

LICENCE HOLDER INSIGHTS

North Canterbury 2005/06 – 2022/23



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North Canterbury Fish & Game Licence Holder Insights

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Defining R3

R3 is a term that refers to the different states of licence holders: Recruitment, Retention, and Reactivation. In this report, we also consider two additional states: In-churn, and lost. The definitions of these states for the purposes of this report are as follows:

RECRUITMENT: A licence holder who has never purchased their licence before purchases it for the first time this year. The recruitment rate is the proportion of this year's licence holders who were recruited to the dataset this year.

RETENTION: A licence holder who purchased their licence last year also purchases their licence this year. The retention rate is the proportion of this year's licence holders who were retained from the previous year.

REACTIVATION: A licence holder who has previously purchased their licence, did not purchase a licence last year, but did purchase a licence this year. The reactivation rate is the proportion of this year's licence holders who were reactivated this year.

IN-CHURN: A licence holder who has previously purchased their licence, did not purchase a licence this year, but does during a future year within the dataset. The churn rate is the number of licence holders in churn relative to the number of active licence holders.

LOST: A licence holder who purchased a licence last year, but did not this year and does not purchase again for the remainder of the dataset. The rate of loss is the number of licence holders lost this year relative to the number of active licence holders.

For the purposes of this regional report, only licences purchased from North Canterbury Fish & Game region are considered when calculating R3. For example, a licence holder who is classified as "recruited" is purchasing their first licence from North Canterbury Fish & Game during the 2005/06 – 2022/23 seasons, but may have purchased from another region previously. Similarly, a licence holder who is classified as "lost" or "in-churn" may still be active in another region.

Methods

This report utilizes licence sales data from the 2005/06 through the 2022/23 fishing and the 2006 through the 2023 game bird seasons. Data was collected at point of sale, either by the sales agent or through an online form. Data was stripped to include only licences that were classified as “active”, or licences which had not been refunded. R3 was tracked using the unique licence holder ID which is assigned at initial purchase. Licences which were not associated with any personal data (i.e., name, date of birth, etc.) were excluded from analyses as that licence could not be associated with a licence holder.

The first 3 years of data were not used when analysing retention, recruitment, reactivation, or churn, as a disproportionate number of licence holders were identified as “recruited” during this time period. Similarly, the final 3 years of data were not used when analysing churn or loss, as a disproportionate number of licence holders were identified as “lost”. These trends occur simply due to proximity to the start and end of the available dataset. Additionally, 2016 was removed from the dataset when analysing R3, as an error which prevented a small proportion of licence holders from being successfully merged in the transition to the new licence sales database system resulted in artificially inflated recruitment and loss, and artificially deflated retention.

Region of residence was determined by matching the address provided by the licence holder to legal addresses as listed in the NZ Addresses shapefile from the LINZ database. Country of residence for non-residents was determined using the country provided by the licence holder during purchase. In some cases, licence holders provided an address in a different country but purchased a resident licence. These licence holders are still included in the non-resident category for the purposes of this document.

Fishing Licences

The Average Licence Holder

Between the 2005/06 and 2022/23 fishing seasons, the average licence holder purchased licences during 2.5 (± 0.010) seasons.

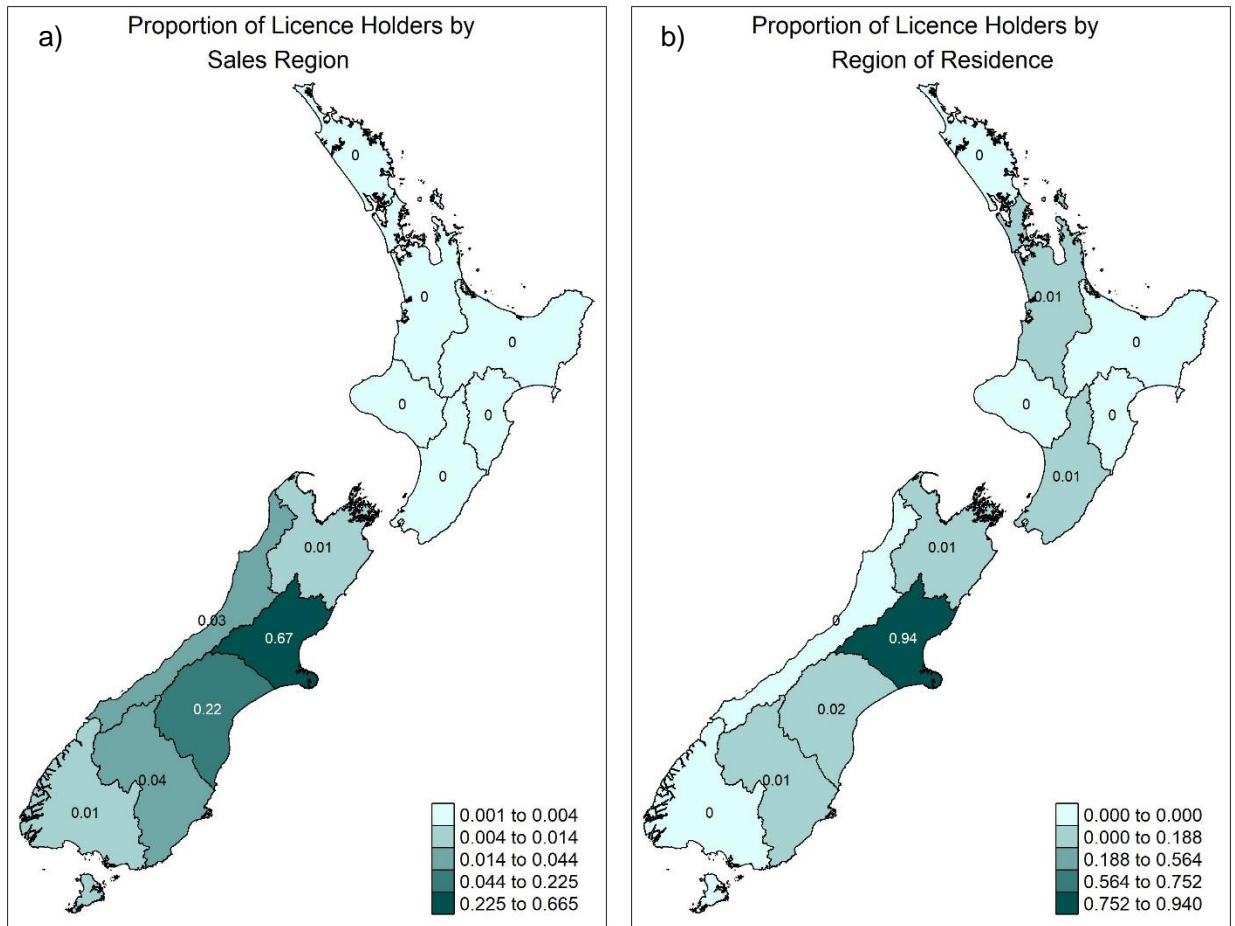


Figure 1. The proportion of North Canterbury Fish & Game fishing licence holders by a) Fish & Game region of licence sale, and b) Fish & Game region of reported residence, between the 2018/19 and 2022/23 fishing seasons. During this time period, 9.8% of licence holders did not provide a valid address.

Over the course of the 2018/19 to 2022/23 fishing seasons, 90.2% of licences sold by North Canterbury Fish & Game were associated with valid addresses. Of those licence holders which provided a valid address who purchased their licence from North Canterbury Fish & Game, an annual average of 93.6% lived within the North Canterbury region, followed by Central South Island (2.1%). Of those licence holders who reported they lived within the North Canterbury region, 66.5% purchased their licence from North Canterbury Fish & Game, followed by Central South Island (22.5%), Otago (4.4%), and West Coast (2.8%). Only 1.1% of licence holders who reported they lived within the North Canterbury region purchased licences from regions on the North Island.

On average, 93.1% ($\pm 0.9\%$) of fishing licence holders self-identified as male while 6.8% ($\pm 0.9\%$) identified as female. There is an increasing trend in the proportion of licence holders that identify as

female of, on average, 0.7% per year ($F_{1, 16} = 256, P < 0.001$). When it came to child's licences, an average of 67.2% ($\pm 0.5\%$) of licence holders identified as male, while 32.7% ($\pm 0.6\%$) identified as female.

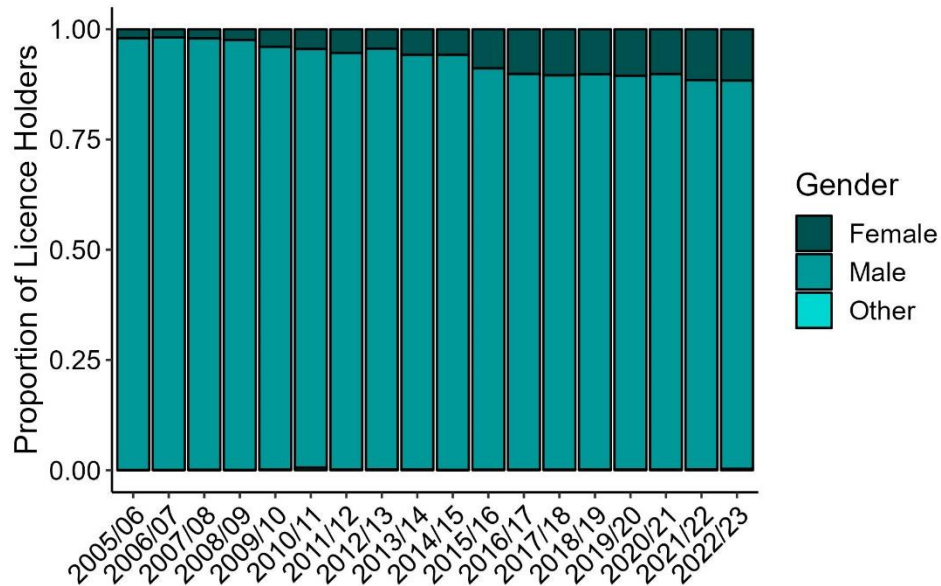


Figure 2. The proportion of licence holders who purchased fishing licences from North Canterbury Fish & Game by gender from the 2005/06 through the 2022/23 fishing seasons.

