# 6.3 Costs and Effectiveness of Different Methods for Capturing Invasive Fish

Brendan J Hicks[1], Adam Daniel[1,3], Nicholas Ling[1], Dai Morgan[1,4] & Stephane Gauthier[2,5]

[1] The University of Waikato, Hamilton, New Zealand

[2] National Institute of Water and Atmospheric Research, Hamilton, New Zealand

Present addresses:

[3] Fish & Game New Zealand, Auckland/Waikato Region, Hamilton, New Zealand

[4] NorthTec, Whangarei, New Zealand

[5] Fisheries and Oceans Canada, Sidney, Canada

## Background

Comparisons of the effectiveness of different fishing techniques in non-wadeable habitats give insights into the relative abundance of invasive fish and native fish, which is important to provide evidence for changes in fish abundance over time. Such comparisons can also be used to determine the most effective methods to remove invasive fish. The objective of this section is to examine methods that yield the most fish for the least cost (i.e. maximise the catch per unit effort). Because comparisons are most effective when applied in a single habitat, they are best considered as case histories at one location. All costs of removal in this chapter are in $NZ. Rotenone has been applied successfully in New Zealand in small waterbodies (e.g. the 0.7 ha Lake Parkinson near Auckland—Tanner *et al*. 1990; Rowe & Champion 1994) and routinely by the Department of Conservation; use of rotenone to control invasive fish is not considered in this section because it is dealt with in Section 4.1.

Boat electrofishing is a technique that has been applied widely in the North Island of New Zealand since 2003 (e.g. Hicks & Bell 2003; Hicks & Tempero 2013; Section 4.4), and provides a useful basis for comparing other methods as it is highly effective at capturing some fish species in non-wadeable habitats. For instance, while boat electrofishing 700 $m^2$ of the Lake Whangape littoral margin (0.4–0.7 m deep) during the spawning season in September 2003, 24 koi carp were caught in 11 minutes, weighing 87.4 kg, with a mean fish mass of 3.64 kg and a catch rate of 349 fish/person-day or 1,271 kg/person-day. The calculated population estimate of 68 carp from the single removal (24 carp), applying Equation 1 in Section 4.4, implies a biomass of 3,541 kg/ha. The electrofishing boat normally has a crew of three, so assuming a cost of $480/person-day and a time of 0.07 person-day, the capture cost was $0.38/kg. The average catch rate for koi carp across our entire data set for locations with koi carp (205 capture occasions) by boat electrofishing is 62 fish/person-day and 99 kg/person-day, suggesting an average capture cost of $4.85/kg for labour for fishing time. These costs do not take into account consumables, travel, capital costs, depreciation or maintenance.

SUGGESTED CITATION FOR SECTION 6.3: Hicks, BJ, Daniel A, Ling N, Morgan D, Gautier S 2015. Costs and Effectiveness of Different Methods for Capturing Invasive Fish. Section 6.3 in Collier KJ & Grainger NPJ eds. New Zealand Invasive Fish Management Handbook. Lake Ecosystem Restoration New Zealand (LERNZ; The University of Waikato) and Department of Conservation, Hamilton, New Zealand. Pp 123–132.

## Trap Netting

There have been few comparisons of the effectiveness of different fishing techniques in a single waterbody in New Zealand, but Hayes (1989) compared trap nets, similar in design to those described by Beamish (1973), to five other fishing techniques in shallow lakes in the Waikato River basin (Gee minnow traps, single-leader fyke nets, gills nets, and beach and purse seine nets; Table 6.6). In that comparison, the large, fine mesh (1 mm) trap nets with two 1 $m^3$ pots and a single 15 m x 1 m leader were the most effective for a wide range of fish species, except for goldfish, catfish and rudd, three of the most important invasive fish. Koi carp, which are now abundant in the lakes sampled, were not caught in 1986 and 1987 when Hayes (1989) sampled. No estimates of costs are available for that study.

