



Consultation Document

LAKE HERON LAKE-TYPE SALMON



Exploring regulatory options to manage Lake Heron's salmon fishery in response to the severe population management status of the sea-run salmon fisheries of the Central South Island and North Canterbury Fish & Game regions



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Overview

Central South Island Fish and Game Council are considering options for further restrictions on lake-type salmon harvest and angling at Lake Heron while the sea-run salmon fishery remains within the severe population management band. This consultation seeks Central South Island licence holder's and public opinions and views on possible further regulation restrictions at Lake Heron.

Background

Lake Heron is the most popular angling destination within Ō Tū Wharekai (Ashburton Lakes) and in the 2021/22 season recorded 2,401 angler days in the National Angler Survey (Stoffels & Unwin 2023). The lake offers anglers the opportunity to catch three different sports fish species those being Chinook salmon, brown trout and rainbow trout, all in a stunning high-country setting.

Lake Heron is situated in the Rakaia River Catchment and connects to the Rakaia River via its outlet stream, Lake Stream. Lake Heron's largest tributary Mellish Stream is a key sea-run salmon spawning site for the Rakaia Catchment, attracting 17% of the 2025 spawning run. Unlike other spawning streams that are experiencing historically low spawning numbers, Mellish Stream remains somewhat stable in its spawning production. A significant number of sub adult salmon (lake-type) remain in the lake for a period of between 1 and 4 years providing for a longstanding recreational fishery. Research suggests all lake-type salmon eventually migrate to sea via Lake Stream and the Rakaia River and return as sea-run salmon to the lake to spawn in Mellish Stream.

Lake Heron salmon have a unique life history. When compared to other Chinook salmon fisheries in New Zealand where salmon rear in freshwater for up to 2 years, Lake Heron salmon can stay up to an extra two years in freshwater. This life history adds to the overall fishery and may act to support a higher survival rate for the sea-going phase as they enter the ocean at an older age and larger than their river rearing counterparts.

The fishery is popular, and it is not uncommon to observe 100+ anglers fishing the lake on opening day of the high-country fishing season. Anglers fishing for lake-type salmon target three and four-year-old salmon for harvest that are between 300 and 450mm in length. Sea-run salmon returning to spawn are protected from harvest by the maximum size limit of 450mm and are rarely, if ever, caught since the closure of the Harrison Bight area of the lake for April was introduced to protect them.



In 2025 sea-run salmon spawning numbers based on three indicator rivers (Waimakariri, Rangitata and Rakaia rivers) dropped below 1,200 fish to historically low levels, moving the fishery into the severe population band for harvest management subject to the Sea-Run Salmon Adaptive Management Strategy. The severely low spawning populations triggered the reduction of the sea-run salmon season bag limit from two to one salmon across the Central South Island (CSI) and North Canterbury (NC) Fish & Game regions for the 2025/26 season. The CSI and NC Fish & Game Councils are now considering options for further harvest restriction, additional to the one season bag limit, within the severe population management band.

Given the historically low sea-run population across the three of New Zealand's most productive sea-run salmon fisheries, the resulting move into the severe management band for sea-run salmon, and consideration of further harvest restrictions additional to a one-fish season bag limit, a precautionary and proactive management approach could be considered for the Lake Heron's lake-type salmon fishery within the severe management band, despite the relative stability of salmon spawning at Lake Heron.

Lifecycle of Lake Heron salmon

Summary of Lifecycle

Adult salmon spawn in Mellish Stream with the juveniles migrating to Lake Heron where they rear for up to 4 years before migrating to the ocean. Three- and four-year-olds in Lake Heron can be harvested. Salmon then rear in the ocean before returning as adults to the Rakaia River where they are either harvested by anglers or return to Mellish Stream to spawn thus completing the lifecycle (Fig 1).