Table 1. The mean age and standard error of North Canterbury Fish & Game licence holders by licence type.

Licence Type	Mean Age
Child	8.0 \pm 0.02
Day	38.1 \pm 0.08
Winter	40.9 \pm 0.20
Short Break	43.0 \pm 0.24
Whole Season	45.8 \pm 0.05
Long Break	48.7 \pm 0.81
Family	48.9 \pm 0.05
Local Area	50.9 \pm 0.41
Loyal Senior	72.9 \pm 0.06

The mean age of licence holders between the 2005/06 and 2022/23 seasons was 43.6 (± 0.04) years. The mean age has decreased by an average of 0.38 years per year ($F_{1, 264,823} = 2,650, P < 0.001$). On average, female licence holders were 14 years younger than their male counterparts ($F_{2, 264,822} = 5,556, P < 0.001$). Mean age varied by licence type, with the day licence holders younger than whole season licence holders by an average of 6.0 years ($F_{8, 264,816} = 16,239, P < 0.001$).

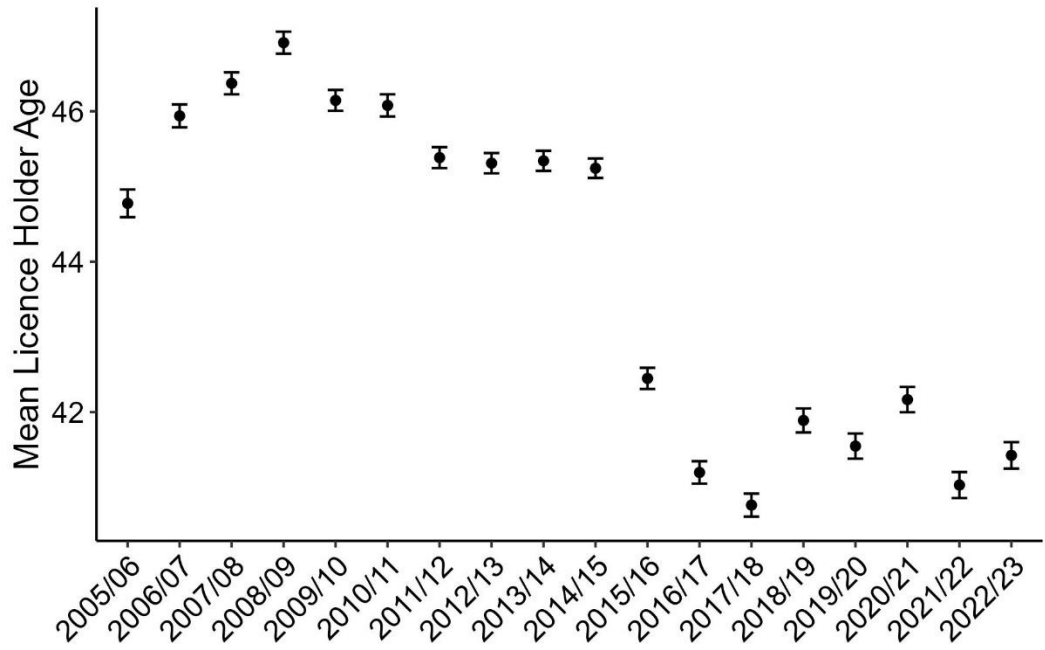


Figure 3. The mean age of licence holders who purchased fishing licences from North Canterbury Fish & Game from the 2005/06 through the 2022/23 fishing seasons, with error bars representing standard error.

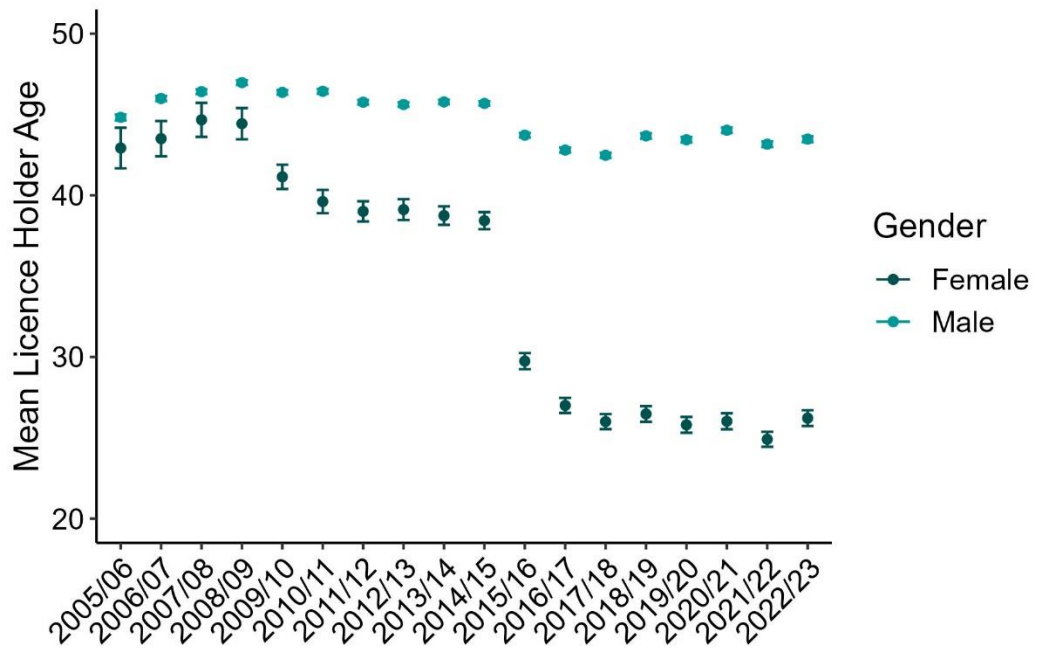


Figure 4. The mean age of licence holders who purchased fishing licences from North Canterbury Fish & Game from the 2005/06 through the 2022/23 fishing seasons by gender, with error bars representing standard error.

Trends in R3

The number of fishing licence holders over time appears to largely fit a quadratic relationship, peaking between the 2015/16 and 2017/18 fishing seasons. Since the 2015/16 season, the number of licence holders has declined somewhat steadily. A Poisson glm on the number of licence holders over time from the 2015/16 – 2018/19 and the 2022/23 season (i.e., excluding years which were significantly impacted by the COVID-19 pandemic) showed a significant negative trend ($F_{1,3}=46.7$, $P = 0.006$).

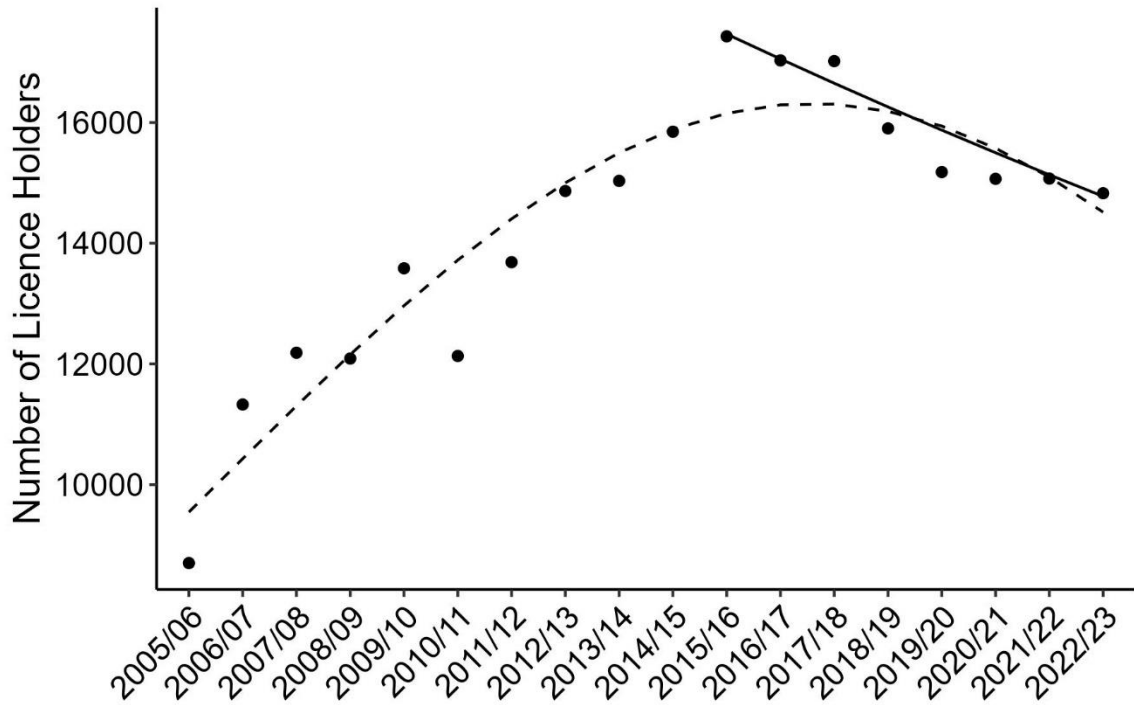


Figure 5. The number of licence holders who purchased fishing licences from North Canterbury Fish & Game from the 2005/06 through the 2022/23 seasons. The dashed line represents a quadratic Poisson regression on the number of licence holders over time, while the solid line represents a simple linear Poisson regression from the 2015/16 through the 2022/23 seasons.