**TABLE 6.6 Number of each species and their length ranges (mm) caught by six gear types in lakes Whangape and Waahi, Waikato River basin, in January 1986 and February 1987; *n* = numbers of net nights or hauls. Adapted from Hayes (1989).**

| | GEE MINNOW (*n* = 12) | | FYKE NET (*n* = 3) | | TRAP NET (*n* = 4) | | GILL NET (*n* = 6) | | BEACH SEINE (*n* = 8) | | PURSE SEINE (*n* = 6) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH |
| NON-INDIGENOUS SPECIES | | | | | | | | | | | | |
| Gambusia | | | | | 848 | 15-55 | | | 378 | 16-45 | 10 | 7-44 |
| Goldfish | | | | | 15 | 10-190 | 16 | 140-275 | 24 | 23-95 | 4 | 12-45 |
| Catfish | | | 3 | | 13 | 65-280 | 40 | 160-500 | 43 | 30-50 | | |
| Rudd | | | | | | | 5 | 134-200 | | | | |
| INDIGENOUS SPECIES | | | | | | | | | | | | |
| Shortfin eel | 52 | 120-450 | 139 | >120 | 1,378 | >70 | | | 2 | | | |
| Common bully | 2 | 47-49 | 240 | 30-66 | 3,688 | 15-80 | | | 351 | 15-57 | 100 | 9-63 |
| Common smelt | | | | | 105 | 20-110 | | | 82 | 44-75 | 10 | 21-81 |
| Īnanga | | | | | 162 | 45-135 | | | 128 | 55-65 | 1 | 70-95 |
| Grey mullet | | | | | | | 184 | 220-425 | | | | |

**GAMBUSIA TRAPPING:** Gambusia live in the shallow margins of waterbodies in summer and are not vulnerable to most capture methods because of their small size and the shallowness of their habitats (commonly 0.1-0.3 m deep). However, Gee minnow traps are moderately effective. To investigate trap efficiency of Gee minnow traps for catching gambusia, one to four 3-mm mesh traps were set in each of six circular concrete tanks that were 0.55 m deep and 1.50 m in diameter (2.72 $m^2$ in area) with about 1,000 L of water. At the start of each trial 50 or 100 gambusia were placed in each tank, a fish density of 18 or 37 fish/$m^2$, with 1-4 unbaited Gee minnow traps in each tank. Traps were set at approximately 08:30 hrs and 13:00 hrs and left to fish for three hours before being removed in the same order they were set. Catch rate per trap declined with increasing numbers of traps per tank, but the total proportion of fish caught increased with increasing numbers of traps (Figure 6.4). At a maximum, minnow traps were able to catch a mean of 70% of the fish present. Gambusia tended to aggregate in traps, possibly regarding them as habitat. The presence of dried blood worms in the traps approximately doubled the catch rate compared to traps without blood worms.

In another experiment, 40 collapsible Promar 1-mm mesh unbaited bait traps (Plate 6.1) were set in Chapel Lake, 0.44 ha in area with a maximum depth 1.8 m on The University of Waikato campus. Traps were set starting at 09:00 hrs and retrieved starting at 10:30 hrs on three consecutive days, twice over two weeks (3-5 and 10–12 February 2009), to give a total of six removals. A total of 5,781 gambusia were removed weighing a total of 1.14 kg (Figure 6.5). Fish caught declined from 1,734 to 509 per day, and catch rates for the same days declined from 43 to 13 fish/trap. Maximum likelihood methods (CAPTURE; Otis *et al.* 1978) to estimate the total population ± 95% confidence interval from the daily removal totals (Figure 6.5A) indicated 7,444 ± 491 fish. This estimate suggests that 78% of the gambusia were removed from Chapel Lake, which required three person-days, equating to 1,927 fish/person-day at a total labour cost of $1,440, or $1,263/kg.

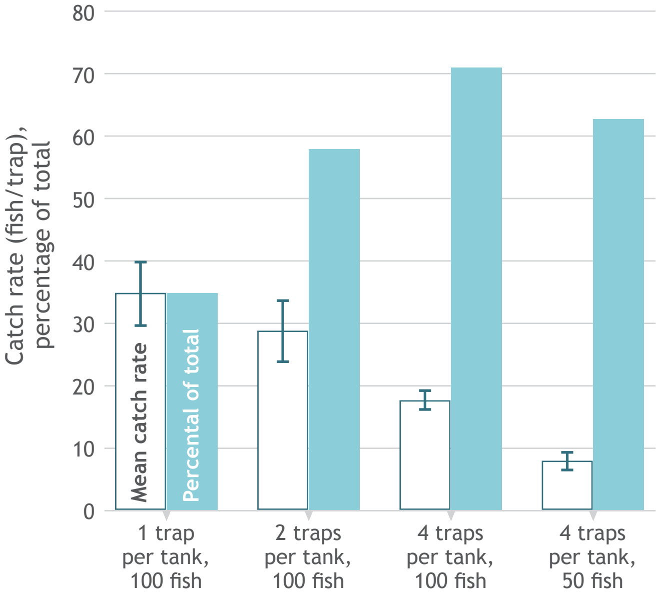


**FIGURE 6.4 Catch rate of gambusia caught in fine-mesh Gee minnow traps set for three hours in circular concrete tanks with 50 or 100 fish in each tank. Error bars are 95% confidence intervals.**

