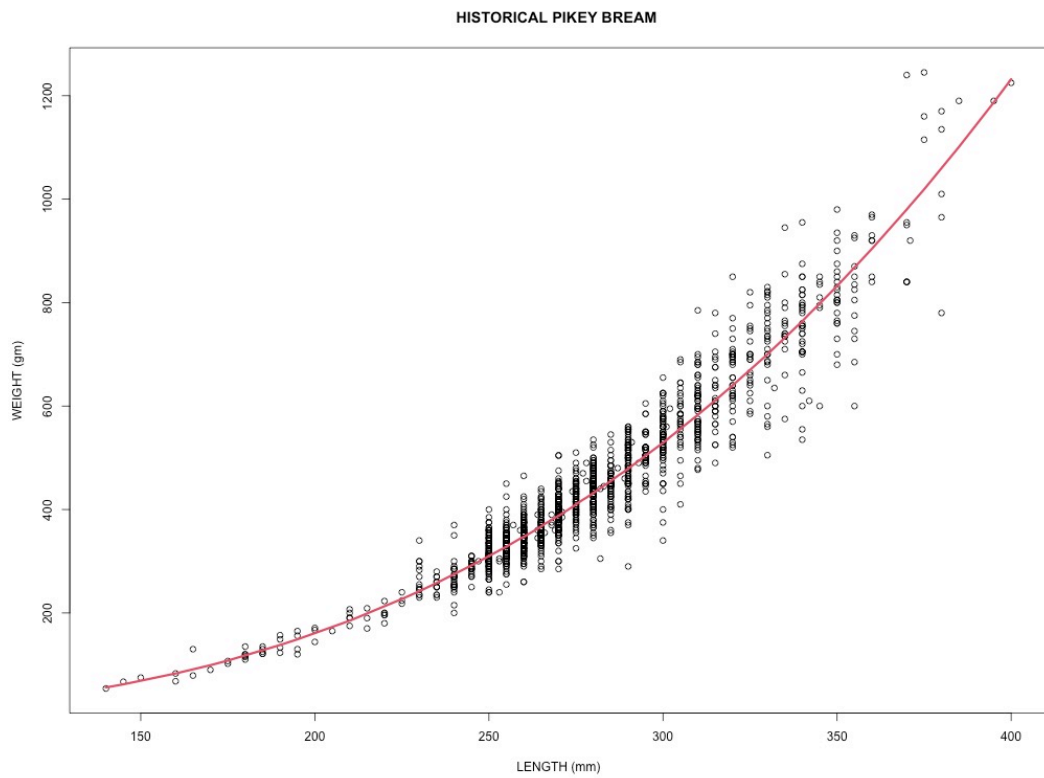


Figure 17: Length-weight plot for Pikey Bream using data from the BTHU from 2014-2025.

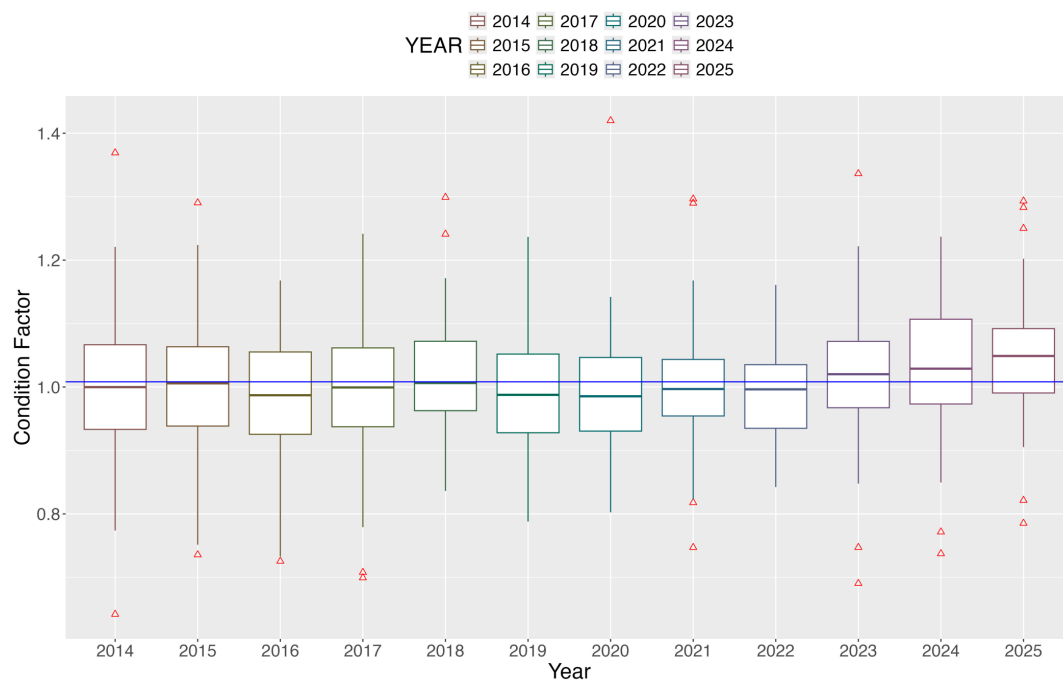


Figure 18: Plot of FBC for Pikey Bream from 2014-2025.