Unlike regions which demonstrate a logistic growth curve, North Canterbury has experienced a steady decline in anglers since the 2015/16 fishing season. The relationship in licence holder count from the 2015/16 – 2018/19 and 2022/23 fishing seasons estimates the number of licence holders for the 2023/24 season as 14,428, a 2.7% decrease from the 2022/23 season, with a prediction interval of 14,070-14,790. The estimated number of licence holders for the 2024/25 season is 14,087, with a prediction interval of 13,715-14,456.

The recruitment rate has declined since the 2008/09 season, by an average of 0.35% per year ($F_{1, 12} = 6.9, P = 0.022$).

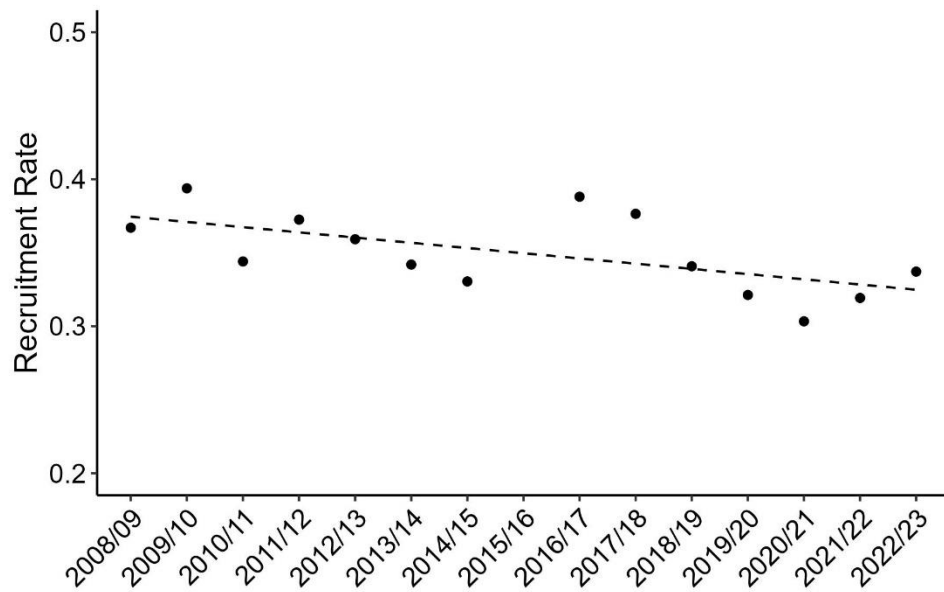


Figure 6. The recruitment rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons. The dashed line represents a simple linear regression on the recruitment rate over time.

There was no evident trend in retention rate over time between the 2008/09 and 2022/23 fishing seasons ($F_{1, 12} = 2.3, P = 0.15$). The average retention rate was 49.0% of licenced anglers, slightly lower than the national average of 50.8%.

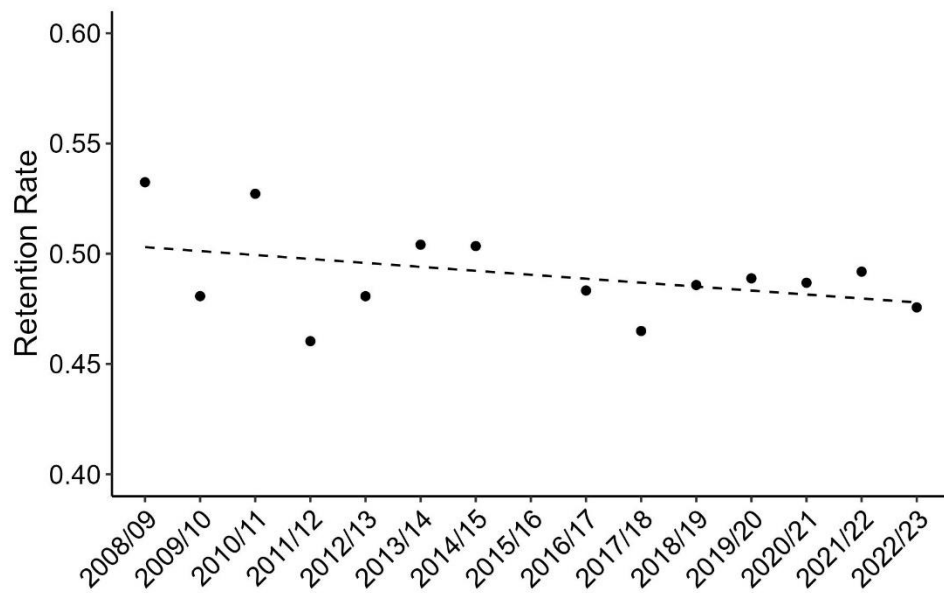


Figure 7. The retention rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons. The dashed line represents a simple linear regression on the retention rate over time.

The reactivation rate has increased since the 2008/09 season, at a rate of 0.5% per year ($F_{1, 12} = 24.2, P < 0.001$).

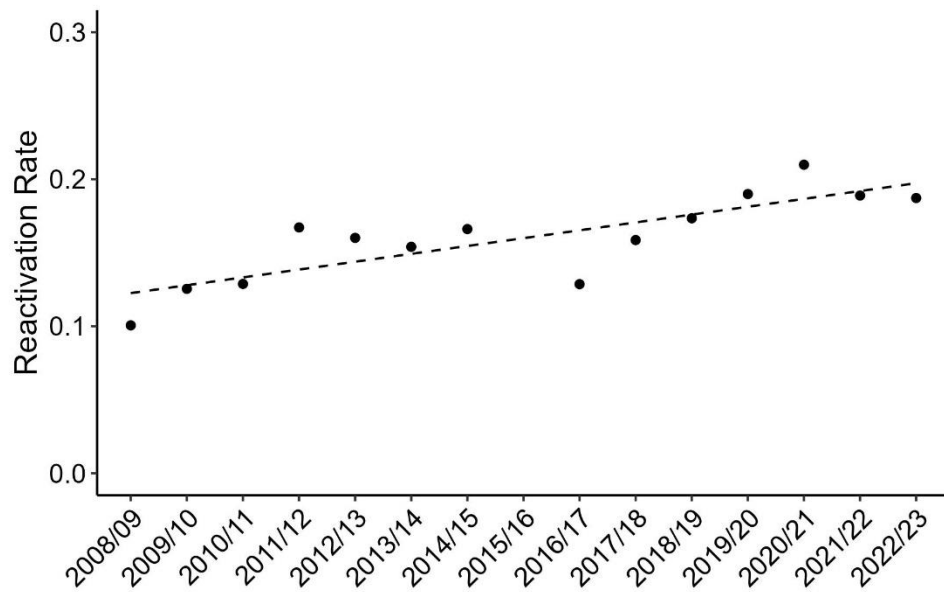


Figure 8. The reactivation rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons. The dashed line represents a simple linear regression on the reactivation rate over time.

The average number of years spent “in-churn” for anglers who purchased in multiple non-consecutive years since the 2008/09 season was 2.7 (± 0.008) years. There was no significant trend in the number of licence holders “in churn” relative to the number of active licence holders ($F_{1, 9} = 0.38, P = 0.55$).

The rate of loss increased by an average of 1.2% annually between the 2006/07-2019/20 seasons ($F_{1, 11} = 28.9, P < 0.001$).

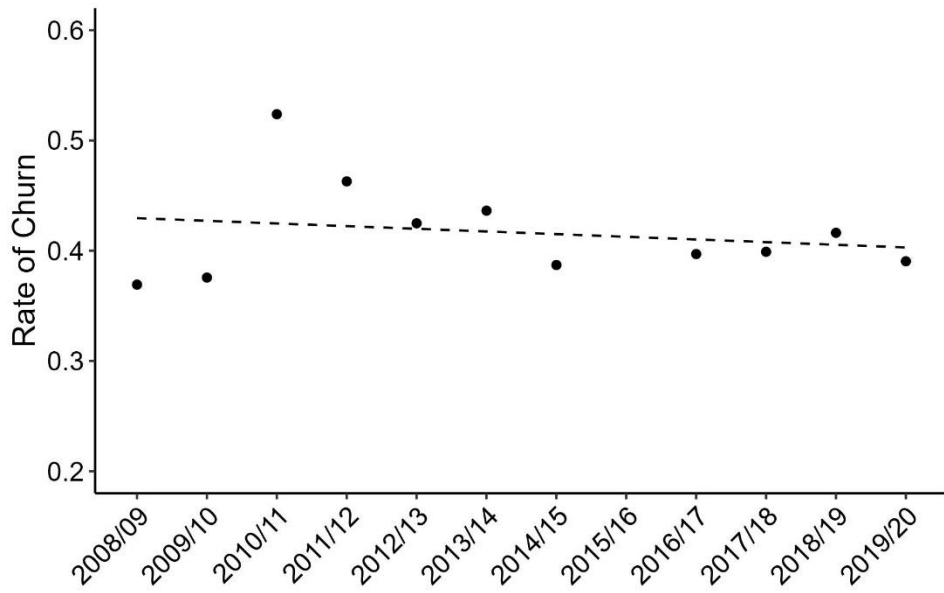


Figure 9. The rate of churn for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2019/20 fishing seasons. The dashed line represents a simple linear regression on the rate of churn over time.