**PLATE 6.1 Collapsible Promar fine-mesh bait trap used to catch gambusia.**

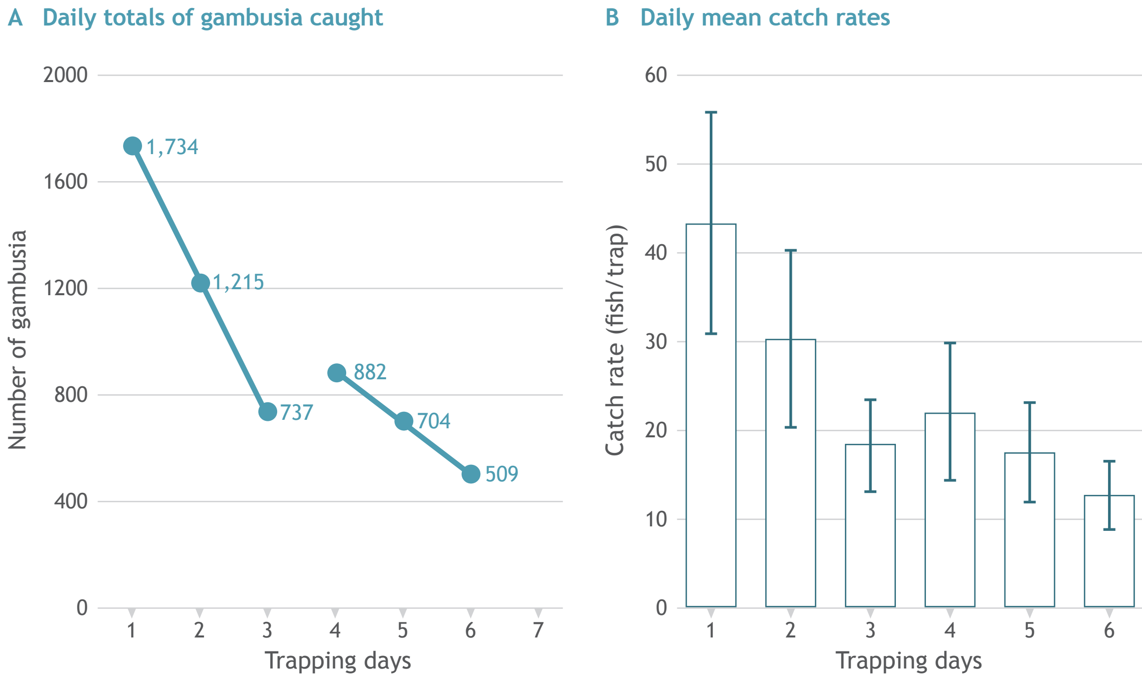


**FIGURE 6.5 Gambusia caught in Chapel Lake, The University of Waikato, during six 1.5 hour sets on separate days (3-5 and 10-12 February 2009) with 40 unbaited collapsible Promar fine-mesh bait traps; (A) daily totals of gambusia caught; (B) daily mean catch rates. Error bars are 95% confidence limits.**

## Netting and Boat Electrofishing Comparisons

**LAKE KAITUNA:** A combination of conventional fish methods such as fyke nets, boat electrofishing and coarse-mesh trap nets were used in Lake Kaituna, a shallow, hypertrophic peat lake in the Waikato region with a surface area of 15 ha and a maximum depth of 1.3 m. Because of its isolation from other waterbodies, and restoration of its riparian margin through stock exclusion and re-establishment of native vegetation, the lake was considered a candidate for in-lake ecological restoration through removal of invasive fish. Preliminary studies found shortfin and longfin eels, and the invasive fish species koi carp, catfish, goldfish and rudd. Boat electrofishing, fyke nets and trap nets were used to estimate total fish abundance by mark-recapture (see Section 6.2). Marking was carried out over 10 consecutive days in September and October 2010, and marked and unmarked fish were caught on 10 fishing days and nights in October and November 2010 (20 days after the marking phase).

