

Tableland Fish Stocking Society (TFSS)--

AGM 2022

Monitoring our stocking activities

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Why are we monitoring?

The new Queensland fish stocking Policy (December, 2020) requires groups to do their own “monitoring” to meet the requirements of the management plans they put forward to obtain permits to stock.

We are required to implement:

“A monitoring, evaluation and improvement component (to) Assess the project in terms of its stated objectives by using quantitative measures of success (and) Use adaptive management to evaluate and improve management strategies and tactics “

What are we monitoring?

Our core measurements of stocking success relate to **survival**, **growth** and **condition** of barramundi and sooty grunter from each mass stocking.

Survival can be inferred by the appearance of large peaks in numbers of “rats” in the months following each stocking. These peaks can then be followed through subsequent years by electrofishing surveys commissioned by the TFSS, in catches of annual fishing competitions, and in “citizen science” initiatives involving angler diaries and monitoring “Apps”.

It appears that barramundi do not get caught much by anglers until they are over about 40 cm long. Members report this is because they are inhabiting deep cover in the weeds and very shallow water not fished by anglers. Above this length they move into deeper water – perhaps switching to bony bream as predominant prey.

The peaks in the length frequency plot below have been updated to September 2022. The main points to note are:

- The 2017 and 2021 stockings produced strong “cohorts” of fish visible within months
- Stockings from 2018 and 2019 cannot be distinguished in catches within those years
- Barramundi of 300mm length in 2017 had grown to around 800mm in 2022
- Barramundi of 400mm length in 2017 had grown to around 900mm in 2022
- Growth of fish is not linear – it tapers off as fish get bigger, until it ceases
- Hence the biggest fish are a mix of many indistinguishable stockings
- The low numbers in the 2022 Barra Bash were due to low water temperatures around 22 deg C in September.