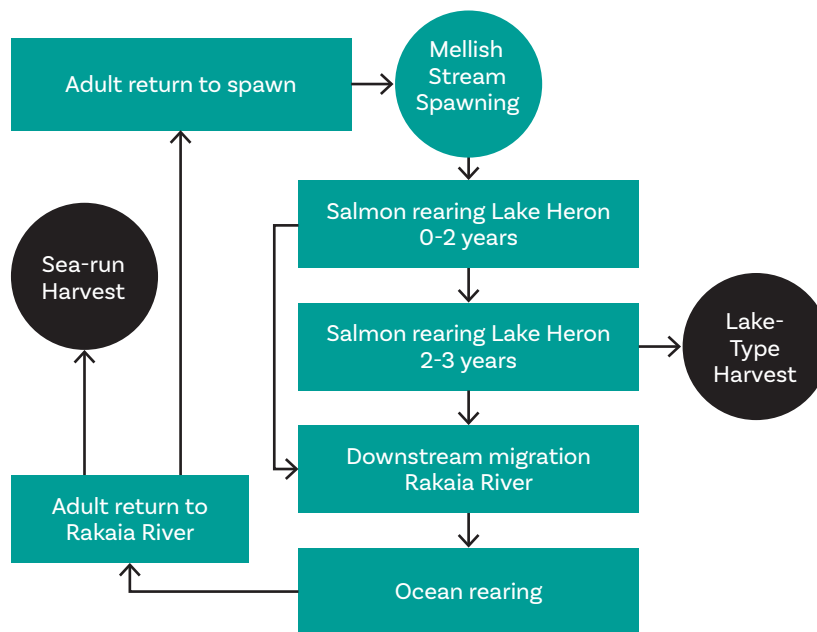


Figure 1: Lifecycle of Lake Heron Salmon

Mellish Stream Spawning

The lifecycle starts with sea-run salmon spawning in Mellish Stream, Lake Heron. Salmon spawning has been monitored through redd (egg nest) counts at Mellish Stream and in a historical context numbers have been higher in the past 20 years than those pre-2005. The long-term average redd count is 42 with all but one of the past eight years being above average (Fig 2).

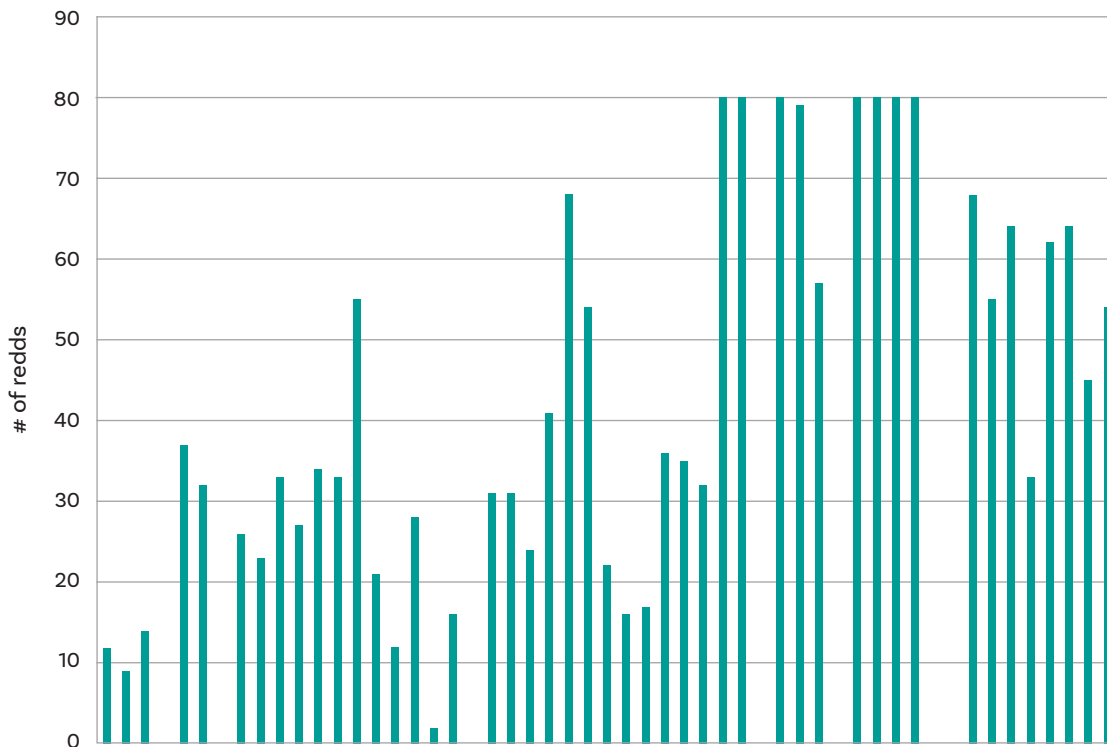


Figure 2: Number of salmon redds surveyed within Mellish Stream between 1973 and 2025 (Note that no survey was undertaken in several years including 2016 and 2017)