During the 14-day recapture and removal phase, 40 fyke nets were set over six nights, 36 20-minute shots of boat electrofishing (720 minutes in total) were administered over four days, and two double-winged 40 mm mesh trap nets were set for 28 trap nights. A total of 1,777 invasive fish were caught totalling 736 kg of biomass, including 410 kg of invasive fish that were removed, comprising 20% of the estimated 2,070 kg total of invasive fish biomass. The number of invasive fish initially marked, as a proportion of total population estimates, ranged from 10 to 24% (Table 6.7). Boat electrofishing caught 1,220 fish, with a catch rate of 271 fish/person-day and 136.3 kg/person-day. Fyke netting caught 557 invasive fish (56 fish/person-day and 12.3 kg/person-day).

Comparing actual catches to population estimates, different methods showed clear species bias (Table 6.7). Fyke nets were 21-52% efficient for catfish and eels, but only 2% efficient for goldfish and caught no koi carp. Boat electrofishing was 13-22% efficient for goldfish and koi carp, but only 2-6% efficient for catfish and eels. Unbaited trap nets were 1-2% efficient for goldfish and koi carp.

**TABLE 6.7 Capture efficiency of boat electrofishing, fyke nets and unbaited trap nets during mark-recapture and fish removal in Lake Kaituna, Waikato region.**

| SPECIES | POPULATION ESTIMATE | MARKED FISH (% of total) | CAPTURE EFFICIENCY (%) | | |
|---|---|---|---|---|---|
| | | | BOAT ELECTROFISHING | FYKE NETTING | TRAP NETTING |
| NON-INDIGENOUS SPECIES | | | | | |
| Catfish | 973 | 23.7 | 5 | 21 | 0 |
| Goldfish | 2,727 | 19.7 | 13 | 2 | 2 |
| Koi carp | 619 | 14.7 | 22 | 0 | 1 |
| Rudd | 302 | 10.3 | 3 | 19 | 0 |
| INDIGENOUS SPECIES | | | | | |
| Longfin eel | 45 | 49.2 | 2 | 72 | 0 |
| Shortfin eel | 4,760 | 29.3 | 6 | 53 | 0 |
| TOTAL | 9,376 | | | | |

Catch rates of koi carp can be improved by baiting traps with chicken feed (6.1 kg/day for unbaited traps compared to 43.8 kg/day when the same traps were baited in Lake Ohinewai; Daniel & Morgan 2011).

**LOWER KARORI RESERVOIR:** The lower Karori Reservoir, Wellington, is a small lake with an area of 2.34 ha, an average depth of 8.2 m, and a maximum depth of about 20 m (Smith & Lester 2007). It was created behind a 21-m earth dam built in 1874 that was part of the Wellington City water supply until 1992. A population of perch was established in 1878 for recreational angling and these fish are presumed to induce cyanobacterial blooms in the reservoir through a trophic cascade (Smith & Lester 2006; Hicks *et al*. 2007).

During fishing in February 2007, we found that gill netting was an effective way to remove large perch from the lower Karori Reservoir but was less effective than boat electrofishing at night in the littoral zone to catch young-of-the-year (YOY, age 0) perch (Figure 6.6). Boat electrofishing for 527 minutes resulted in a catch rate of 693 fish/person-day ($n$ = 2,282 fish), compared to day-time gill netting with a total fished length of 1,728 m of 1 m long 25–100 mm mesh mist nets with a catch rate of 1.5 fish/m ($n$ = 1,666 fish).

In February 2009, we conducted a comparison of nocturnal boat electrofishing and diurnal gill netting techniques. We caught 4,671 perch in 617 minutes of boat electrofishing (catch rate 1,211 fish/person-day), and 773 perch in six 3-h sets of 60 m (360 m of net in total; catch rate 2.1 fish/m) of 25 mm mesh gill netting to give a total of 5,158 perch ≥35 mm fork length. Boat electrofishing caught 4,281 YOY perch <100 mm and 390 perch ≥100 mm; all perch caught by gill netting were ≥100 mm.

Our initial estimates of the number of perch in the lower Karori Reservoir were 20,000 to 22,000 fish. In 2007, we removed 3,948 perch totalling 78 kg. The steep sides of the reservoir made fyke netting inappropriate for much of the shoreline. Fish removal in the first year was estimated to be 18–20% of the total number of fish present, or 8–10% of the estimated total biomass. This took 7.3 person-days of effort, implying a capture efficiency of 541 fish/person-day or 10.7 kg/person-day. Using an estimate of $480/person-day, the cost of removal in labour alone was $3,501, or $41/kg. From our estimates, boat electrofishing was 11–22% efficient and gill netting 4–8% efficient.