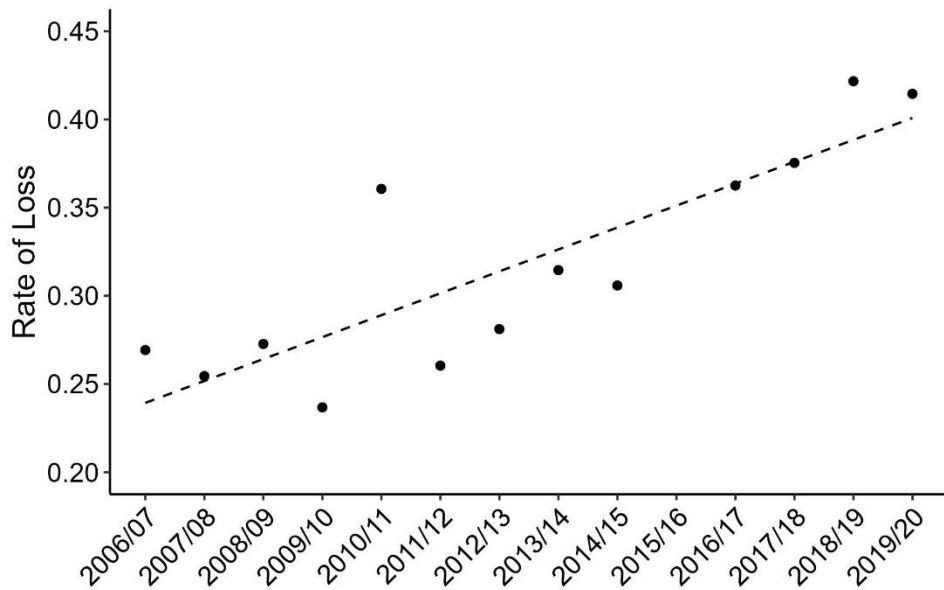


Figure 10. The rate of loss for North Canterbury Fish & Game fishing licence holders from the 2006/07 through the 2019/20 fishing seasons. The dashed line represents a simple linear regression on the rate of loss over time.

Gender

Recruitment was higher for female anglers than male anglers, with an average annual recruitment rate of 50.7% relative to male's 20.8% ($F_{1,24} = 284, P < 0.001$). There was no evidence of any difference in trend between male and female recruitment rates over time ($F_{1,24} = 2.1, P = 0.16$).

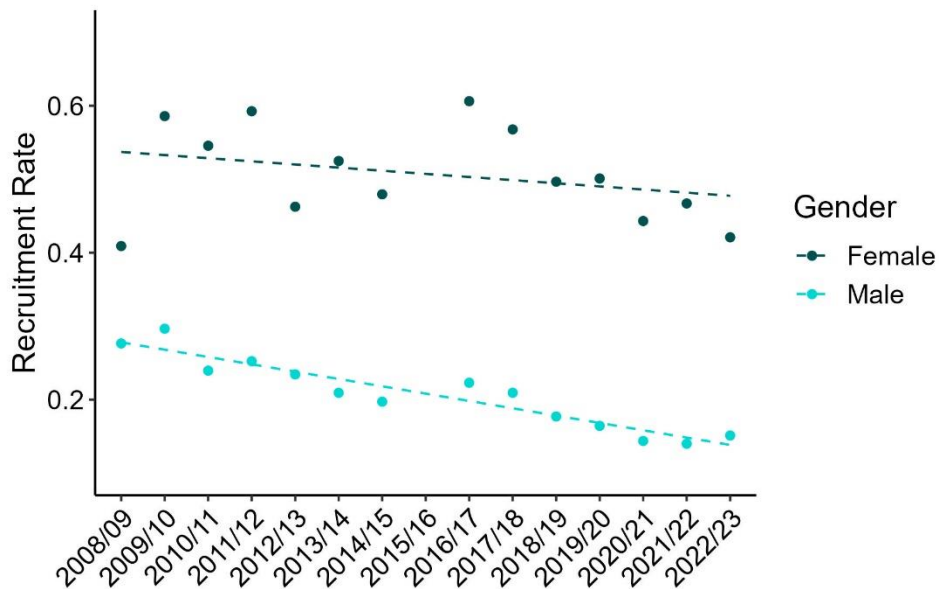


Figure 11. The recruitment rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the recruitment rate over time.

Retention was significantly lower for female anglers than male anglers, with an average annual retention rate of 36.0% relative to male's 62.7% ($F_{1,24} = 343, P < 0.001$). There is evidence of differing trends in retention rates over time between male and female anglers ($F_{1,24} = 6.0, P = 0.022$). While there was no evidence of a trend in retention over time for female anglers ($F_{1,12} = 1.5, P = 0.25$), there was an increasing trend in retention over time for male anglers ($F_{1,12} = 12.8, P = 0.004$).

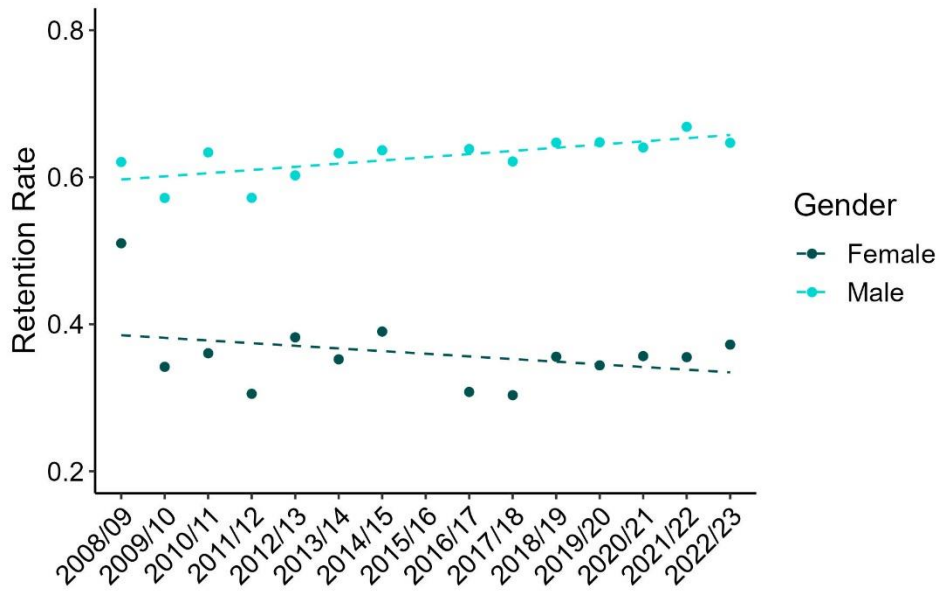


Figure 12. The retention rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the retention rate over time.

Reactivation was higher for male anglers than female anglers, with an average of 16.5% relative to female’s 13.3% ($F_{1,24} = 15.7, P < 0.001$). There was no evidence of any difference in trend between male and female reactivation rates over time ($F_{1,24} = 1.5, P = 0.23$).

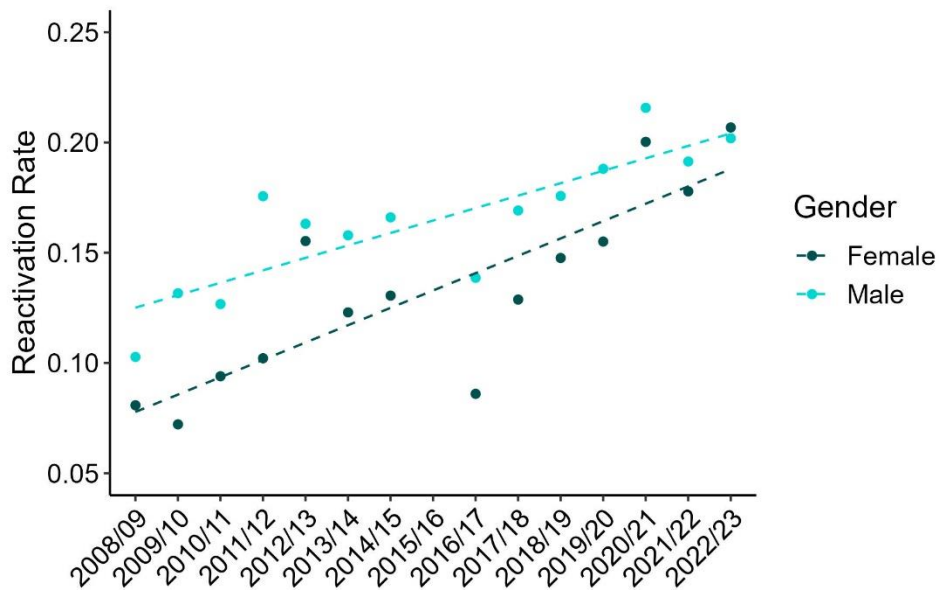


Figure 13. The reactivation rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the reactivation rate over time.

There was no evidence of any difference in churn rate between male and female anglers ($F_{1,18} = 1.5$, $P = 0.23$). Similarly, there was no evidence of any difference in trend between male and female rate of churn over time ($F_{1,18} = 0.88$, $P = 0.36$). On average, male anglers spent slightly longer in-churn than female anglers, at 2.6 (± 0.006) years relative to female's 2.4 (± 0.02) years ($F_{1,117,915} = 108$, $P < 0.001$).