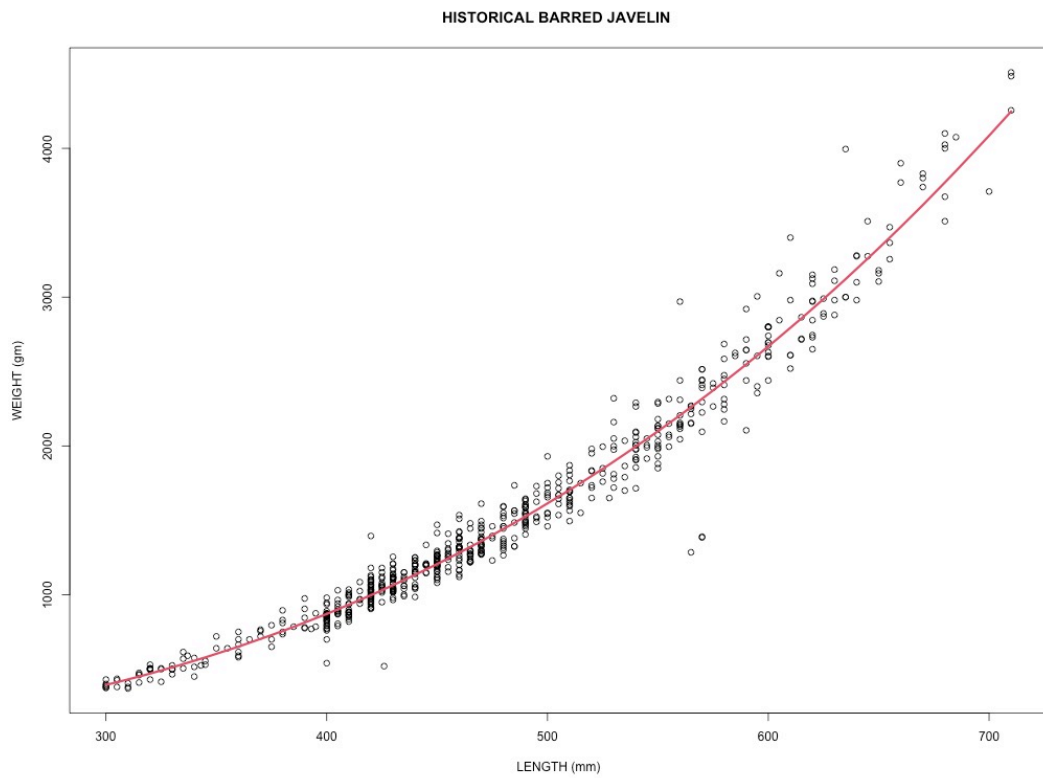


Figure 19: Length-weight plot for Barred Javelin using data from the BTHU from 2014-2025.

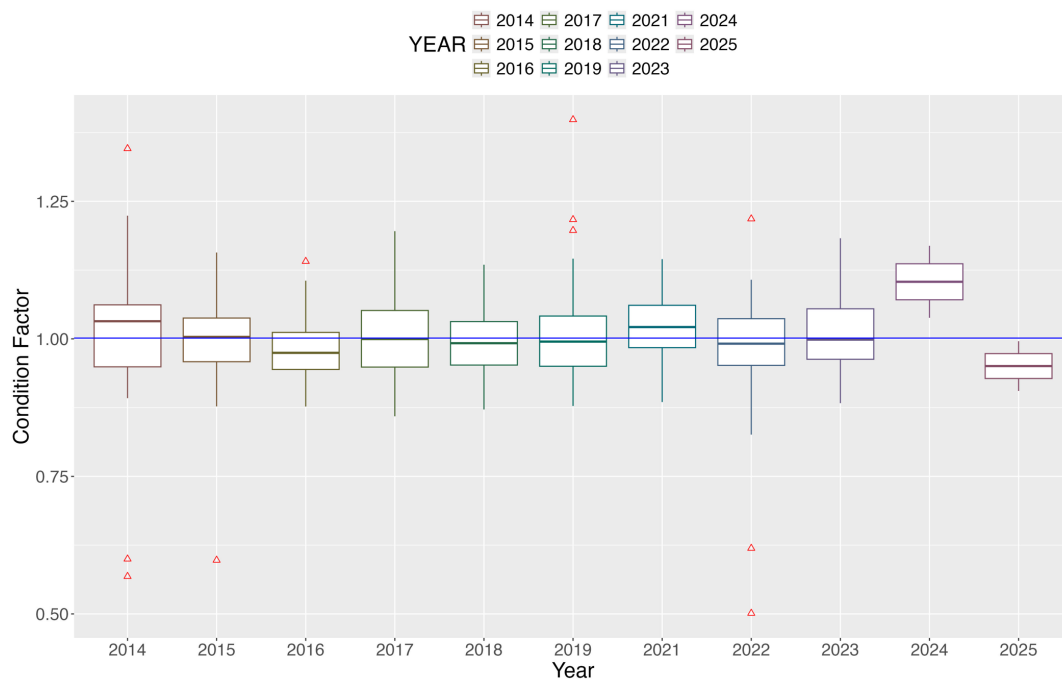


Figure 20: Plot of FBC for Barred Javelin from 2014-2025 (only 2 samples from 2024 and 2025).