As an aside, a population estimate before fish removal in 2009 was obtained using a hydroacoustic method, which indicated 2,877 perch >30 mm (acoustic target strength ≥-56 dB) and 1,333 perch after removal (Figure 6.7). This result suggests that the hydroacoustic methods were 30% efficient, detecting 1,544 of the 5,158 perch that we removed. The most likely cause of the relatively low efficiency of

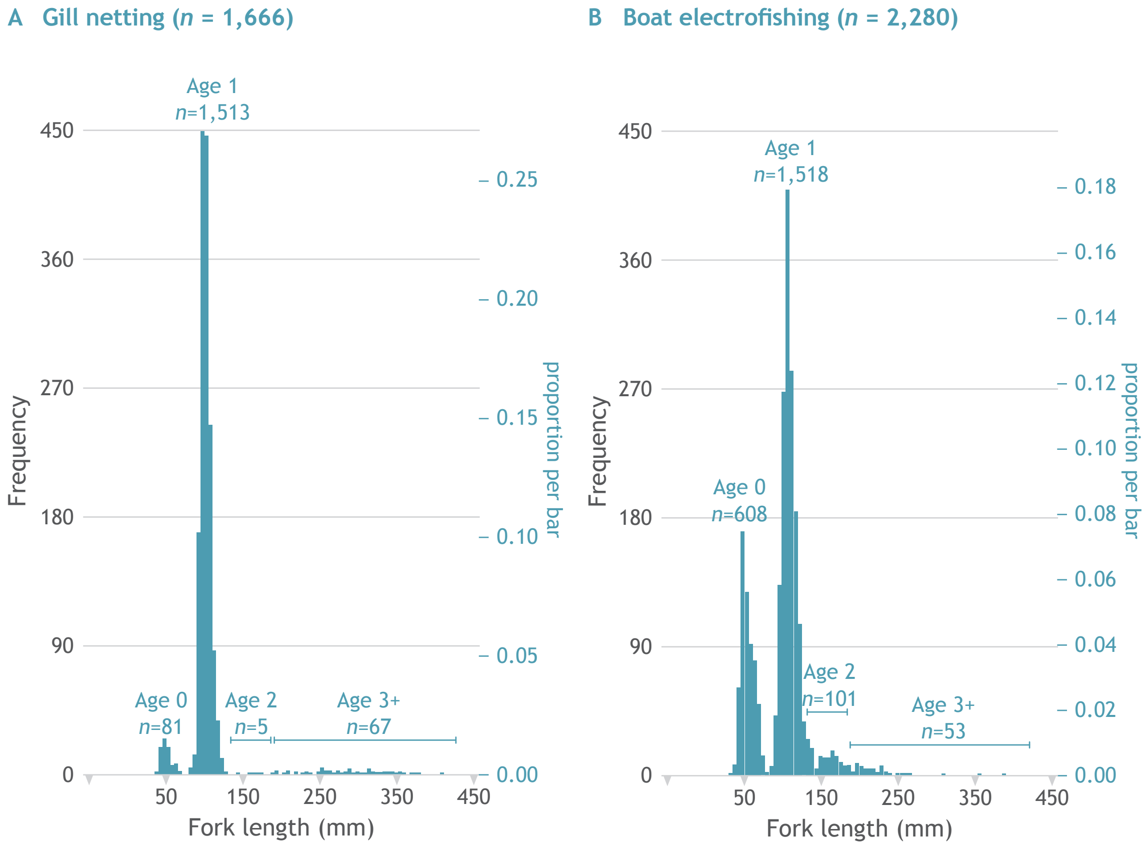


**FIGURE 6.6 Size frequency of perch caught in the lower Karori Reservoir, Wellington, from 12–15 February 2007 by (A) gill netting; (B) boat electrofishing. Source: Hicks *et al*. (2007).**

hydroacoustic estimates was the concentration of small fish close to the bed in littoral zones where the hydroacoustic signal could not detect them.

**ROTOPIKO (SERPENTINE) LAKE COMPLEX:** Fine-mesh monofilament gill nets set overnight were used in the three shallow Waikato lakes (the Rotopiko (Serpentine) lakes—East, North and South) to assess the potential of this method as a tool for controlling or eradicating rudd (Neilson *et al*. 2004). Between 2001 and 2003, gill nets 15 m long and 1.8–3.0 m deep with several stretched mesh sizes between 10 and 38 mm were set at a density of 16–30 nets depending on lake size. Boat electrofishing was undertaken once in September 2003 during the post-removal sampling period in North and East lakes.