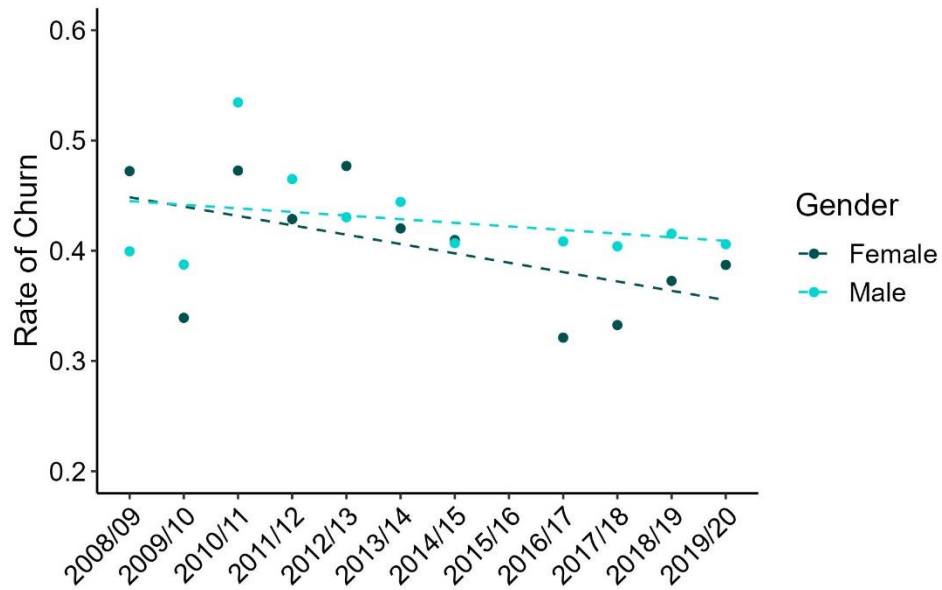


Figure 14. The rate of churn for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2019/20 fishing seasons by gender. The dashed line represents a simple linear regression on the rate of churn over time.

Loss was higher for female anglers than male anglers, with an average rate of loss of 32.3% amongst females relative to male's 18.3% ($F_{1,22} = 38.4, P < 0.001$). On average, the rate of loss for female anglers increased by 3.6% annually ($F_{1,11} = 46.6, P < 0.001$). On average, the rate of loss for male anglers increased by 0.7% annually ($F_{1,11} = 17.7, P = 0.001$).

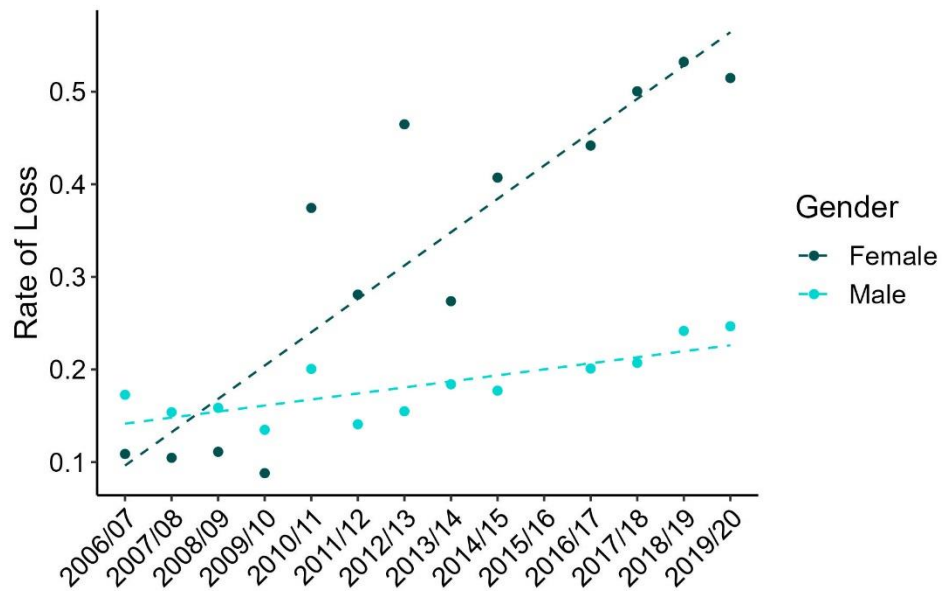


Figure 15. The rate of loss for North Canterbury Fish & Game fishing licence holders from the 2006/07 through the 2022/23 fishing seasons by gender. The dashed line represents a simple linear regression on the rate of loss over time.

Age

Since the 2005/06 fishing season there have been steady increases in the number of licence holders in the 66 to 75 and Over 75 age classes. The Under 18 age class more than tripled between the 2014/15 and 2017/18 fishing seasons, becoming the most abundant age class, and has been roughly stable since. All other age groups saw increasing numbers of licence holders through the 2015/16 season and have since declined. This trend is most pronounced for the 26 to 35 and 46 to 55 age classes.

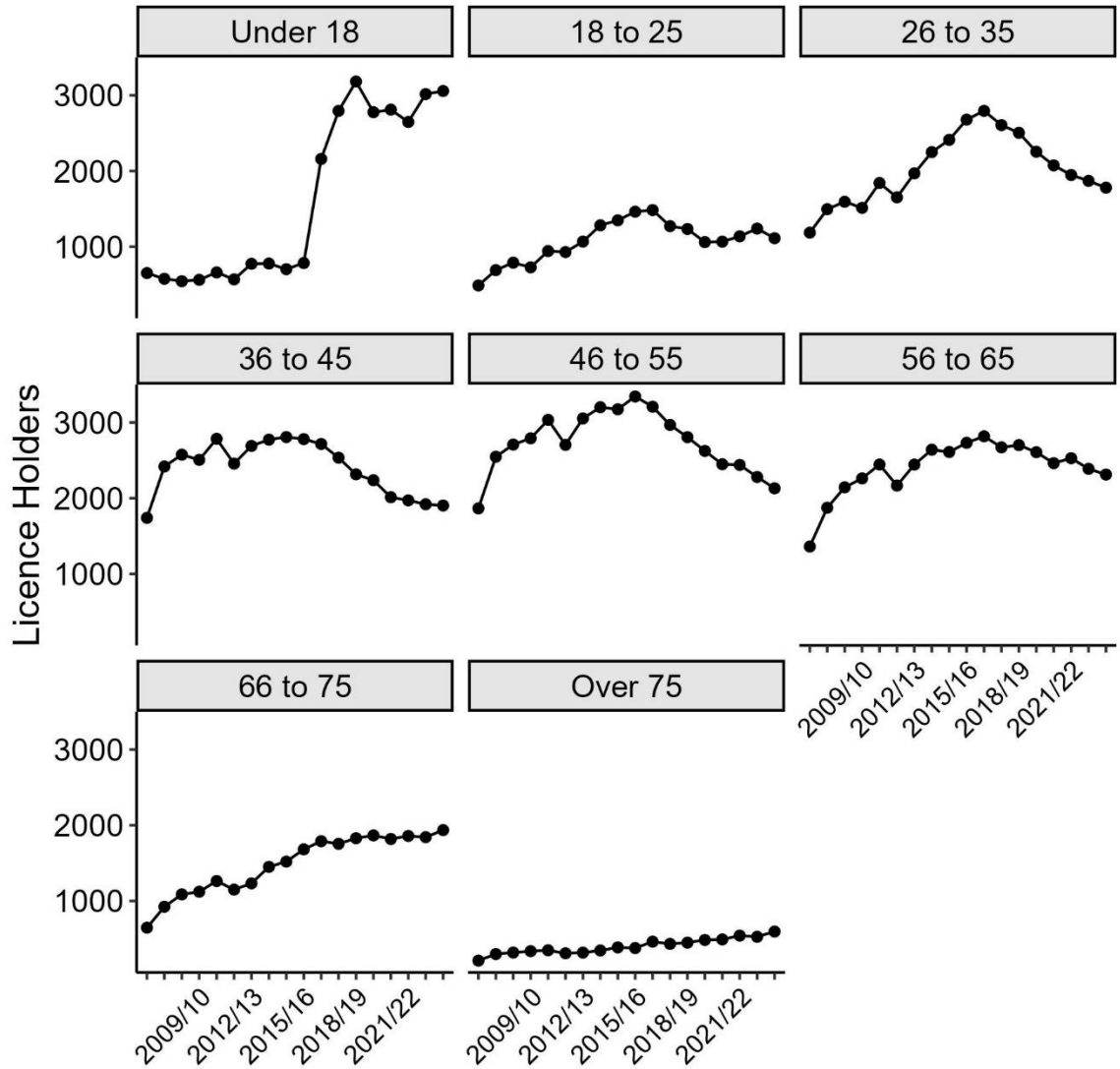


Figure 16. North Canterbury Fish & Game fishing licence holders from the 2005/06 through the 2022/23 fishing seasons by age group.

Both recruitment rates and the change in recruitment over time varied by age class ($F_{7,96} = 490$, $P < 0.001$; $F_{7,96} = 3.7$, $P = 0.001$). On average, recruitment was highest for the younger age classes and was lowest within the older age classes. All age classes exhibited an increase in recruitment over time, but the increase was less pronounced for age classes over 65.