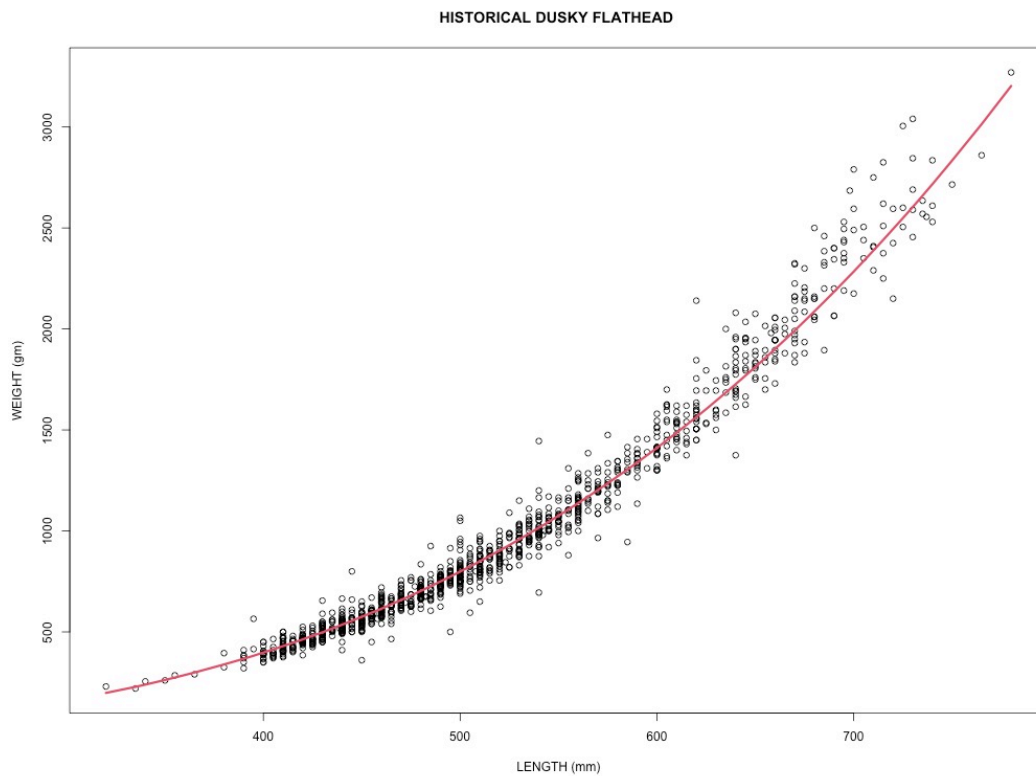


Figure 21: Length-weight plot for Dusky Flathead using data from the BTHU from 2014-2025.