Growth of stocked Barramundi in Lake Tinaroo 2017 – 2022

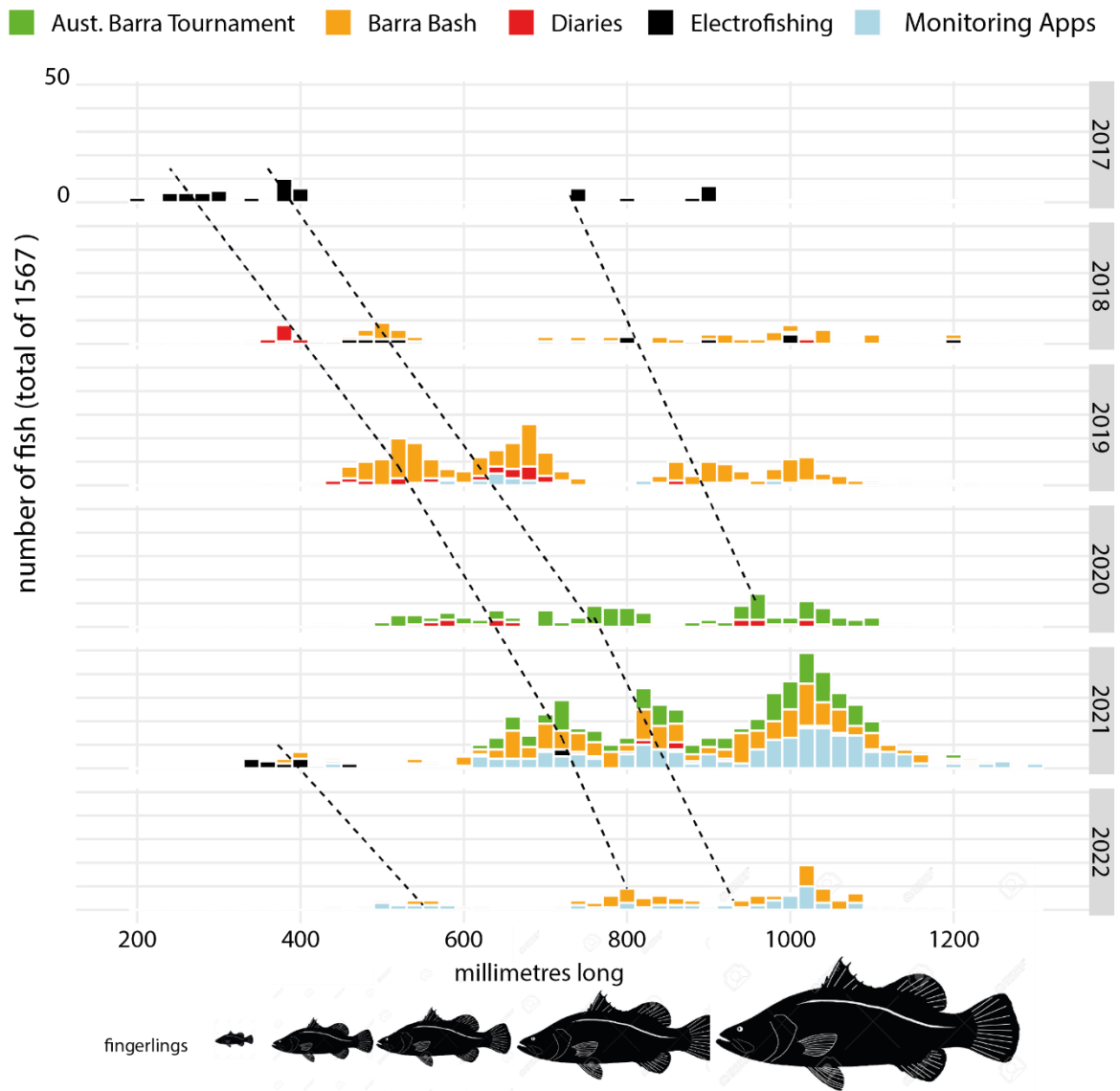


Figure 1 Caption: Growth of stocked fingerlings is being tracked through time from anglers' catches. This graph shows the stocking in the wet seasons of 2016 and 2017 produced a "cohort" of fish in the 300's (millimetres) and high 200's in 2017. These 2 groups of fish reached the 80's and 90's (centimetres) respectively by 2022 (blue curves). Fish stocked in 2020 had reached about 300-400mm in 2021 and 500-600mm in 2022.

Sooty grunter was stocked again in small numbers in 2022. It will be informative to monitor the appearance and growth of the new cohort of small sooty grunter once they appear in Figure (2).