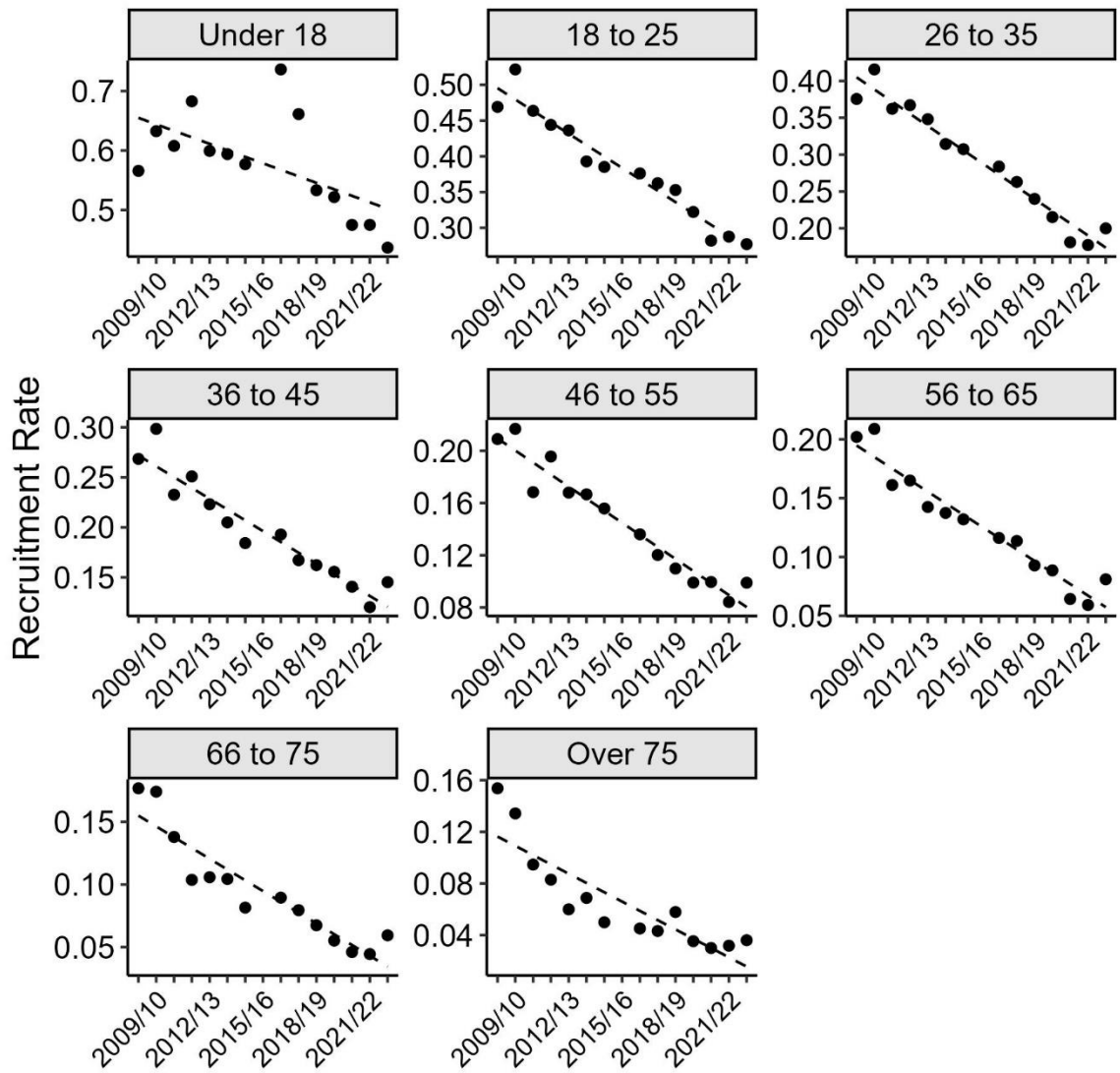


Figure 17. The recruitment rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by age group. The dashed line represents a simple linear regression on the recruitment rate over time.

Retention rates varied by age class ($F_{7, 96} = 565, P < 0.001$) but the change in retention over time did not vary by age class ($F_{7, 96} = 2.0, P = 0.06$). On average, retention was highest within the older age classes and lowest within the younger age classes.

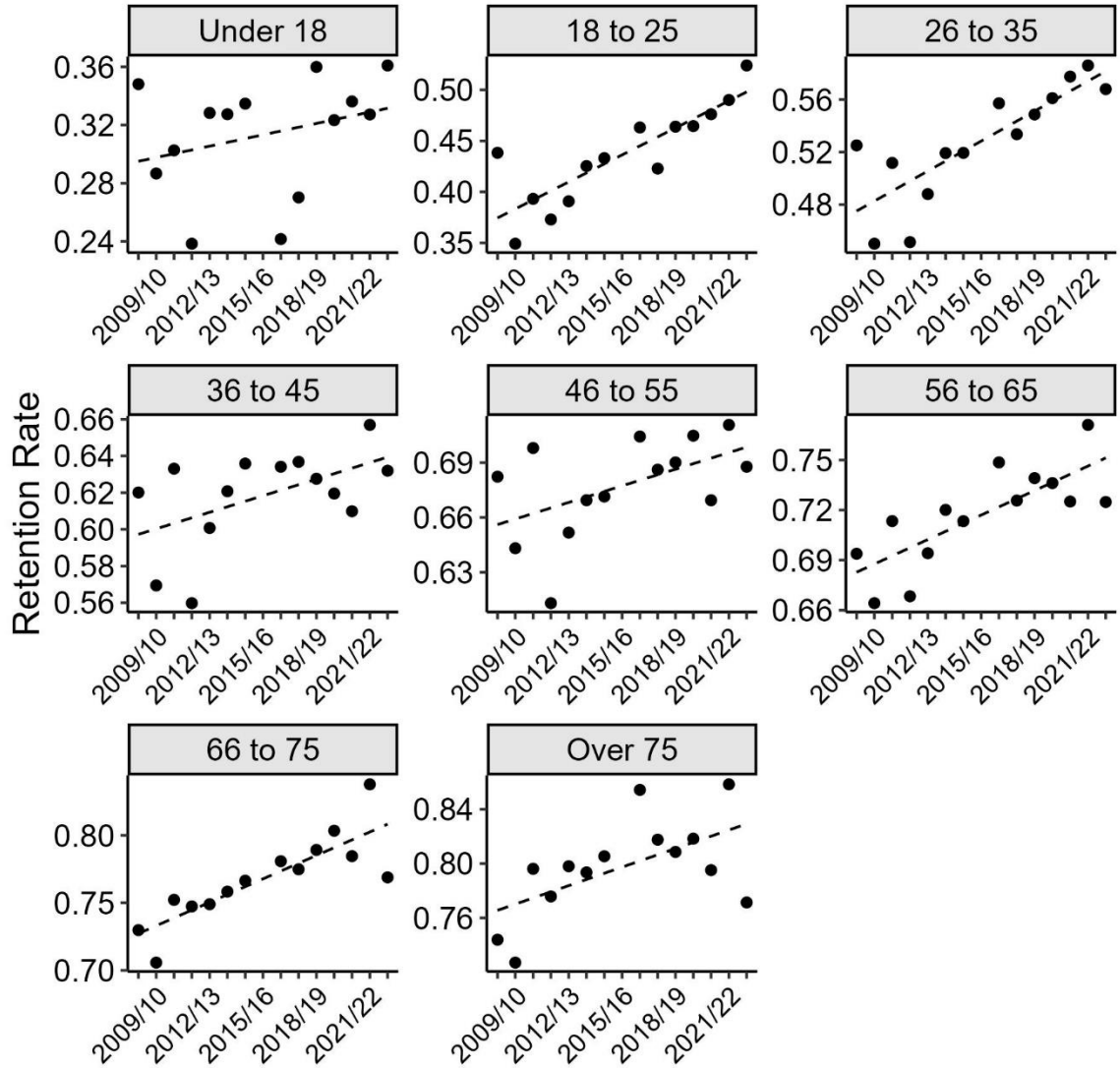


Figure 18. The retention rate for North Canterbury Fish & Game licence holders from the 2008/09 through the 2022/23 fishing seasons by age group. The dashed line represents a simple linear regression on the retention rate over time.

Both reactivation rates and change in reactivation over time varied by age class ($F_{7, 96} = 20.8, P < 0.001$; $F_{7, 96} = 3.0, P = 0.006$). On average, reactivation was lowest within the under 18 age class and age classes over 55. All age classes exhibited an increase in reactivation over time, but the increase was less pronounced for age classes over 65.