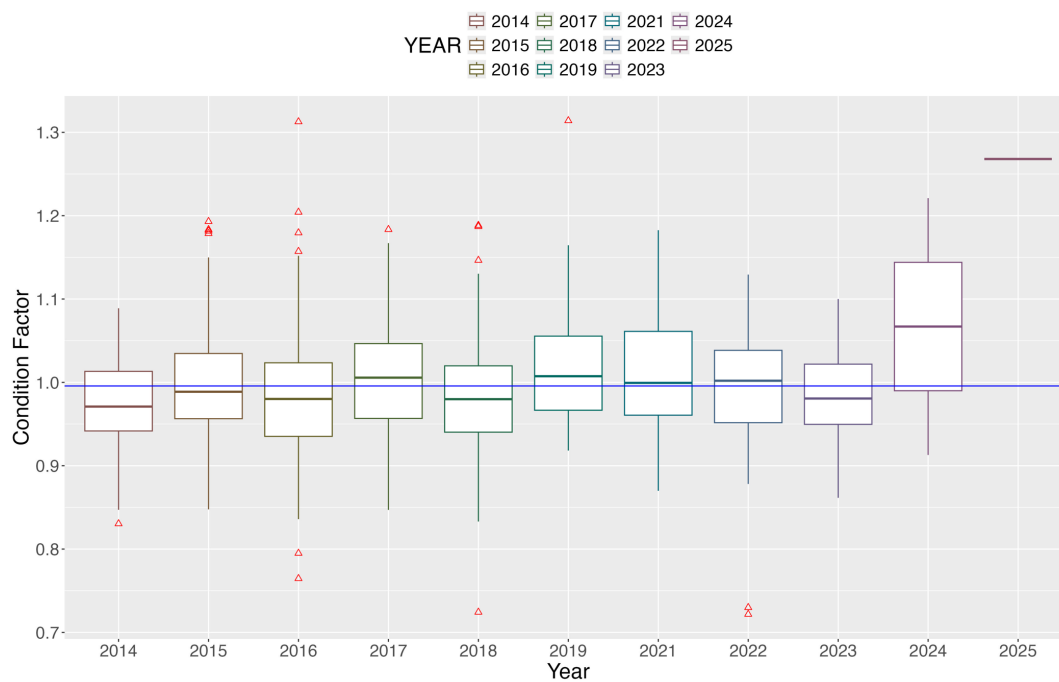


Figure 22: Plot of FBC for Dusky Flathead from 2014-2025 (only 2 samples from 2024 and 1 from 2025).

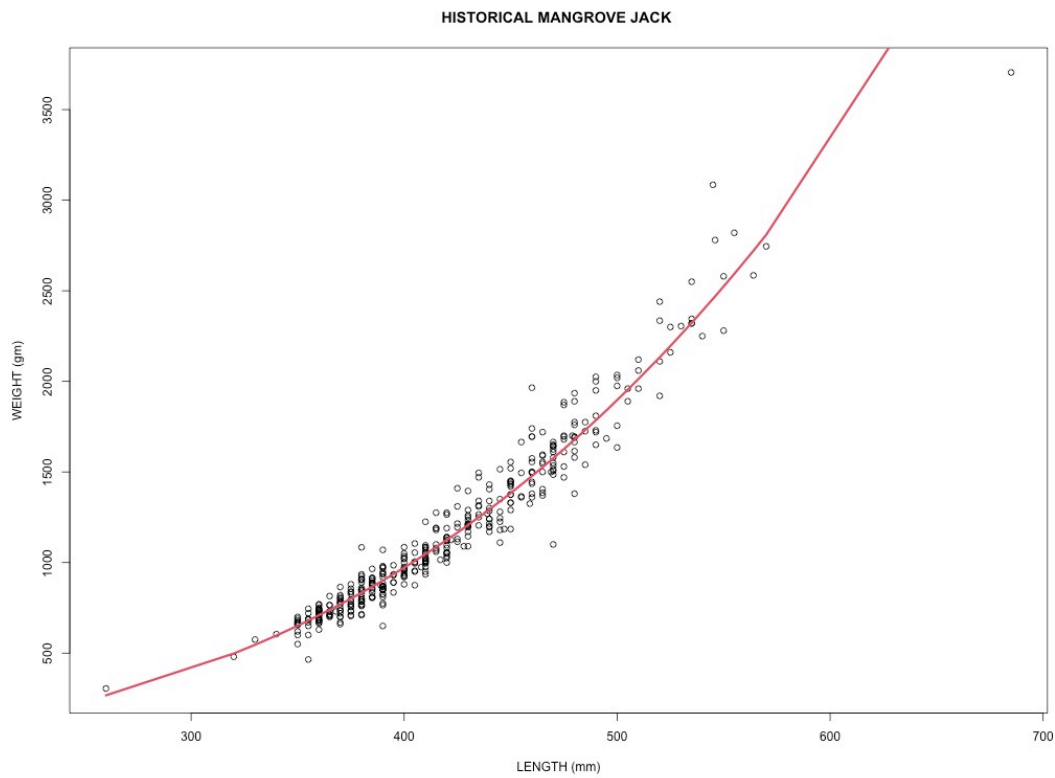


Figure 23: Length-weight plot for Mangrove Jack using data from the BTHU from 2014-2025.