Spawning habitat within this stream is very limited and relatively low numbers of salmon in the spawning area can saturate all available habitat, meaning that more salmon doesn't necessarily equal more production. The ricker curve, a stock recruitment assessment method applied to Mellish Stream, suggested optimal spawning success can be expected when there are between 30 and 60 redds with a drop in recruitment beyond 60 redds due to superimposition (salmon digging up other redds resulting in lost production) (Stevens & Webb 2022). It is estimated that between 90 - 180 salmon spawning are required to produce between 30 - 60 redds. In 2025 an estimated 106 salmon created 54 redds, possibly achieving optimal spawning production according to Ricker curve assessment.

Optimal production from the spawning ground at Mellish Stream occurs when redd numbers exceed 45 and at this level there is no concern for the sustainability of the lake-type fishery given spawning productivity is maximised. Should spawning numbers drop below this then there would be concern for the sustainability of the current lake-type fishery.



Salmon rearing in Lake Heron

Once eggs hatch the juveniles migrate downstream a short distance into Lake Heron and can remain in the lake for up to four years before migrating to the sea. These salmon, while remaining in the lake, are called “lake-type salmon”, (for management purposes), to differentiate them from those salmon that migrate out of the lake to the sea and return, known as “sea-run salmon”. Lake-type fish are not landlocked and are free to migrate to the ocean via Lake Stream and the Rakaia River.

Of the returning sea-run adults, research demonstrates that 73% migrated to sea as two-year-olds (Olley 2021). Two-year-old lake-type salmon are not subject to harvest within Lake Heron, being protected by the 300mm minimum size limit. However, when they reach three or more years old, they have exceeded the minimum takeable size of 300mm and can be harvested by anglers. Of the returning sea-run adults research demonstrates that 27% migrated to sea as three or four-year-olds. (Olley 2021). Research to date has not found evidence to support that there are any ‘landlocked’ lake-type salmon that remain in the lake for their whole lifecycle and contribute to the spawning population.

Ocean rearing and return

Once salmon migrate out of Lake Heron to the ocean they then rear for up to two years before returning as sea-run adults to the Rakaia River. Once the adults enter the river they are either harvested by anglers in the Rakaia River or continue migrating upstream to Lake Heron / Mellish Stream where they are protected from harvest and spawn and complete the lifecycle.



Potential impact of lake-type harvest

The potential impact of angler harvest of 3+ year-old lake-type salmon on Rakaia River sea-run salmon catch and Mellish Stream spawning can be assessed by modelling estimated harvest of lake-type salmon alongside their estimated rate of survival for the period of their life from when they leave the lake to returning to spawn. Current seasonal harvest of lake-type salmon is estimated to be 200 fish or less based on the period 2021 to 2025 (staff observation, creel survey (Stevens & Webb 2022) and expert angler comms). During this period the regulations permitted the harvest of four sports fish at Lake Heron, however, rangers have observed that anglers rarely harvest more than two salmon per day.

The survival or return rates for Lake Heron salmon are unknown. Return rates from hatcheries can provide insight into potential return rates that may be expected at Lake Heron. Return rates for McKinnon’s Creek hatchery released salmon in the last 10 years have averaged 0.58% with the best return rates historically closer to 3% (Dellaway 2025). Salmon from the McKinnon’s Creek hatchery are approximately 15 months old at release (180mm approx.) with Lake Heron salmon either one or two years older (between 220 and 390mm approx.), so Lake Heron salmon are generally larger in size, older and have acclimatised to foraging for wild food and escaping predators, when compared to hatchery fish. It’s fair to assume lake-type salmon survival rates could be higher than current hatchery returns of 0.58%. Three percent represents the best return rate in more recent history and is considered closer to the potential return rate for Lake Heron lake-type salmon.