Between September 2001 and March 2003, 1,740 rudd were removed from the lakes. In September 2003, after the intensive removal, boat electrofishing in North Lake for 106 minutes caught 10 rudd and 109 goldfish. Shortfin eels and common smelt were abundant but were not enumerated. In East Lake, electrofishing for 58 minutes caught three goldfish and one catfish, but no rudd. Common smelt were abundant but were not caught. Gill netting in North for 16 net nights caught 17 rudd and 25 goldfish, and three weeks of netting in East Lake caught four rudd.

A total of 640 and 570 person hours in September 2002 and March 2003, respectively, were spent carrying out intensive removal over the three Rotopiko (Serpentine) lakes. The most labour-intensive part of the fishing effort was undoing knots in nets that had been created by eels scavenging captured fish. This was particularly so in North Lake where large numbers of goldfish were captured in addition to rudd. Using the Department of Conservation standard operating procedure charge-out rate for field staff of $60 per hour, the labour component of the two intensive removal periods came to $72,600. In comparison the cost of the nets was just $4,720, or 6% of the total cost (Neilson *et al*. 2004).

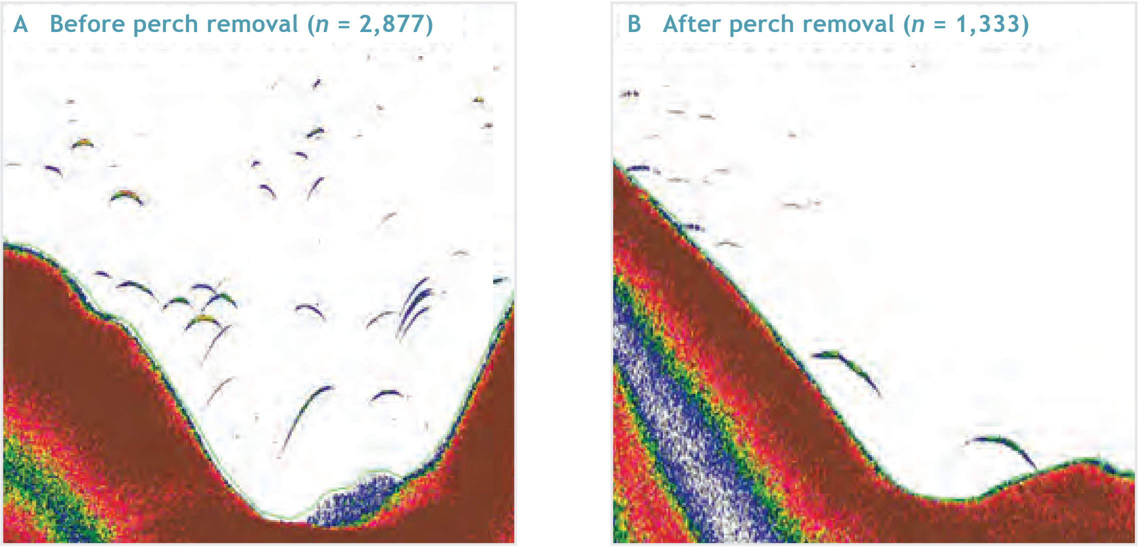


**FIGURE 6.7 Representative hydroacoustic scans of lower Karori Reservoir, Wellington, in February 2009 showing the echo traces of fish in the water column (A) before and (B) after removal of 5,158 perch ≥35 mm. Source: S. Gautier, NIWA, Wellington, unpubl. data.**

These authors concluded that it was more cost-effective to set nets for one or two nights, retrieve and discard the nets, and then set new nets for another one or two nights as most of the fish were caught in the first 3–4 days of fishing. This level of control effort has continued (see Section 5.4).

## Pod (Feeder) Traps

Pod traps are pyramid-shaped nets equipped with an automated wildlife feeder that frequently adds fresh bait to the trap to attract fish (Plate 6.2). Baits lose most of their attraction properties within an hour in the water, so by adding fresh bait, trapping rates are greatly improved. Once inside the pod trap, one-way doors keep fish within the trap until emptied. Pod traps are particularly effective at trapping koi carp and also rudd, and have been shown to improve catch rates compared with other types

**PLATE 6.2 Pod trap (left) developed by Adam Daniel (shown right) to catch koi carp, and (right) installed in Lake Ohinewai with automatic bait dispenser.**

of nets. Baited traps, such as the pod trap, lose their effectiveness after the bulk of the population has been removed because food becomes more plentiful, making bait less attractive to fish. Baits laced with toxins have been used elsewhere to control carp numbers, but flavouring is often necessary to mask the unpleasant taste of some piscicides.