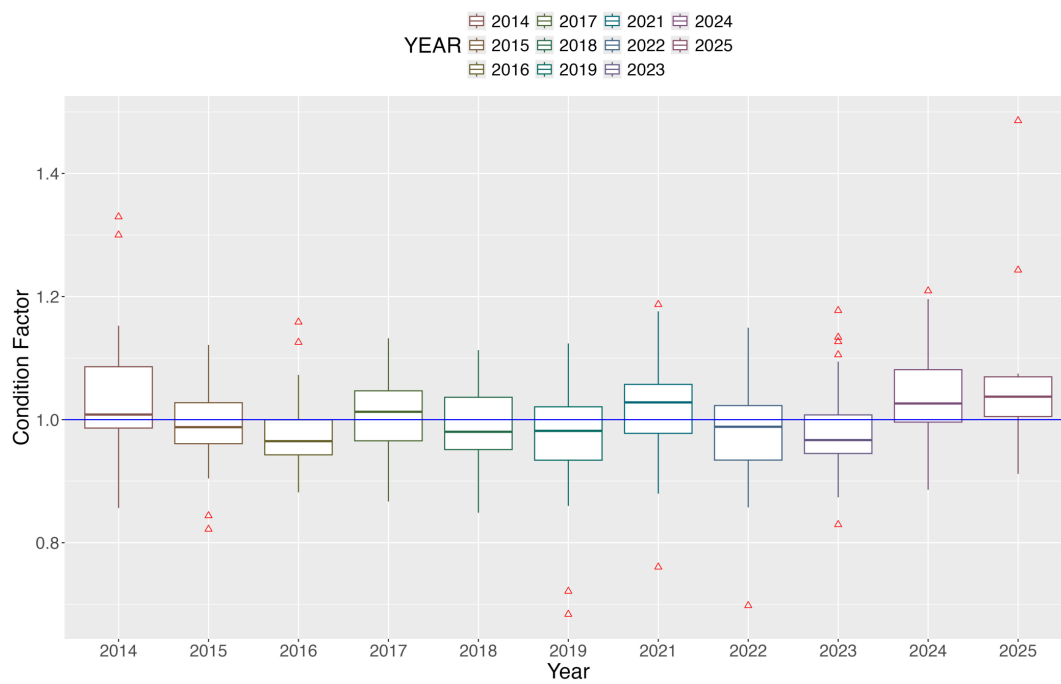


Figure 24: Plot of FBC for Mangrove Jack from 2014-2025 (12 samples from 2025).

Table 9 shows the FBC values calculated for the key species using the historic data from the BTHU from 2014-2025 where a and b are parameters in the model, while R^2 is a measure (between 0 and 1) of how well the model fits the data (with 1 being a perfect fit). Table 10 show the mean, median, minimum and maximum FBC from the historic data from 2014-2025. Table 11 shows the values calculated for 2025 and Table 12 shows the values converted to FBC scores and grades for 2025.

Table 9: FBC values for the key species using the historic data from the BTHU from 2013-2024.

SPECIES	Number Samples	a	b	R^2
Yellowfin Bream	4439	3.23E-05	2.881	0.917
Pikey Bream	1456	2.83E-05	2.936	0.928
Barred Javelin	627	5.74E-05	2.760	0.967
Dusky Flathead	1140	2.99E-06	3.122	0.962
Mangrove Jack	394	1.56E-05	2.996	0.940

Table 10: Mean, median, minimum and maximum condition factors for the key species from the historic data from the BTHU for 2013-2025.

SPECIES	Mean Condition	Median Condition	Minimum Condition	Maximum Condition
Yellowfin Bream	1.004	0.995	0.572	1.480
Pikey Bream	1.006	1.004	0.605	1.420
Barred Javelin	1.003	1.002	0.501	1.398
Dusky Flathead	1.000	0.993	0.626	1.476
Mangrove Jack	1.000	0.999	0.684	1.330

Table 11: Mean, median, minimum and maximum condition factors and standard deviation for the key species in 2025.

Species	Sample size	Mean Condition	Median Condition	Minimum Condition	Maximum Condition	Standard deviation condition
Yellowfin Bream	248	1.038	1.024	0.646	1.438	0.096
Pikey Bream	68	1.047	1.049	0.785	1.293	0.093
<i>Barred Javelin</i>	<i>2</i>	<i>0.951</i>	<i>0.951</i>	<i>0.905</i>	<i>0.996</i>	<i>0.064</i>
<i>Dusky Flathead</i>	<i>1</i>	<i>1.268</i>	<i>1.268</i>	<i>1.268</i>	<i>1.268</i>	
<i>Mangrove Jack</i>	<i>12</i>	<i>1.074</i>	<i>1.037</i>	<i>0.912</i>	<i>1.486</i>	<i>0.154</i>

Table 12: Mean, median FBC scores and standard deviation for the key species in 2025.

Species	Mean Score	Median Score	Standard Deviation Score	Mean Grade
Yellowfin Bream	0.68	0.60	0.11	B
Pikey Bream	0.71	0.72	0.11	B
<i>Barred Javelin</i>	<i>0.18</i>	<i>0.18</i>	<i>0.07</i>	<i>E</i>
<i>Dusky Flathead</i>	<i>2.19</i>	<i>2.19</i>		<i>A</i>
<i>Mangrove Jack</i>	<i>0.96</i>	<i>0.73</i>	<i>0.24</i>	<i>A</i>