Growth of stocked sooties in Lake Tinaroo 2017 – 2022

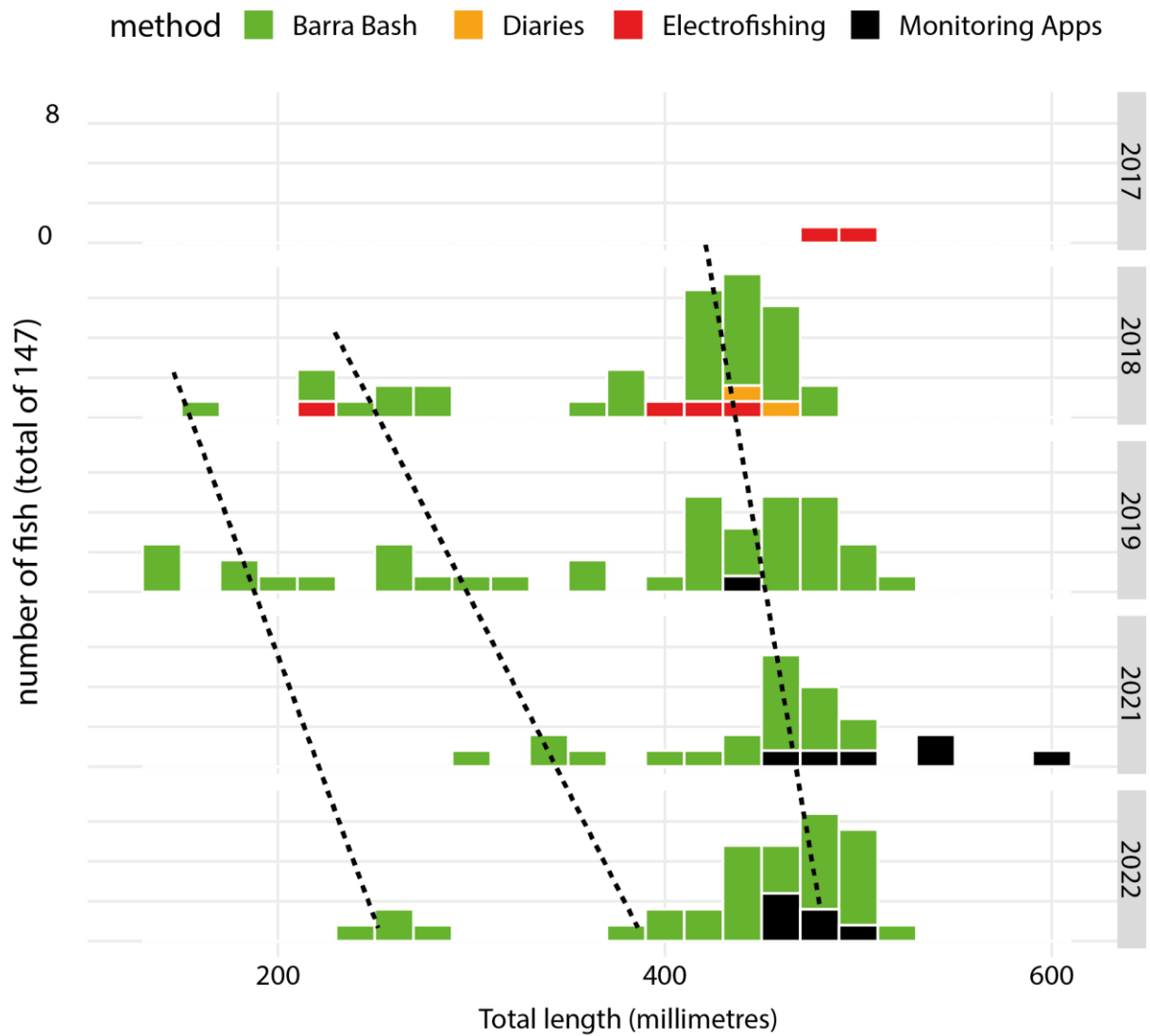


Figure 2 Caption: The large stocking of sooty grunter in 2022 should appear in the 2023 update of this length frequency compilation.

Fish Condition from Body ratios

Apart from electrofishing, all our monitoring is based on photographs. The fishing events on the dam are all catch-and-release, with entries based on photographs.

We are also assessing fish condition using a novel technique of virtual measurements from archived photographs using “Screen Callipers”[®] software.

Fish Condition Factor

= sum of BD + AD, divided by TL, then multiplied by 100 $\{(BD + AD)/TL \times 100\}$

From photos, in real or “virtual” units of length

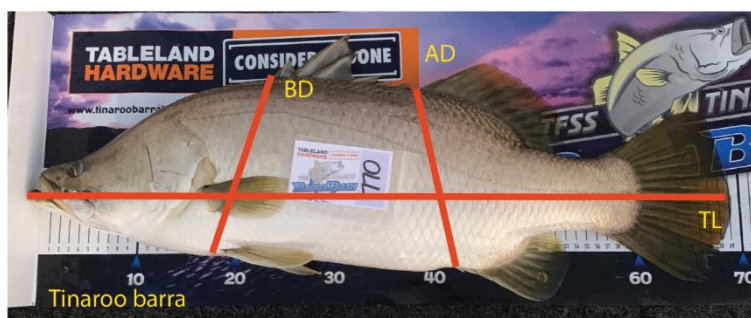
BD= Body depth ; straight line from insertion of first dorsal down to insertion of ventral fins