The effectiveness of floating baits made mainly from brewer's yeast and grain laced with 'bold' flavours, such as vanilla or strawberry essence has been investigated (Morgan *et al.* 2013). All flavours were readily consumed by koi carp indicating that any of the formulations could be used with equal success. One advantage of using floating baits is that unconsumed pellets can be removed from the water surface before they sink and toxins become available to native species feeding at night or on the bottom, such as eels. Pod traps and baits may form part of a range of methods used to trap fish and monitor population change as part of integrated pest fish management.

An invasive fish removal project in Lake Kuwakatai, north Auckland, showed that pod traps set overnight had a higher catch rate overall than either fyke nets or 10-minute boat electrofishing shots. In this comparison, which was a mark-recapture study, pod traps baited with chicken feed delivered from a wildlife feeder were by far the most effective method to catch rudd, the most numerous species in the marking phase (13–16 November 2012) when 1,655 fish (176 kg) were caught, marked, and released back into the lake. During the subsequent recapture and removal phase (27 November 2012 to 17 January 2013), when 20,566 fish (912 kg) were caught, baited pod trapping was the most effective way to catch large numbers of rudd. The addition of fyke nets to the sampling tools showed their effectiveness at catching large numbers of rudd and juvenile perch (Table 6.8). Boat electrofishing was the best method to catch adult koi carp, which were present at low abundance in Lake Kuwakatai (33 kg/ha; Section 6.2).

Cost-effectiveness can be calculated from the known personnel effort, which was 1.3 person-days for boat electrofishing, 24 person-days for fyke netting, and 27 person-days for pod trapping. This means that catch rates for the different methods were 47.1, 11.6 and 21.3 kg/person-day for boat electrofishing, fyke netting and pod trapping, respectively, equating to $10/kg, $42/kg and $23/kg. Baited pod traps were the cheapest of the three methods to remove rudd at high densities because boat electrofishing and fyke netting caught only 4% and 23% of the total number of rudd, whereas pod trapping caught 71%. Pod traps caught 576 kg of fish, almost 10 times the total biomass from boat electrofishing (59 kg), mostly because pod trapping was used more as it requires cheaper equipment and less training.

## Summary

Catch rates of invasive fish in this comparison are highly variable, depending on water depth and morphology of littoral habitat, and methods need to be highly targeted to different species. The fine-mesh trap net described by Hayes (1989) is very effective for gambusia (as well as native bullies and eels), but is expensive and cumbersome for normal use. In addition, its efficiency for species such as koi carp and rudd is unknown. Fyke netting is the best method to catch catfish (and eels), whereas boat electrofishing is more efficient for goldfish and koi carp in shallow water than other methods. Baiting improves catch rates of traps, in this case for catches of gambusia in minnow traps and koi carp, goldfish and rudd in pod traps. Baited pod traps worked well for rudd in Lake Kuwakatai where the population was estimated by mark-recapture at 28,934 (Section 6.2), almost half of which were removed by pod trapping.

A preliminary survey to estimate population size is important to establish a target biomass for removal, but fishing alone will not necessarily achieve a given target. Personnel costs of capture can vary from $0.38 to $50/kg for boat electrofishing, $39–42/kg for fyke netting, and $29–41/kg for gill netting, depending on species, and $22/kg for pod trapping (Table 6.9). One minnow trapping trial for gambusia cost $1440/kg because of their extremely small size; nearly 6,000 fish weighed just over 1 kg. The capture efficiencies and costs of conventional methods of fish capture (fyke nets, trap nets, gill nets, pod traps and electrofishing) mean that control of fish populations by the capture methods summarised in this section is not generally realistic within limited budgets.

**TABLE 6.8 Comparative catches from 10-minute boat electrofishing shots, fyke nets and pod traps set overnight in Lake Kuwakatai, as (A) numbers and (B) biomass, from the removal phase over 27 November 2012 to 17 January 2013. Juveniles are fish <100 mm fork length.**