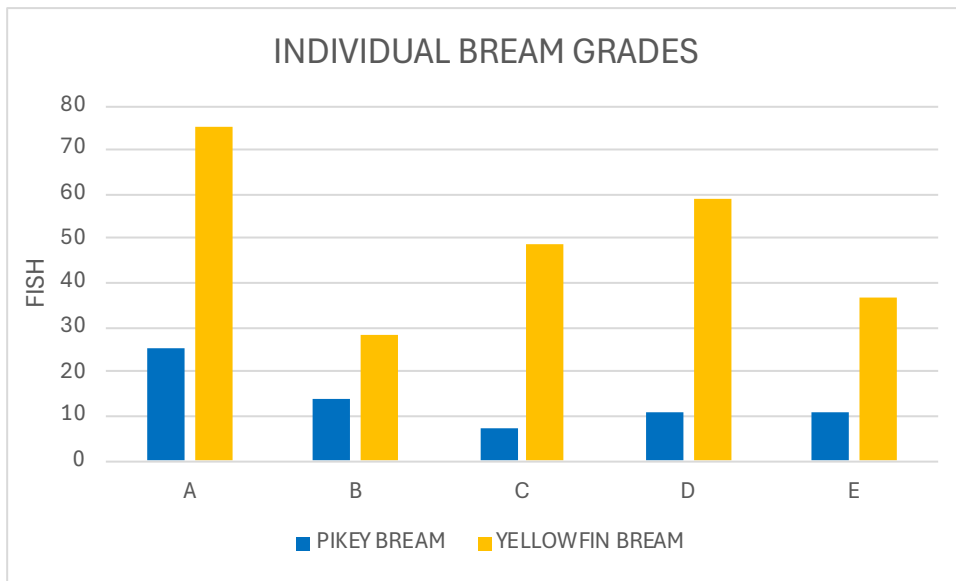


Figure 25: Number of Yellowfin and Pikey Bream in grades A-E in 2025.

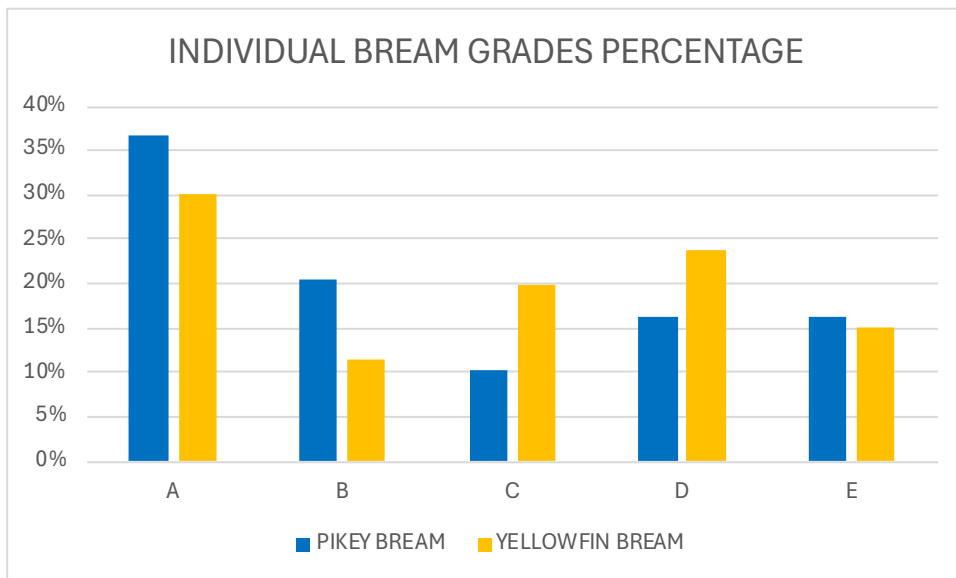


Figure 26: Percentage of Yellowfin and Pikey Bream in grades A-E in 2025.

Grades for individual fish for Yellowfin and Pikey Bream are shown in Figure 25 while the percentage of fish in each grade are shown in Figure 26. There were 30% of Yellowfin Bream with an A grade while there were 15% with an E grade. For Pikey Bream 37% were A grade and 16% were E grade.

5.3 CALLIOPE RIVER FLOWS AND LAKE AWOONGA LEVELS

Rainfall and river flows play an important role in the dynamics of fish populations. In the Gladstone area river flows in the Calliope River are indicative of flows in streams in the study area and can influence the dynamics of the key species. When Lake Awoonga spills it allows fish in the lake to enter the Boyne River and move beyond and can have a significant impact on fish health in the area as occurred in 2011 (Department of Agriculture, Forestry and Fisheries 2013).

Figure 27 shows the monthly flow and the mean monthly flow in the Calliope River at Castlehope over the last 10 years from 1 January 2016 – 31 May 2025. Figure 28 shows the Awoonga lake level at the dam wall over the same period. Lake Awoonga last spilled in March and November 2017 and flows in the Calliope River were the highest at that time with 197,797ML in March 2017. Since then, monthly flows have mostly been below monthly means and wet season flows have been well below the mean.