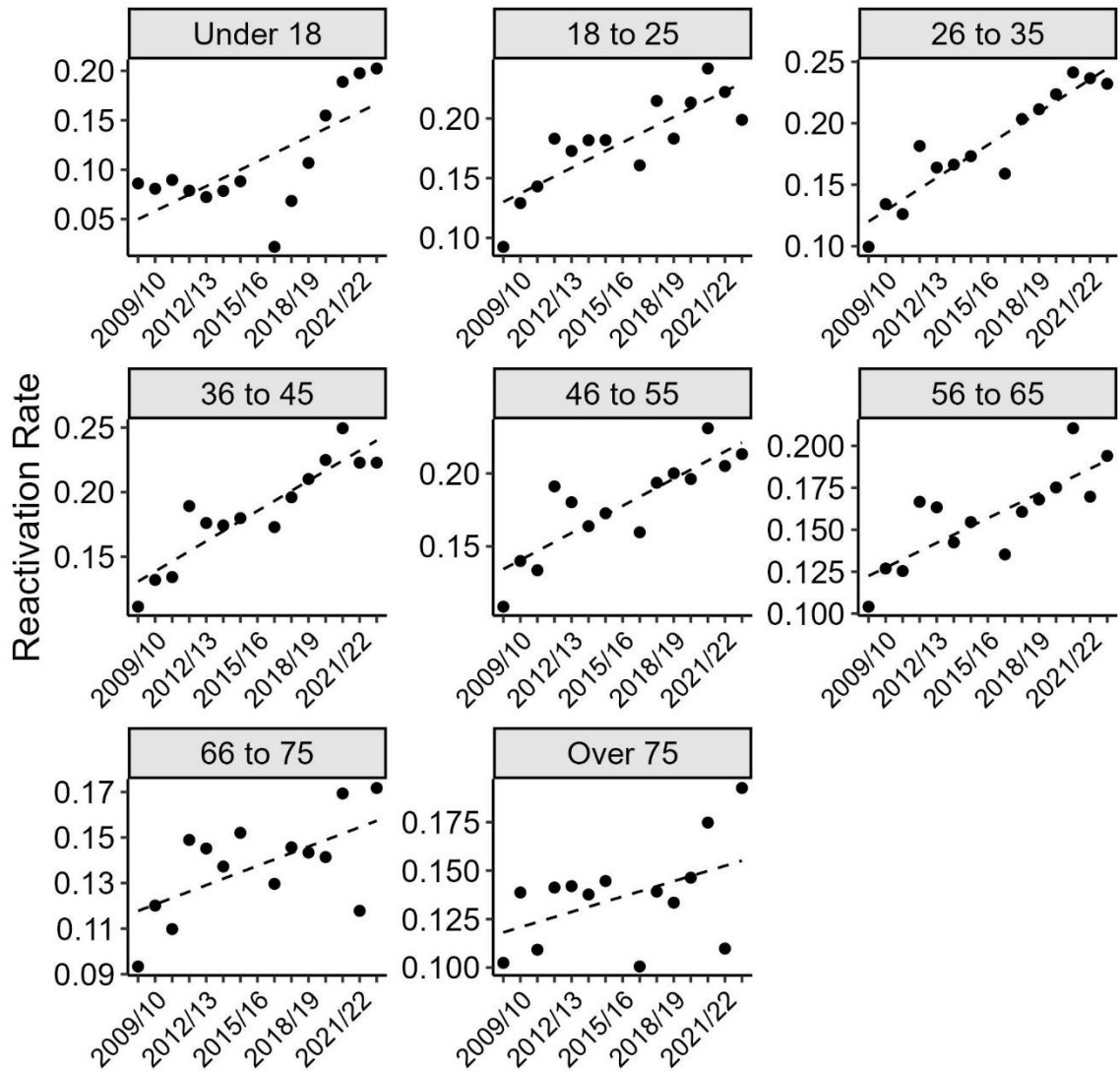


Figure 19. The reactivation rate for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons by age group. The dashed line represents a simple linear regression on the reactivation rate over time.

Both rate of churn and the change in rate of churn over time varied by age class ($F_{7, 72} = 67.3, P < 0.001$; $F_{7, 72} = 2.3, P = 0.038$). On average, rate of churn was highest within the 18 to 25 age class and decreased with age. Age classes up to 35 exhibited declining trends in rate of churn, while the other age classes exhibited no evident trend. Differences in the length of time spent in churn varied between age classes by a small, but statistically significant amount ($F_{7, 121,680} = 251, P < 0.001$).

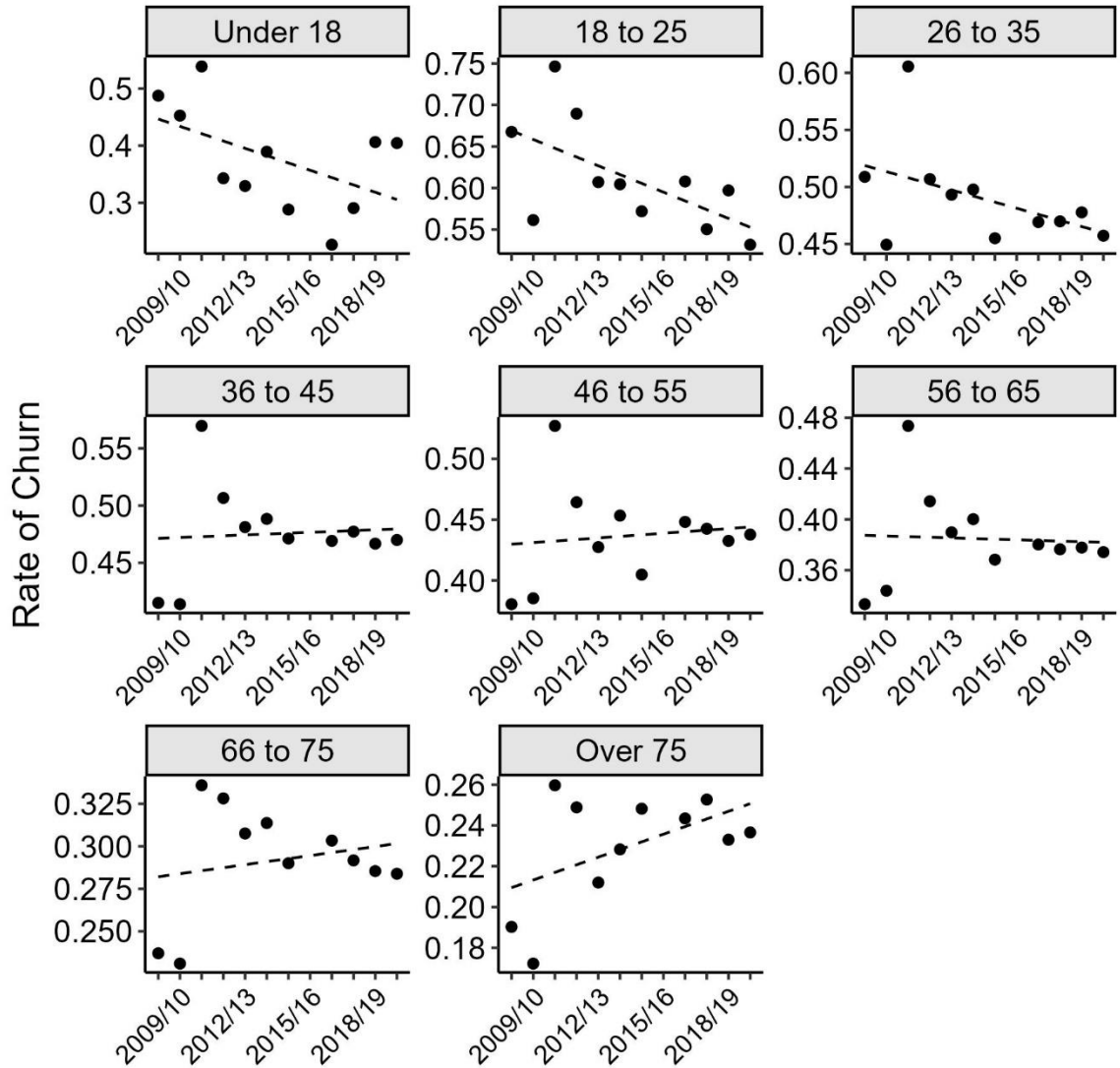


Figure 20. The rate of churn for North Canterbury Fish & Game fishing licence holders from the 2009 through the 2020 fishing seasons by age group. The dashed line represents a simple linear regression on the rate of churn over time.

Table 2. The mean number of years spent in-churn and standard error by age group for North Canterbury Fish & Game fishing licence holders from the 2008/09 through the 2022/23 fishing seasons.

Age Group	Years In-Churn
Under 18	1.8 ± 0.01
18 to 25	2.9 ± 0.02
26 to 35	2.5 ± 0.01
36 to 45	2.6 ± 0.01
46 to 55	2.7 ± 0.01
56 to 65	2.8 ± 0.01
66 to 75	2.7 ± 0.02
Over 75	2.6 ± 0.05

Both rate of loss and the change in rate of loss over time varied by age class ($F_{7, 88} = 61.7$, $P < 0.001$; $F_{7, 88} = 5.4$, $P < 0.001$). On average, rate of loss was highest within the under 18 age class. Age classes 18-65 exhibited increasing trends in rate of loss, while the age classes under 18 and over 65 years old exhibited no evident trend.