### A Number

| SPECIES | TOTAL NUMBER | MEAN NUMBER PER SHOT OR TRAP NIGHT | | |
|---|---|---|---|---|
| | | ELECTROFISHING | FYKE NET | POD TRAP |
| | (*n* = 434) | (*n* = 20) | (*n* = 197) | (*n* = 206) |
| NON-INDIGENOUS SPECIES | | | | |
| Koi carp | 75 | 0.60 | 0.15 | 0.16 |
| Koi-goldfish hybrid | 1 | 0.00 | 0.01 | 0.00 |
| Juvenile goldfish | 114 | 0.65 | 0.28 | 0.22 |
| Goldfish | 712 | 6.35 | 1.66 | 1.03 |
| Juvenile perch | 3,289 | 3.20 | 14.41 | 1.85 |
| Perch | 1,050 | 2.05 | 4.54 | 0.29 |
| Rudd | 14,284 | 31.15 | 16.55 | 49.42 |
| Tench | 841 | 3.95 | 2.38 | 1.32 |
| INDIGENOUS SPECIES | | | | |
| Common bully | 184 | 0.00 | 0.92 | 0.01 |
| Shortfin eel | 1 | 0.00 | 0.01 | 0.00 |
| Kōura (crayfish) | 358 | 0.00 | 1.79 | 0.03 |
| TOTAL NUMBER | 20,909 | 959 | 8,413 | 189 |

### B Biomass

| SPECIES | TOTAL WEIGHT (kg) | MEAN WEIGHT PER SHOT OR TRAP NIGHT (g) | | |
|---|---|---|---|---|
| | | ELECTROFISHING | FYKE NET | POD TRAP |
| NON-INDIGENOUS SPECIES | | | | |
| Koi carp | 113.6 | 1000 | 182 | 276 |
| Koi-goldfish hybrid | 0.3 | 0 | 2 | 0 |
| Juvenile goldfish | 0.1 | 1 | 0 | 0 |
| Goldfish | 75.3 | 565 | 169 | 133 |
| Juvenile perch | 5.7 | 19 | 25 | 1 |
| Perch | 114.9 | 288 | 434 | 59 |
| Rudd | 510.1 | 625 | 327 | 2068 |
| Tench | 108.1 | 308 | 223 | 271 |
| INDIGENOUS SPECIES | | | | |
| Common bully | 0.2 | 0 | 1 | 0 |
| Shortfin eel | 2.8 | 0 | 14 | 0 |

**TABLE 6.9 Comparative catch rates of invasive fish and personnel costs of capture for boat electrofishing, fyke netting, gill netting, minnow trapping, and pod trapping in North Island lakes. Costs calculated assuming $NZ480/person-day. ND = no data.**

| LOCATION | FISHING METHOD | SPECIES | PERSON-DAYS | BIOMASS (kg) | NO. OF FISH | TOTAL LABOUR COST ($) | FISH/PERSON-DAY | WEIGHT (kg/person-day) | COST ($/fish) | COST (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| Average, all North Island sites (*n* = 205) | Boat electrofishing | Koi carp | 47.1 | 4,658 | 2,939 | 22,596 | 62 | 98.9 | 7.69 | 4.85 |
| Lake Whangape | Boat electrofishing | Koi carp | 0.07 | 87 | 24 | 33 | 349 | 1,270.7 | 1.38 | 0.38 |
| Lake Kaituna, marking and removal | Boat electrofishing | Catfish, goldfish, koi carp, rudd | 4.5 | 613 | 1,220 | 2,160 | 271 | 136.3 | 1.77 | 3.52 |
| | Fyke netting | | 10.0 | 123 | 557 | 4,800 | 56 | 12.3 | 8.62 | 39.15 |
| Lower Karori Reservoir | Boat electrofishing 2007 | Perch | 3.3 | 32 | 2,282 | 1,581 | 693 | 9.6 | 0.69 | 50.19 |
| | Gill netting 2007 | | 4.0 | 46 | 1,666 | 1,920 | 417 | 11.6 | 1.15 | 41.47 |
| | Boat electrofishing 2009 | | 3.9 | 45 | 4,671 | 1,851 | 1,211 | 11.7 | 0.40 | 40.95 |
| | Gill netting 2009 | | 4.0 | 67 | 773 | 1,920 | 193 | 16.7 | 2.48 | 28.79 |
| Chapel Lake | Minnow trapping | Gambusia | 3.0 | 1.1 | 5,781 | 1,440 | 1,927 | 0.4 | 0.25 | 1,263.16 |
| Lake Kuwakatai, removal phase only | Boat electrofishing | Rudd, perch, goldfish, koi carp, tench | 1.3 | 59 | 959 | 600 | 767 | 47.1 | 0.63 | 10.19 |
| | Fyke netting | | 24.0 | 278 | 8,413 | 11,520 | 351 | 11.6 | 1.37 | 41.50 |
| | Pod trapping | | 27.0 | 576 | 11,194 | 12,960 | 415 | 21.3 | 1.16 | 22.50 |
| Serpentine (Rotopiko) lakes | Gill netting (DOC) 2001-03 | Rudd | 151.3 | ND | 1,740 | 72,600 | 12 | ND | 41.72 | ND |