AD= Anal body depth; straight line from insertion of 2nd, soft, dorsal fin to insertion of anal fin

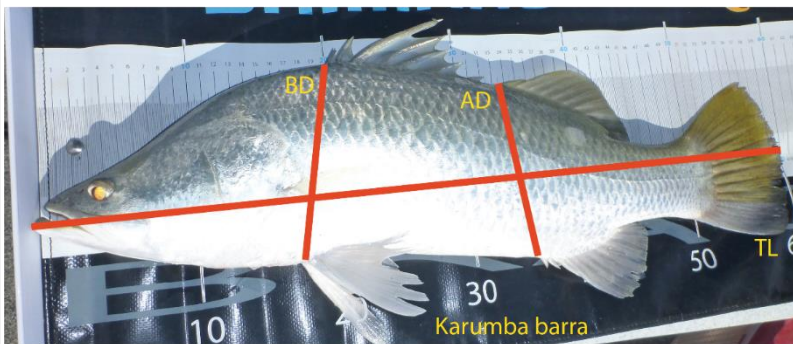
TL= maximum length from tip of tail to tip of lower jaw

These measurements include **ratios of body depth to fish length at two locations on the fish**. These ratios capture the differences between fat and lean fish.

The higher the number, the fatter the fish.....



Tinaroo fish condition factor = 53



Norman River fish condition factor = 49

Lean fish in impoundments can be a signal of “overstocking” if food chains are insufficient to support continual addition of fish.

The benchmark the TFSS will use is the same ratios from wild, estuarine fish from the Gulf of Carpentaria and Hinchinbrook Channel. These have been supplied by fishing guides and TFSS members.

“The Barra Bash”

The annual “Barra Bash” event organised and hosted by TFSS provides an ideal snapshot of fish stocks each year, as a very large numbers of anglers fish the whole dam using all available techniques and hook

sizes. There is also an incentive to provide a standard photograph of fish of all sizes against a standard measuring mat (the “Brag Mat” issued to all participants).

The growth of the stocked barramundi and sooty grunter can be seen from event to event through time (Figures 1 and 2).

The Sweetwater “Monitoring App”

We are now advertising the easy-to-use “Sweetwater” smartphone app to allow anglers to provide lengths and dates of fish capture with photographs. No geocoding is used on images, so we do not record “spots” of capture.



Signage with “QR Codes” has been erected by the TFSS at major boat ramps to enable adoption of the “App”. Ian Leighton and other members installed the signage with posts and concrete at major entry points to the lakeside during working bees. The “App” is advertised on social media by way of monthly prizes from a random draw of entries.

Adoption was slow at first but rose very fast in the spring of 2021 before dropping away to zero in winter 2022. There has been a sudden upsurge in entries since this report was drafted in coincidence with rising water temperatures above 25 deg C.



Entries on the Sweetwater Monitoring App are lower in 2022 than the same time last year. Photo courtesy of Gary Fitzgerald (App designer and maintainer).

The TFSS has been actively distributing laminated cards and tacklebox stickers featuring the QR code to the public and members at fish stockings. We are particularly grateful to **Terry Connolly** (a Governor in the TFSS) for intercepting anglers on the dam to encourage participation and personalised feedback on the monitoring. He is also the major contributor of catches to the “App”.

Submissions are now rising again with rising water temperatures in the dam, but not at the rate experienced when it was launched in 2021. The “novelty” may be wearing off, or the relentless south-east trade winds and La Nina rain conditions may have reduced effort on the dam in winter. Monthly prizes from random draws are available for participants in the monitoring App and it is heartening to note the prevalence of juvenile anglers in the prize-winning pool.