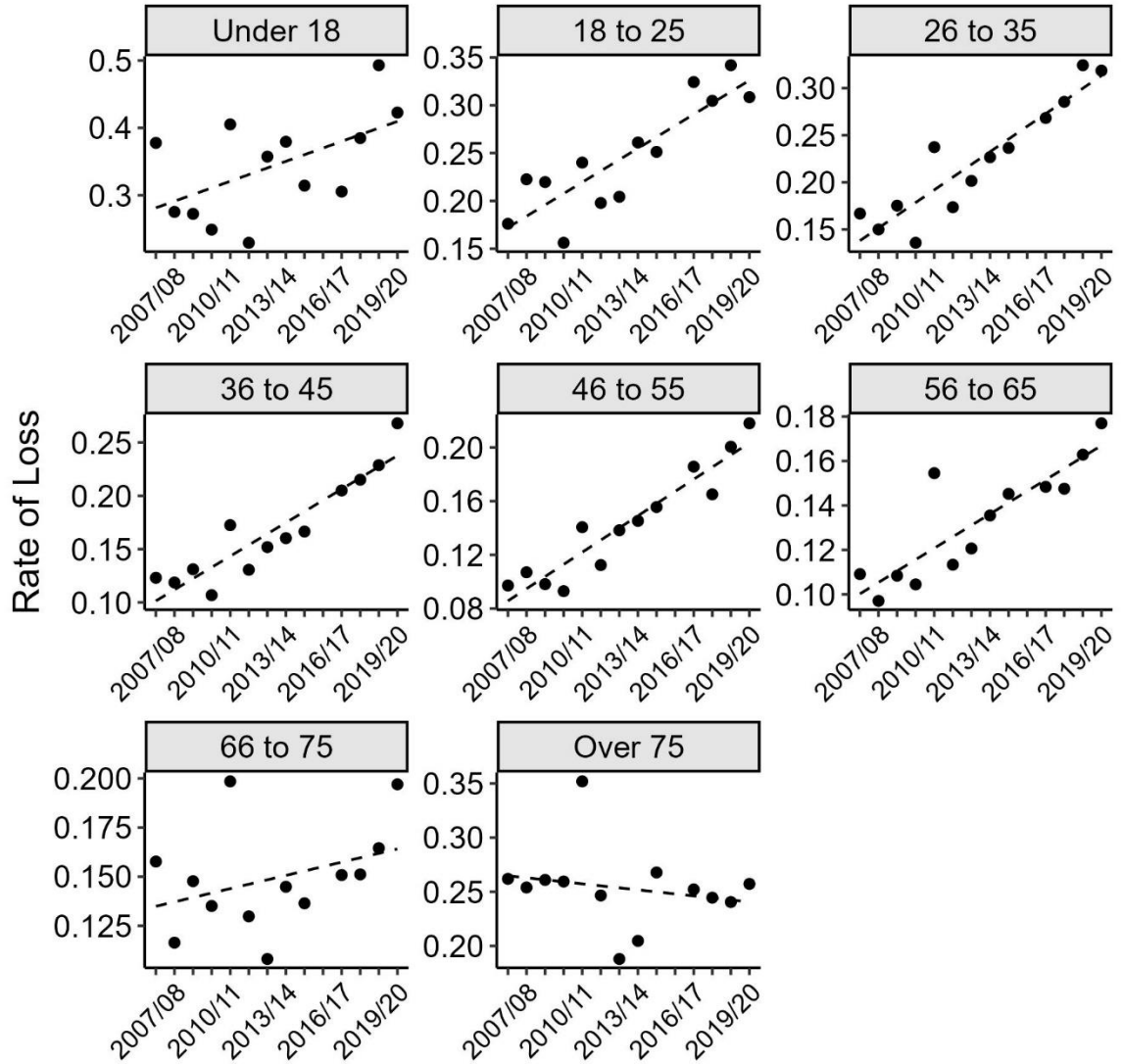


Figure 21. The rate of loss for North Canterbury Fish & Game fishing licence holders from the 2006/07 through the 2019/20 fishing seasons by age group. The dashed line represents a simple linear regression on the rate of loss over time.

Non-Residents

Since the 2005/06 fishing season, non-residents from 79 countries have purchased fishing licences from North Canterbury Fish & Game. On average, 57.4% ($\pm 2.5\%$) of licences purchased by non-residents are day licences. The number of non-resident licence holders varied between 1,478 and 1,787 in the years prior to the COVID 19 pandemic. During the 2022/23 season, 850 non-residents purchased 1,044 fishing licences, equating to a value of \$112,837 NZD.

The majority of non-resident anglers have been from Australia (35.0%) followed by the United States (20.8%) and the UK (9.6%).

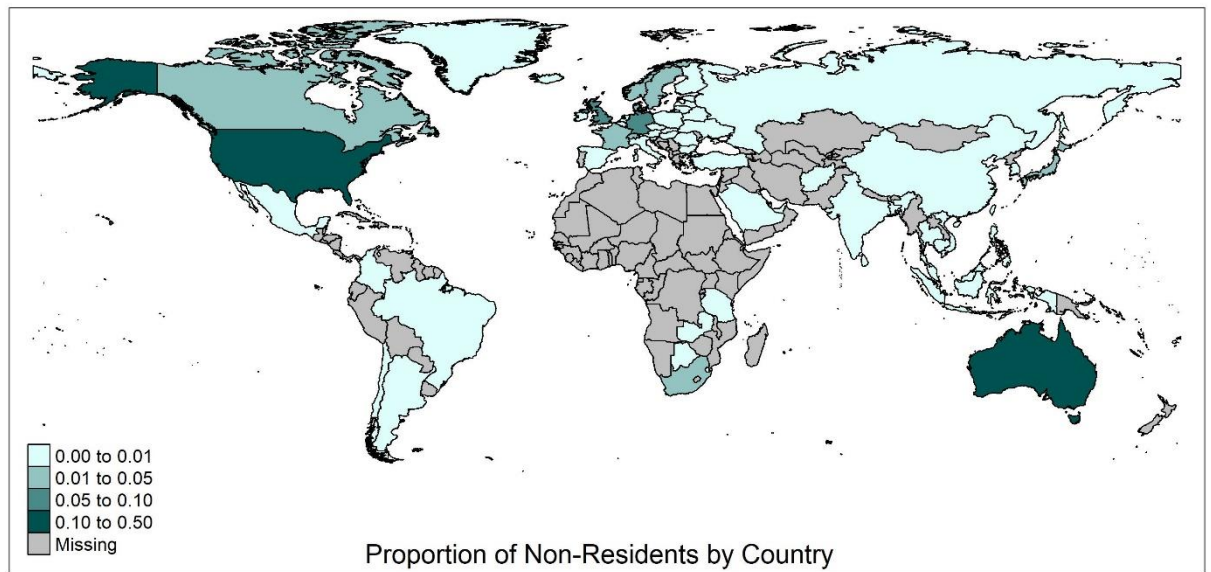


Figure 22. The proportion of North Canterbury Fish & Game non-resident fishing licence holders from the 2005/06 through the 2022/23 fishing seasons by reported country of residence.

Region Switching

The overwhelming majority of region switching for North Canterbury licence holders was switching to purchase in Central South Island. On average, 56.9% of licence holders who switch regions away from North Canterbury each year purchase their next licence in CSI, followed by Otago (14.3%), West Coast (9.7%) and Nelson Marlborough (8.2%).

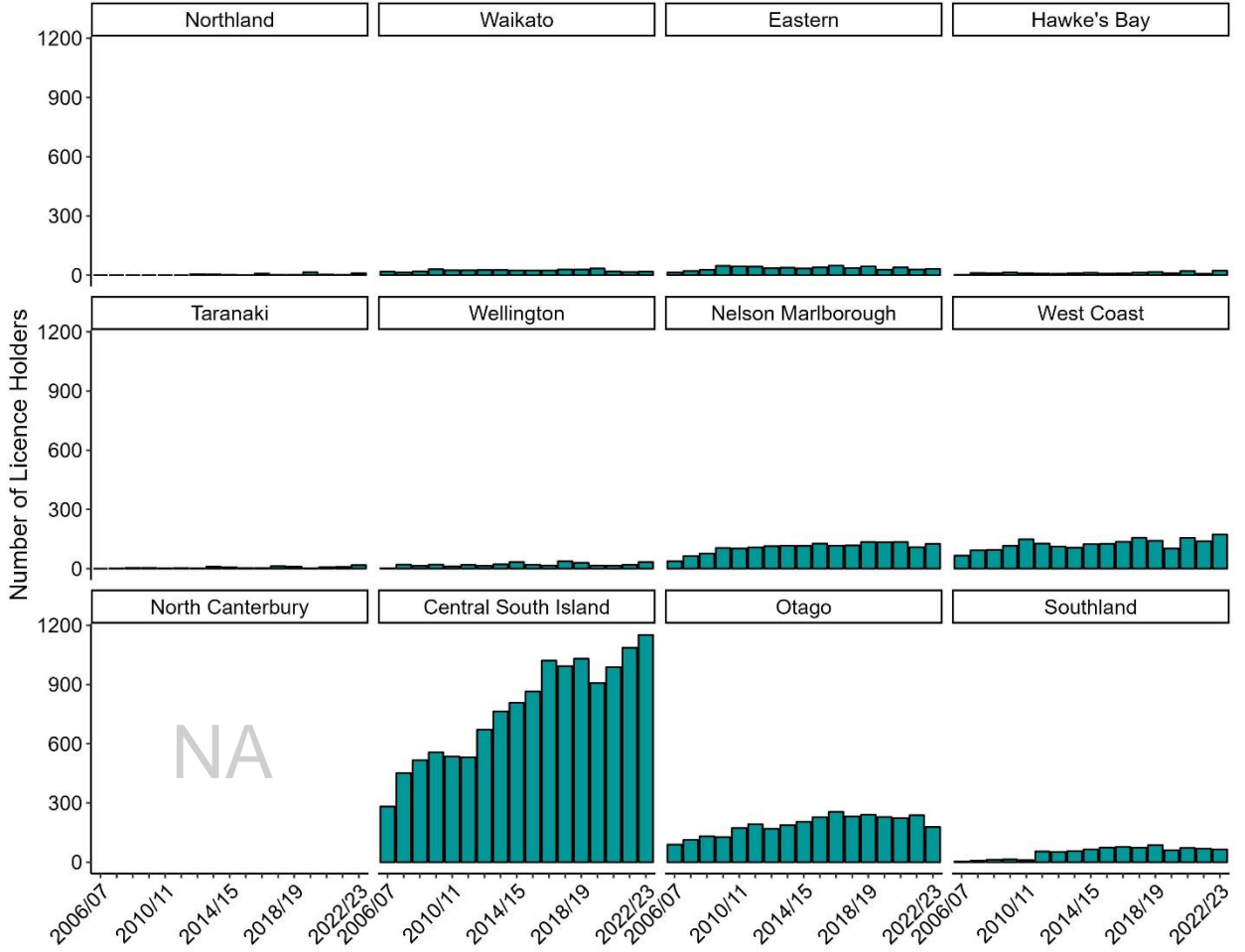


Figure 23. The number of licence holders who had purchased a licence from North Canterbury Fish & Game during the previous fishing season but did not during the current fishing season by the region they did purchase a fishing licence from.