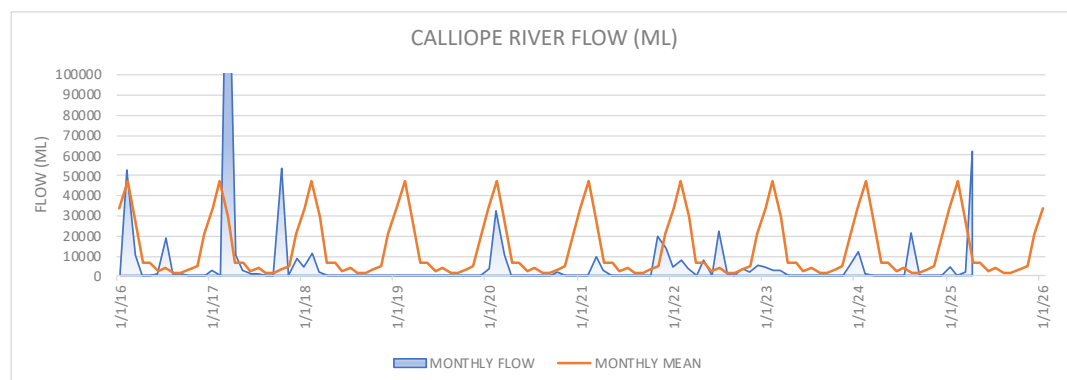


Figure 27: Calliope River flows and mean monthly flows (ML) July 2018 – May 2024.

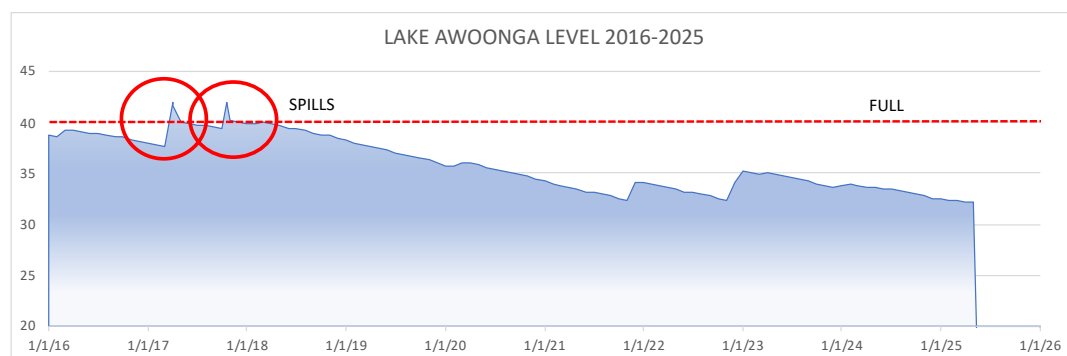


Figure 28: Awoonga lake levels and dam wall height (full level 40m).

5.4 SPECIES SCORES AND GHHP GRADES

Table 13 shows the VFC and FBC scores that were averaged to provide a species FC score on a 0-1 scale that were converted to GHHP grades from A-E. The following table provides a summary of the scores and grades including the image numbers (VFC) and sample sizes (FBC) in brackets. All of harbour scores were calculated for each metric by averaging over fish species, and an overall harbour score was finally calculated as the average of those scores. The all of harbour FC score was 0.83 based on the average FC for Yellowfin Bream and Pikey Bream and the grade was B. The FC grade for Yellowfin Bream was B, and for Pikey Bream was A. The FC grades for Barred Javelin, Dusky Flathead, and Mangrove Jack were all A, based on VFC only. The FC grade was not available for Barramundi however was A for fish in Lake Awoonga.

Table 13: GHHP scores and grades for the 6 key species (figures in brackets are sample size) for the 2025 report card.

Species	Visual Fish Condition (VFC)	Fish Body Condition (FBC)	Fish Condition (FC)	GHHP Species Grade
Yellowfin Bream	0.96 (444)	0.67 (248)	0.82	B
Pikey Bream	0.99 (244)	0.71 (68)	0.85	A
Barred Javelin (VFC only)	0.96 (439)	0.18 (2)	0.96	A
Dusky Flathead (VFC only)	0.94 (66)	2.10 (1)	0.94	A
Mangrove Jack (VFC only)	0.94 (68)	0.96 (12)	0.94	A
<i>Barramundi</i>	NA (0)	NA (0)	NA	NA
All of harbour	0.96	0.69	0.83	B

5.5 VFC COMPARISON BY LOCATION

Population levels of Barramundi in the study area are low and this year there were no images recorded in the study area. Following restocking of Lake Awoonga since 2022 the Barramundi population there has increased. There were 128 images of Barramundi collected from the lake during the ABT Barramundi tournament in September 2024. These provide an assessment of VFC that is relevant as when the dam spills fish can enter the study area.

Table 14 shows the number of severity scores for fins and skin while there were no detections made in relation to eyes, parasites, or deformities. Table 15 shows the VFC scores and grade for fish from Lake Awoonga while FBC was not assessed.

Table 14: Severity score of variable fins and skin condition for Barramundi in Lake Awoonga with the number of detections.

Fins	Score	Fish
No Active Erosion	0	57
Light Active Erosion	10	71
Moderate Active Erosion with some haemorrhage	20	0
Severe Active Erosion with some haemorrhage	30	0

Skin	Score	Fish
No Active Erosion	0	58
Light Active Erosion	10	70
Moderate Active Erosion with some haemorrhage	20	0
Severe Active Erosion with some haemorrhage	30	0

Table 15: GHHP scores and grades for Barramundi in Lake Awoonga (figure in brackets is sample size).