There have been no “nuisance” entries on the App, but the quality of the photographs continues to be low (about 50%) for use in measuring body ratios. This is partly because many fish are caught at night and are being cradled by the angler in photos – rather than photographed against a brag mat.

How about disease?

Our members have noticed dead diseased barramundi occur mainly in very large size classes (“metries”) and mainly in both the cold snaps of winter and the sudden falls in water temperature during flooding inflows.

In 2019 detailed analysis of all body parts of diseased fish by veterinary fish pathologists from the Queensland Government ruled out an epidemic of an infectious agent (such as a virus), and the fish were found to be suffering from an underlying range of internal organ failures and parasite loads. It was concluded that these were **old fish with depressed immune systems**, stressed by colder temperatures, succumbing to secondary bacterial infections blooming in minor cuts and scrapes.

The pathology reports are available for members and managers to read if required. This work was followed up by microbiologists from **James Cook University** who cultured swabs of bacteria from the diseased fish in the laboratory. That work was inconclusive.

Otoliths (earstones) of those diseased fish were also collected and sent to **Dept of Agriculture and Fisheries** for ageing to confirm that old age was a factor in the deaths. **No results have been received yet.** Previous tag returns have shown fish older than 20 years in the dam.

The photos from the “App” and “Barra Bash” are examined now for signs of infection.



This 105cm barra was found in the Barron Arm during the September Barra Bash 2022 when the water was 22.8 degrees Celsius. The ulceration is typical of the fish examined by fish pathologists in 2019. Photo courtesy Dan Hammersley (TFSS member).

Unlike the large numbers evident on the dam in 2019, few dead and diseased fish were reported in winter 2022 and all were large. One was tagged, and the TFSS is following up the release details.

Conclusions and Recommendations

1. Electrofishing is the best way to detect fingerling presence and growth from stockings within the year.
2. Stockings from 2018 and 2019 cannot be distinguished in the length frequency plots. This may indicate those years were poor. The TFSS could investigate this further by examining dam levels, inflows and timing of stockings in those years to try and understand this lack of apparent success.
3. It is too early to detect the presence of the 2022 stocking of small sooty grunter.
4. The TFSS **could consider** stocking barramundi every second year to allow fingerlings to reach about 400mm long, when they leave the juvenile habitats in the weeds and join the fishery in open water to feed on bony bream. This could free newly-stocked fingerlings from predation pressure by the previous season's juveniles dwelling in the bankside shallows.
5. Sooty grunter and mangrove jack could be stocked in the years between barramundi introductions.
6. Such a strategy might be problematic with securing continued supply of quality fingerlings with our loyal suppliers.
7. The "novelty" may be wearing off the Sweetwater App, or the La Nina conditions may have reduced effort and participation
8. The new scoring app for the "Barra Bash" designed and implemented by TFSS member **James Masterman** has provided immediate and easily accessible data for monitoring. There is high quality control flawlessly linking photos on brag mats against fish lengths.
9. The Australian Barra Tournament is also providing valuable data, although there may some bias away from small fish to larger size classes.
10. The "Barra Bash" includes all forms of line-fishing such as live-baiting, dead baiting with small baits, and lure fishing. It is therefore not subject to the sampling biases of targeting large trophy fish for competition points.
11. Measurements of body ratios for fish condition factors are in the early stages of data gathering, and will be tabled in 2023.
12. Both the "Barra Bash" and the Sweetwater App allow the TFSS to collate the postcodes of anglers to determine the local and tourist participation in catches of fish.
13. In the complete absence of ANY government-funded destruction of Tilapia, stocking of Barr, Jacks and Sooties, and fishing competitions, are the only human induced pressure in controlling their numbers in Tinaroo. Surely shags and pelicans would probably eat them but Barra definitely do. One wonders what Tinaroo Tilapia schools would look like in the absence of Barra??

This report will be written as an update and posted on the "Tinaroo Barra Bash" FaceBook page after submission to DAF (Thomas Hart)