

Invasive brown bullhead catfish tagging in Lake Rotoiti reveals how control efforts can be targeted

Summary snapshot

Project contact: Robin Holmes

Brown bullhead catfish in Te Arawa Lakes are more mobile than previously thought. A new acoustic tagging study in Lake Rotoiti has shown that catfish are easiest to target with trapping control methods in spring / summer, when they almost exclusively occupy shallow nearshore areas. During the cooler months, they become more mobile and spread out across deeper, mid-water parts of the lake, where current trapping methods will be ineffective. For more information, see Blanchfield et al. (2026).

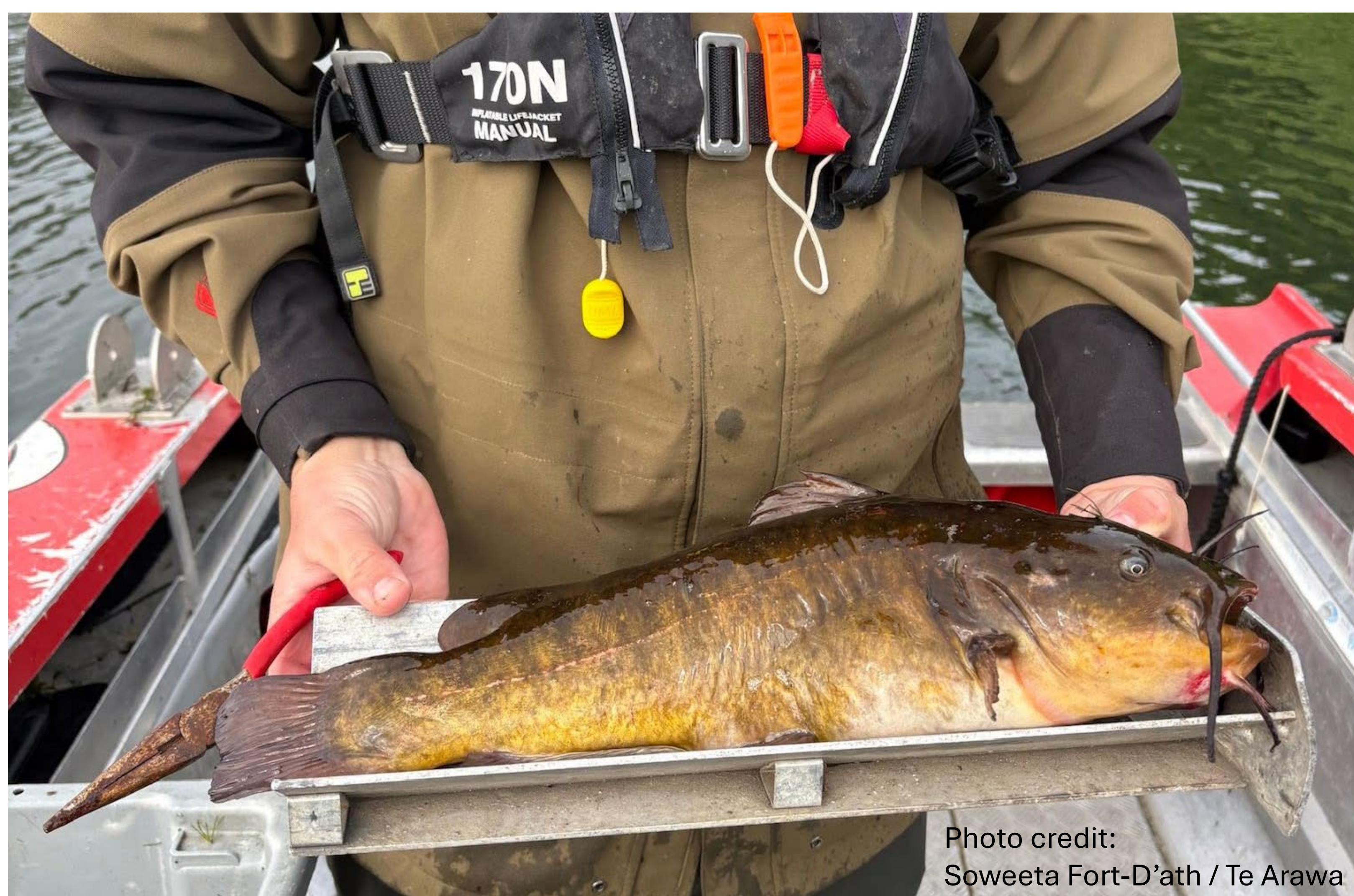


Photo credit:
Soweeta Fort-D'ath / Te Arawa



Photo credit: Te Arawa Lakes Trust

MANAGEMENT RECOMMENDATIONS

➤ Focus effort during spring / summer

Prioritise nearshore fyke netting between October and February, when catfish are most concentrated in the shallows and are vulnerable to trapping. Resources devoted to trapping at other times of the year should be refocused within this period. The peak nearshore activity period was found to occur during December and January.