Species	Visual Fish Condition (VFC)	Fish Body Condition (FBC)	Fish Condition (FC)	GHHP Species Grade
Barramundi	0.92 (128)	NA	0.92 (VFC only)	A

6. DISCUSSION

This year the total number of images at 1,261 for key species exceeded the target of 800 and there were 1,595 images for all species in the study area. There was an increase in the number of Gladstone Sportfishing Club members that used the Suntag app for their normal tagging activities this year and this resulted in sufficient images being obtained for all key species except Barramundi. It was expected that getting the required number of images of Barramundi would be difficult due to the low level of stock in the study area and that proved to be the case with no images being obtained.

VFC for all species is shown in Appendix 1 which indicates that apart from fin issues there were very low levels of issues with skin, eyes, parasites, and deformities across all species. Fish handling, the use of inappropriate landing nets and containers for transporting the fish to the weigh-in stations are likely to have contributed to the moderate to high level of fin issues although most were classified as light.

The Boyne Tannum Hookup fishing competition has been used to collect FBC data for several years through the live weigh-ins where length and weights are collected.

This has been a cost-effective way of obtaining that data. However this year Barred Javelin and Dusky Flathead were not included in the live weigh-in and it was really only effective for Yellowfin and Pikey Bream. Also this year, due to several factors, length-weight data were only collected at Bray Park and not at the Gladstone Marina. This reduced the number of samples obtained however there were adequate numbers of the Bream species. Even if weights were collected at the marina this would have mainly boosted the Bream numbers, with little change in the results.

The Boyne Tannum Hookup committee have advised that this would be their last year, so the future of the competition is uncertain unless an alternative way of running the event is found. Even if the event goes ahead next year, it will most likely only be suitable for collecting length-weight data for the Bream species and possibly Mangrove Jack.

It is possible to undertake additional field work to obtain length-weight and this would need to aim for legal fish, to get data to compare with previous years. Obtaining additional legal samples to meet the requirements for the key species was not included in the initial proposal and there is likely to be a significant cost associated with getting additional samples. This is something that GHHP will need to consider.

The incidence of fish health issues is often associated with flooding or high flows affecting salinity in the rivers and creeks and the harbour. The last spilling of Lake Awoonga was in 2017 and flows in the Calliope River have mostly been well below the mean monthly flows since 2018. The exception was 2022 which was a wet year however even then the wet season flows were still below the long-term mean. The 2025 wet season was also well below the long-term mean. This is likely to have contributed to the health status of fish.

7. REFERENCES

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9. Stefan Sawynok, Bill Sawynok and Phoenix Sawynok, Infofish Australia Pty Ltd (2024), Fish condition health indicators for the Gladstone Harbour Report Card 2024, Gladstone Healthy Harbour Partnership, Gladstone Queensland

APPENDIX 1: VISUAL FISH CONDITION OBSERVATIONS AT GLADSTONE

Table 16: VFC detections for all species at Gladstone 2024-25.

Species	Images	Fins	Skin	Eyes	Parasites	Deformities
Australian Strippey	1	0	0	0	0	0
Barcheek Coral Trout	1	0	0	0	0	0
Barramundi	13	3	0	0	0	0
Barred Javelin	439	190	0	0	0	0
Bartail Flathead	3	0	0	0	0	0
Black Jewfish	2	1	0	0	0	0
Blackspotted Rockcod	15	5	0	0	0	0
Blotched Javelin	1	1	0	0	0	0
Blue Threadfin	43	7	0	0	0	0
Bream	14	9	0	0	0	0
Butter Bream	2	0	0	0	0	0
Crab	1	0	0	0	0	0
Dusky Flathead	66	8	0	0	0	0
Forktail Catfish	3	0	0	0	0	0
Giant Trevally	4	3	0	0	0	0
Golden Snapper	51	29	1	0	0	0
Goldspotted Rockcod	86	26	0	0	0	0
Grass Emperor	74	29	0	1	0	0
Grinner	2	2	0	0	0	0
Kingfish	2	0	0	0	0	0
Mangrove Jack	68	32	0	0	0	0
Moses Snapper	2	0	0	0	0	0
Pikey Bream	244	175	0	0	1	1
Queenfish	3	0	0	0	0	0
Rock Flathead	1	1	0	0	0	0
Saddletail Snapper	1	0	0	0	0	0
Sand Flathead	2	1	0	0	0	0
Speckled Javelin	2	0	0	0	0	0
Tailor	3	2	0	0	0	0
Tripletail	1	1	0	0	0	0
Whitespotted Rockcod	1	1	0	0	0	0
Yellowfin Bream	444	3115	0	0	0	2
All species	1595	863	1	1	1	3
Percentage		54%	0.1%	0.1%	0.1%	0.2%

Species	Images	Fins	Skin	Eyes	Parasites	Deformities
Barramundi (Awoonga)	128	12	0	0	0	0
Percentage		9%	0	0	0	0