Applying the best McKinnon’s Creek return rate (3%) to the estimated harvest of 200 lake-type salmon results in an estimated return of six additional sea-run salmon to the Rakaia River if those fish were not harvested within the lake, for example, under a scenario that the lake-type fishery was closed. Based on current Rakaia River harvest rates, two of these six salmon would be caught by anglers in the Rakaia while the remaining four would carry on to spawn in Mellish Stream. Applying the current hatchery return rate (0.58%) to the estimated harvest of 200 lake-type salmon results in an estimated return of one additional salmon to the Rakaia River (Table 1).

Essentially, this can be viewed as a trade-off between the value to anglers associated with 200 lake-type salmon being caught and harvested from Lake Heron versus the possibility of between one and six adult sea-run salmon returning to the Rakaia River and the associated value to Rakaia anglers and to fisheries sustainability from additional spawning (Table 1).

Table 1: Modelled returns to the Rakaia River for sea-run salmon if lake-type harvest was closed at Lake Heron.

# of harvested lake-type salmon	Return rate %	Total additional # of sea-run salmon saved by closure	Additional sea-run salmon spawning in Mellish Stream	Additional sea-run salmon caught in Rakaia River
200	0.58	1	1	0
	3	6	4	2

Regulations

In 2020, a precautionary measure was taken to reduce the daily bag limit for lake-type salmon from six to four while research was undertaken to investigate the life history of sea-run salmon returnees to Mellish Stream. That research suggested that 73% of returning sea-run salmon were from sub adults that had left the lake as two-year-olds (Olley 2021). Given this information, the Central South Island Fish and Game Council raised the minimum size from 250mm to 300mm. This regulation change resulted in the protection of two-year-old lake-type salmon from harvest.

To add further protection to undersized two-year-old salmon, Council have resolved to introduce a regulation for the 2026/27 season that requires all anglers fishing Lake Heron to use single hooks. This is designed to reduce damage to undersized salmon that are caught and released.

Lake Heron has a slot size limit for salmon between 300 and 450mm, sea-run salmon are greater than 450mm in length when they return and are therefore protected from harvest. Sea-run salmon returning to spawn are further protected from all catch in Harrisons Bight by an early closure to all fishing. The season for this area of the lake finishing at the end of March to protect the salmon that are known to congregate before migrating into Mellish Stream.

Current regulations

- Season:** Lake Heron, excluding Harrisons Bight, First Saturday November to 30 April
Lake Heron, Harrisons Bight, First Saturday November to 31st March
- Daily bag limit:** 4 sports fish
- Salmon size limit:** 300mm minimum and 450mm maximum

Consultation questions

Question 1

What best describes your fishing of Lake Heron?

- a. I have never fished Lake Heron
- b. I only fish Lake Heron for trout
- c. I have fished for lake-type salmon at Lake Heron
- d. I fish most seasons for lake-type salmon at Lake Heron

Question 2

What best describes your fishing of the Rakaia River?

- a. I have never fished the Rakaia River
- b. I only fish the Rakaia River for trout
- c. I have fished for sea-run salmon in the Rakaia River
- d. I fish most seasons for sea-run salmon in the Rakaia River

Question 3

When the sea-run salmon population is within the severe management band (less than 1,200 spawners across Waimakariri, Rakaia and Rangitata Catchments), please rank the following potential management options for Lake Heron in order from your most preferred (1) to your least preferred (6).

- a. Keep regulations the same
- b. Reduce the daily bag limit for lake-type salmon
- c. Reduce season length
- d. Fly fishing only
- e. Temporarily close the lake-type salmon fishery
- f. Temporarily close to all fishing

Question 4

At what point, if at all, would you close the lake-type salmon fishery at Lake Heron in relation to the productivity of the Mellish Stream spawning ground?

- a. Keep Lake Heron regulations the same regardless of spawning production
- b. Close lake-type salmon fishery when spawning is at 100% (45 redds) of optimal production
- c. Close lake-type salmon fishery when spawning reaches 75% (34 redds) of optimal production
- d. Close lake-type salmon fishery when spawning reaches 50% (23 redds) of optimal production
- e. Close lake-type salmon fishery when spawning reaches 25% (12 redds) of optimal production

Question 5

Are there any other factors that Central South Island Fish & Game should consider when thinking about implementing regulations related to the lake-type salmon fishery at Lake Heron?

References

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