➤ Target warm-water (thermal) areas during winter

Catfish showed a strong association with areas of the lake that have relatively high temperatures. We suggest trialling fyke netting around geothermal areas and warmer parts of the lake in late autumn / winter to investigate if there are potential fish aggregations at these sites. This could be an effective way to continue control efforts during winter.

➤ Improve incursion response timing and methods

In newly invaded areas, lake managers will need to act quickly before winter dispersal occurs. To prevent catfish spread, containment methods such as lake cordons will need to cover the full water column, especially the top 10 m from the surface. The tagging data showed that catfish tended to occur in mid to upper parts of the water column during winter.

Invasive brown bullhead catfish tagging in Lake Rotoiti reveals how control efforts can be targeted

Summary snapshot

Project contact: Robin Holmes

INTRODUCTION

Catfish move around, a lot

Brown bullhead catfish are an established and expanding pest species within Te Arawa Lakes. Managing these fish is an ongoing challenge in protecting lake ecosystem health and populations of taonga species such as kōura (freshwater crayfish), which the catfish predate on. Effective control of this species is a priority for Te Arawa iwi and the Bay of Plenty Regional Council.

In a recent study in Lake Rotoiti, catfish were fitted with acoustic telemetry tags and their movements were tracked for a year (Blanchfield et al. 2026). The research found that catfish behaviour in this system differs markedly from that in their native range, with important implications for how control efforts are designed and prioritised.

Brown bullhead catfish are typically described as slow-moving, bottom-dwelling fish that occupy shallow, nearshore habitats. However, the telemetry data showed that they are far more mobile and flexible in their behaviour than previously assumed, and that their use of lake habitats changes significantly throughout the year.

During spring and summer (October to March), catfish almost exclusively occupied shallow, nearshore areas (typically less than few metres deep) of Lake Rotoiti. The peak nearshore activity period was between December and January (Figure 1).

Current control methods, using shore-based fyke net trapping, are likely to be highly effective during this time. However, at the onset of autumn, the catfish started to move away from the shoreline and into deeper, offshore areas. During winter, they spent much of their time a substantial distance from shore. Furthermore, when they were out in the middle of the lake, they were well off the bottom in mid-water, typically no deeper than 10 m.

These seasonal movements are likely to be strongly driven by water temperature. Catfish are a warm-water fish and appear to seek out the warmest water available in the lake to feed and rear their young. In the warmer months, this draws them into shallow nearshore areas. As the lake cools over autumn and winter and water temperatures become similar throughout, the fish become more mobile and disperse widely across the lake.

Together, these findings suggest that for much of the year a large proportion of the catfish population occupies areas of the lake that are currently not being targeted by control efforts, which tend to be focused on fyke netting at the lake edge. Across the full year, only around one-fifth of catfish observations occurred in nearshore areas.

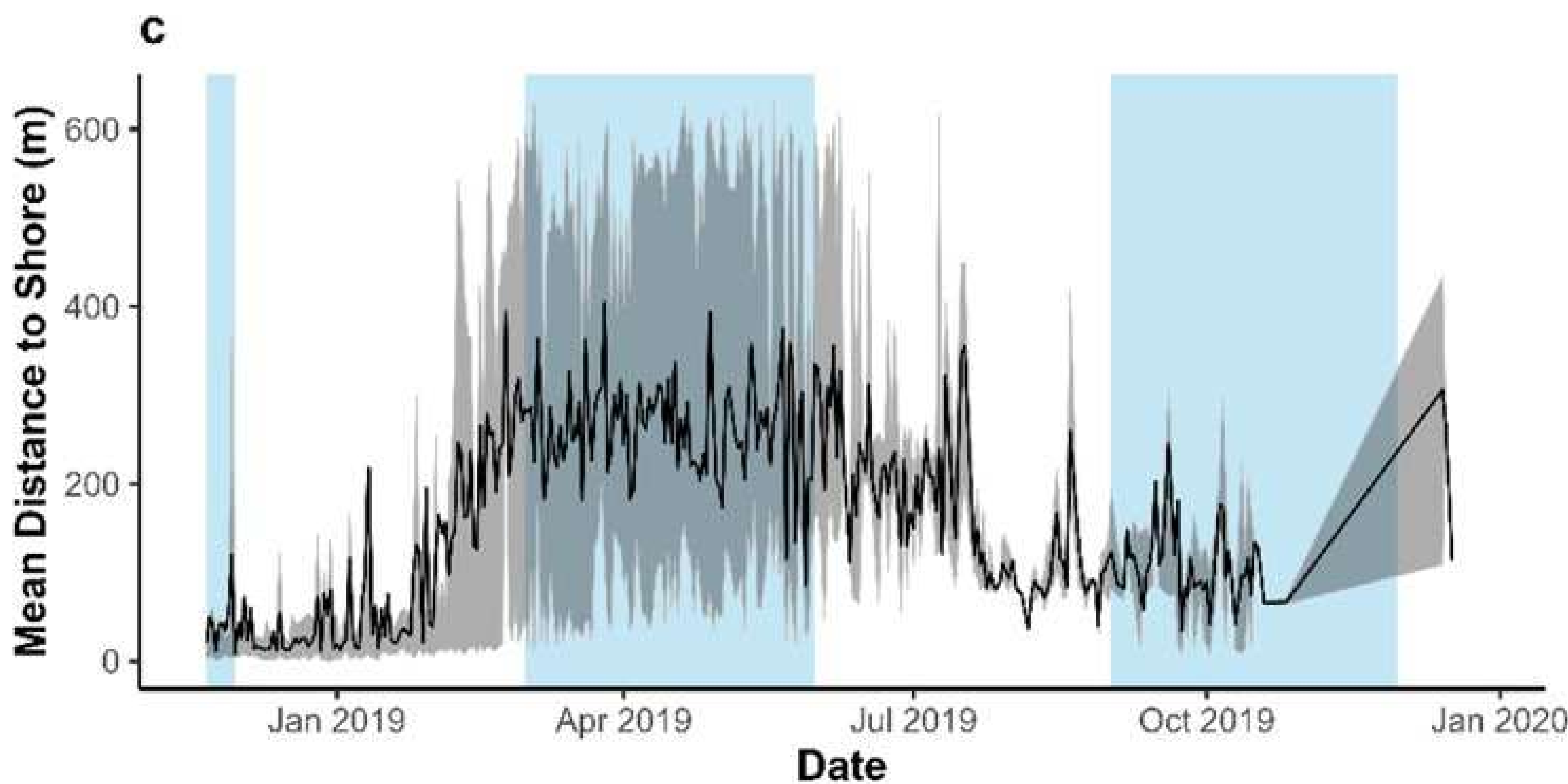


Figure 1. The average (black line) and range (grey shading, 2.5–97.5th percentile) of catfish distance from shore from all detection records. Blue bars indicate season.

MANAGEMENT RECOMMENDATIONS

➤ Prioritise control efforts to target nearshore habitats during summer

Nearshore fyke netting should be targeted between October and February. Current nearshore fyke netting methods remain appropriate and effective during spring and summer, and should continue to be a core component of control efforts. However, because catfish disperse more widely across the lake outside of this period, any effort or resources spent netting over winter could be refocused to occur over spring / summer.

➤ Winter trapping

Because catfish range into open water areas of the lake during winter, expanding control efforts to include offshore habitats could be attempted, although this will be logistically challenging. If offshore trapping or netting were to be attempted, fishing should target depths around 5–10 m below the surface, as these are the depths most occupied by catfish during winter.

References

Blanchfield PJ, Rodrigues TH, MacNeil C. et al. 2026. Invading brown bullhead catfish (*Ameiurus nebulosus*) show thermal niche rigidity and benthic niche plasticity: implications for management. Biological Invasions. 28:205. <https://doi.org/10.1007/s10530-026-03877-5>

➤ Trial targeting trapping near thermal areas

The strong link between catfish distribution and temperature also provides an opportunity to better target control efforts by focusing on areas of warmer water, including geothermal features that occur in parts of Te Arawa Lakes. It may be that catfish aggregate around thermal discharges during winter to find temperatures that better suit their metabolism. We recommend trialling intensive fyke netting focused around these areas in late autumn and winter to investigate whether this is occurring. If catch rates are high, this could support the use of an additional strategy to help control catfish year-round. For the initial trial, a range of depths should be targeted – we recommend pairing thermally influenced sites with control sites in areas of the lake that have a similar habitat but no thermal influence.

➤ Incursion response

The movement patterns observed suggest that late autumn and winter are key periods for catfish dispersal. If a new incursion is detected in a different lake, then removing fish prior to winter will be critical. Lake cordon approaches have been used in the past to contain catfish spread (e.g. the large anchored net across Te Weta Bay). For this approach to be effective, our results suggest that the whole water column, and especially the top 10 m, would need to be netted.



Photo credit: Te Arawa Lakes Trust